PROJECT MANUAL

FOR THE

DEVELOPMENT AUTHORITY OF WALTON COUNTY
EXISTING BUILDING RENOVATION

136 WEST HIGHLAND AVENUE
MONROE, GA

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OWNER
DEVELOPMENT AUTHORITY OF WALTON COUNTY
132 E. SPRING STREET
MONROE, GA 30655

Prepared by:

PRECISION Planning Inc.
400 Pike Boulevard
Lawrenceville, GA 30046
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JANUARY 2021

DEVELOPMENT AUTHORITY OF WALTON COUNTY
EXISTING BUILDING RENOVATION

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INVITATION TO BID

PROJECT: **Development Authority of Walton County Renovation**
OWNER: **Development Authority of Walton County**
ARCHITECT: **Precision Planning, Inc.**

Separate sealed pre-qualifications and bids will be received by the OWNER for a General Contract to furnish and install all materials, labor and equipment, necessary for the Development Authority of Walton County Renovation located in Monroe, Georgia.

PROJECT SCOPE: The project is located at 136 West Highland Avenue, Monroe, Georgia. The existing building is a shell; all interior walls, electrical systems, mechanical systems and plumbing fixtures have been removed. The renovation includes selective exterior and interior demolition of the existing sidewalks, pavement and exterior walls. New work includes limited wood framing, gypsum board walls and ceilings, painting, plastic laminate cabinets, granite countertops, tile and carpet flooring, electrical, plumbing and mechanical systems. The existing site is unoccupied; however, property boundaries are tight on two adjacent sides.

Access to the **electronic only Bid Documents** shall be obtained from the office of Precision Planning, Inc. upon payment of a non-refundable fee of **$50.00.** A request for access to the electronic bid docs shall be made via email only to **861np@ppi.us** (scan and email a copy of your company check, made payable to Precision Planning, Inc., and access instructions will be available on Tuesday, January 26, 2021). Bidders wanting to submit a bid must purchase access to the bid documents from Precision Planning, Inc. A hard copy of the Bid Documents may be examined at the following locations only:

Precision Planning, Inc.
802 E. Spring Street
Monroe, GA 30655
(770) 267-8800

Development Authority of Walton County
132 E. Spring Street
Monroe, GA 30656
(770) 267-6594 **(by appointment only)**

Bid packages will be received at the Development Authority of Walton County, 132 E. Spring Street, Georgia 30656, no later than 2:00 p.m. on Friday, February 26, 2021. Any packages received after 2:00 p.m. will not be considered by the OWNER. Bid packages will be opened and read aloud. Bids will be evaluated by the OWNER, and the project award is anticipated upon completion of this evaluation.

A mandatory pre-bid conference for interested bidders will be held at 2:00 p.m. on Friday, February 5, 2021, at the project site.

Questions and substitution requests must be submitted in writing via email to Natalie Pifer at **861np@ppi.us** by 2:00 p.m. on Friday, February 12, 2021, to be considered.

OWNER requires a bid bond issued by a Surety listed on the Treasury as licensed in the State of Georgia, or a cashier's check in the amount of five percent (5%) of your total bid to be enclosed with your bid at the time of bid opening to be made payable to the OWNER. No other form of security will be acceptable.

Each bid must be submitted in separate sealed envelopes, addressed to "OWNER". BIDDER shall provide one (1) original and two (2) copies in each envelope. Each bid sealed envelope must be plainly marked on the outside as **"Development Authority of Walton County Renovation".**

Any and all packages received without the aforementioned criteria enclosed will be returned to BIDDER.

All Bid Packages must be made out on the bid form of the type bound in the Contract Documents, in accordance with the instructions in the Information for BIDDERS. No interlineations, additions, or deletions shall be made in the proposal form by BIDDER. No conditional Bids will be acceptable.

Contract will be awarded on a stipulated sum to the most responsive, responsible BIDDER presenting the lowest acceptable Bid, based on the Lump Sum Base Bid plus any combination of Alternates (if appropriate) acceptable to Owner.

OWNER reserves the rights to reject any and all bids, to waive informalities, and to re-advertise.

No BIDDER may withdraw his bid within the time limit specified in Section 00 01 00 Instructions to Bidders.

DEVELOPMENT AUTHORITY OF WALTON COUNTY

SECTION 00 01 00

INSTRUCTIONS TO BIDDERS

AIA Document A701

AIA® Document A701™ – 1997

Instructions to Bidders

for the following PROJECT:
(Name and location or address)
Development Authority of Walton County Renovation
136 W Highland Street, Monroe, GA 30656

THE OWNER:
(Name, legal status and address)
Development Authority of Walton County
132 E Spring Street, Monroe, GA 30656

THE ARCHITECT:
(Name, legal status and address)
Precision Planning, Inc.
400 Pike Blvd., Lawrenceville, GA 30046

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. ~~The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.~~

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

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§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

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§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the

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signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1 a designation of the Work to be performed with the Bidder's own forces;

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

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

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1)

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withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

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SECTION 00 01 01

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

1. PREPARATION OF BID

Documents required in the Bid Package:

A. Section 00 03 00 – Bid Form
B. Section 00 03 10 – Partnership or Section 00 03 20 – Corporate Certificate
C. Section 00 04 10 – Bid Bond (AIA A310)
D. Section 00 04 20 – Contractor's Qualification Statement (AIA A305) as modified
E. Section 00 04 30 – Subcontractor List (AIA G705)
F. Section 00 04 35 – Supplier List
G. Section 00 04 80 – Non-Collusion Affidavit of Prime Contractor
H. Section 00 04 85 – Georgia Security and Immigration Compliance Act

Each Bid must be submitted on the prescribed Bid Form and accompanied by the Bid Bond issued by a Surety listed on the most current Treasury list as licensed in the State of Georgia (or Cashier's Check), and include the Subcontractor List, and Supplier List. All blank spaces for lump sum price and alternate prices (if any) must be filled in, in ink or typewritten, in both words and figures (in case of discrepancy, the amount shown in words will govern and the sum of the unit prices will govern in the case of a discrepancy in the written extended price), and the foregoing items must be fully completed and executed when submitted. Each bid must be submitted in a sealed envelope bearing on the outside the name of the Bidder, his address, and the name of the project for which the Bid is submitted. Prior to bid opening date and hour, errors may be stricken or revisions may be made and corrections entered on the Bid Form, provided that any such strike over or revision is signed in ink by the person signing the bid or his agent. **Any revision made on the outside of the envelope will not be accepted**.

2. SCHEDULE OF CONSTRUCTION

A. Notice of Award is anticipated to be issued after review of bids by the Owner.
B. Notice to Proceed shall be issued upon receipt of Contractor's Performance and Payment Bonds.
C. Contractor must commence work no later than ten (10) days after receipt of a Written Notice to Proceed.

3. MATERIALS TESTING

Materials shall be tested according to the procedures outlined in their respective specification sections or as described on the drawings. All costs for the Testing shall be paid for by the General Contractor.

4. PERMITS AND INSPECTIONS

General Contractor shall be responsible for obtaining all permits, fees and inspections required by state, federal and local laws, ordinances, etc., including but not limited to: Building permit, HVAC permit, electrical permit, plumbing permit, water "tap" fee, sewer "tap" fee, business licenses for Contractor and Sub-contractor. General Contractor shall be responsible for the cost of such permits, fees and inspections, except fees normally charged by the City of Monroe.

5. PERFORMANCE AND PAYMENT BONDS

General Contractor shall provide Performance and Payment Bonds in the total amount payable under the terms of the contract and said bonds shall be increased as the contract amount is increased.

END OF SECTION 00 01 01

SECTION 00 03 00

BID FORM

Proposal for General Contracting for the **Development Authority of Walton County Renovation**

Proposal submitted by: *(hereinafter referred to as "BIDDER")*

_____

(Name of Contractor)

Development Authority of Walton County *(hereinafter referred to as "OWNER"*)
132 W. Spring Street
Monroe, GA 30655

Gentlemen:

The BIDDER by making a bid represents that the following have taken place:

- The BIDDER has read and understands the bidding documents and the bid is made in accordance therewith.

- The BIDDER has read and understands the bidding or contract documents to the extent that such documentation relates to the work for which the bid is submitted and to other portions of the project, if any, being bid concurrently or presently under construction.

- The BIDDER has visited the site, become familiar with conditions if the building and site under which the work is to be performed, and has correlated the BIDDER'S personal observations with the requirements of the proposed contract documents.

- The BID is based upon the materials, equipment, and systems required by the bidding documents without exception.

- The BIDDER has studied and compared the bidding documents with each other and has reported to the architect any errors, inconsistencies, or ambiguities discovered.

- The BIDDER hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of OWNER and to fully complete the project within the Contractor's stipulated calendar days from the date of the written Notice to Proceed.

- The BIDDER acknowledges receipt of the following addenda:

ADDENDUM NO.	DATE RECEIVED

- The BIDDER understands that the OWNER reserves the right to reject any or all bids and to waive any informalities in the bidding.

- The BIDDER agrees that his bid shall be binding and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

- The BIDDER proposes to furnish all services, labor and materials required by them for the entire work within the Lump Sum Base Bid in accord with said documents for the sum of:

LUMP SUM BASE BID

_____

_____ (Dollars)

($_____)

Which sum is hereinafter called the "Base Bid".

CONTRACTOR STIPULATED TIME

_____ (Calendar Days)

ALTERNATES

The undersigned further proposes that should any of the following Alternates (refer to Section 01 23 00) be accepted and incorporated in the Contract, the Base Bid will be altered and the additional cost will be provided below.

Alternate No. 1 – Ceiling Change

Remove existing tray ceilings in Offices (102 and 117) and only have one level of gypsum ceiling without framed soffits or trays (crown molding will remain at the ceiling intersection to the wall).

DEDUCT _____ Dollars

($_____)

UNIT PRICES

Unit Prices are provided in accordance with Unit Prices, Section 01 27 00, of the Specifications. The pricing below fully implements the work described.

SCHEDULE OF UNIT PRICES/ALLOWANCES:

Unit Prices shall be included for the following items and **must** be included in the **BASE BID**.

ITEM	UNIT	COST/UNIT	ALLOWANCE
Unit Price Removal of Deteriorated Roof Decking: Removal and disposal off-site of deteriorated roof decking and replacement with new 5/8" pressure treated plywood. Confirmation must be approved by, monitored, and quantified by the Owner's representative. Note: Contractor shall include this amount in the base bid price **in addition to** what is required to the base scope of work indicated.	300 Square Feet	_____/SF	$_____

These Unit Prices are submitted as part of the Lump Sum Bid: The BIDDER declares that they understand that the Contract Sum may be decreased or increased at the unit prices listed above. The BIDDER declares that they understand that the quantities of work shown are subject to either decrease or increase, and that should the quantities of any of the items of work be increased, the BIDDER proposed to do the additional work at the unit prices listed herein; and should the quantities be decreased, the BIDDER also understands that payment will be made on the basis of actual quantities at the unit price proposal and will make no claim for anticipated profits for any decrease in quantities and that the actual quantities will be determined upon completion of the work; at which time adjustment will be made to the Contract Sum.

Respectfully Submitted:

_____
Contractor Name

_____
Type or Print

By: _____
(Signature)

Title: _____

Business Address: _____

_____

_____

Federal I.D. or Social Security No.: _____

ATTEST:

_____

Name: _____
(Please Type)

NOTE: *Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a Notary.*

END OF SECTION 00 03 00

SECTION 00 03 10

PARTNERSHIP CERTIFICATE

STATE OF _____)
) SS
COUNTY OF _____)

On this _____ day of _____, 20____, before me personally appeared _____ known to me to be the person who executed the above instrument, who, being by first duly sworn, did depose and say that he is a general partner in the firm of _____

_____

and that firm consists of himself and _____

_____

and that he executed the foregoing instrument on behalf of said firm for the uses and purposes stated therein, and that no one except the above named members of the firm have any financial interest whatsoever in said proposed contract.

_____

PARTNER PARTNER

_____

PARTNER PARTNER

Subscribed and sworn to before me, this ____ day of _____, 20____.

_____

NOTARY PUBLIC

My Commission Expires:

_____(Date)

NOTE: *If only one partner signs, a power of attorney executed by all other partners authorizing him to act in the name of the Company must be attached; otherwise, all partners must sign.*

END OF SECTION 00 03 10

SECTION 00 03 20

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the Corporation named as Contractor in the foregoing bid; that _____ _____, who signed said bid in behalf of the Contractor was then _____ of said Corporation; that said authority was duly signed for and in behalf of said corporation by authority of its Board of Directors, and is within the scope of its corporate powers; that said Corporation is organized under the laws of the State of _____.

This _____ day of _____, 20____.

_____

CORPORATE SECRETARY

(SEAL)

END OF SECTION 00 03 20

SECTION 00 04 10

BID BOND

AIA Document A310

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30655

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Development Authority of Walton County Renovation
136 West Highland Avenue
Monroe, GA 30655

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Init.
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Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

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SECTION 00 04 20

CONTRACTOR'S QUALIFICATION STATEMENT

AIA Document A305

AIA® Document A305™ – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

[ ] Corporation
[ ] Partnership
[ ] Individual
[ ] Joint Venture
[ ] Other

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.

NAME OF PROJECT: *(if applicable)* Development Authority of Walton County Renovation

TYPE OF WORK: *(file separate form for each Classification of Work)*

[ ] General Construction
[ ] HVAC
[ ] Electrical
[ ] Plumbing
[ ] Other: *(Specify)*

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation:

§ 1.3.2 State of incorporation:

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§ 1.3.3 President's name:
§ 1.3.4 Vice-president's name(s)

§ 1.3.5 Secretary's name:
§ 1.3.6 Treasurer's name:

§ 1.4 If your organization is a partnership, answer the following:
§ 1.4.1 Date of organization:
§ 1.4.2 Type of partnership (if applicable):
§ 1.4.3 Name(s) of general partner(s)

§ 1.5 If your organization is individually owned, answer the following:
§ 1.5.1 Date of organization:
§ 1.5.2 Name of owner:

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

§ 2 LICENSING

§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or Contractor license numbers, if applicable.

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

§ 3 EXPERIENCE

§ 3.1 List the categories of work that your organization normally performs with its own forces.

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)
§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

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§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

§ 3.4.1 State total worth of work in progress and under contract:

§ 3.5 On a separate sheet, list the major projects of comparable size and complexity that your organization has completed in the past five years, giving the name of project, ~~owner, architect,~~ owner name and contact email address and phone number, architect name and contact email address and phone number, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

§ 3.5.1 State average annual amount of construction work performed during the past five years:

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

§ 4 REFERENCES

§ 4.1 Trade References: Include contact name, email address and phone number

§ 4.2 Bank References: Include contact name, email address and phone number

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

§ 4.3.2 Name and address of agent:

§ 5 FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

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Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

§ 6 SIGNATURE

§ 6.1 Dated at this day of

Name of Organization:

By:

Title:

§ 6.2

M being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this day of

Notary Public:

My Commission Expires:

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SECTION 00 04 30

SUBCONTRACTOR LIST

AIA Document G705

AIA® Document G705™ – 2001

List of Subcontractors

PROJECT: *(Name and address)*
Development Authority of Walton County Renovation
136 West Highland Avenue, Monroe, GA 30655

DATE:

TO ARCHITECT: *(Name and address)*
Precision Planning, Inc.
400 Pike Blvd., Lawrenceville, GA 30046

ARCHITECT'S PROJECT NUMBER:
A20-117

FROM CONTRACTOR: *(Name and address)*

CONTRACTOR'S PROJECT NUMBER:

(List Subcontractors and others proposed to be employed on the above Project as required by the bidding documents.)

Work/Firm Name	Address/Phone	Superintendent

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SECTION 00 04 35

SUPPLIER LIST

List all major suppliers for the Work. Attach additional sheets as necessary.

	Manufacturer and Distributor (Name, Address, Tel. No.)	Product Description
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

SECTION 00 04 80

NON-COLLUSION AFFIDAVIT OF PRIME CONTRACTOR

State of Georgia)
)
County of _____)

_____, being duly sworn, deposes and says that:

(1) He is _____ (Owner, Partner, Officer, Representative, or Agent) of _____, the Bidder that has submitted the attached Bid.

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid.

(3) Such Bid is genuine and is not a collusive or sham Bid.

(4) Neither the said Bidder, nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person, to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against Owner (Local Public Agency) or any person interested in the proposed Contract.

(5) The price or prices quoted in the attached Bid are fair and proper and not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

_____
Print or Type Name

_____
Signature

Title _____

Subscribed and Sworn to before me this _____

day of _____, 20_____.

_____
Notary Signature

My Commission expires _____

(SEAL)

END OF SECTION 00 04 80

SECTION 00 04 85

GEORGIA SECURITY AND IMMIGRATION COMPLAINCE ACT

Contractor shall comply with the provisions of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor's obligations under this section shall include, but not be limited to, the following:

A. Contractor agrees to execute and comply with the Contractor Affidavit and Agreement attached hereto as **Affidavit A** and incorporated herein by reference.

B. Prior to the execution of this Agreement, Contractor must check the appropriate category below identifying the number of people employed by the Contractor. In the event the number of employees employed by the Contractor changes such that it would change the category identified below, Contractor agrees to notify the Owner in writing of such change within ten (10) days.

Number of people employed by the Contractor (check one):

500 or more employees _____

100 or more employees _____

Fewer than 100 employees _____

C. Contractor agrees to insure that all subcontractors performing work under this Agreement will comply with the requirements of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor agrees to require all subcontractors performing work under this Agreement to identify in writing the number of people employed by the subcontractor pursuant to the categories set forth in subsection 8 of this section. Contractor further agrees to maintain records of the Subcontractor Affidavit(s) and to make such Subcontractor Affidavit(s) available for inspection by the Owner at any time. **See attached Affidavit B**.

Affidavit A

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned Contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is contracting with the Development Authority of Walton County, Georgia has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performances of services pursuant to this contract with the Development Authority of Walton County, Georgia, Contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the Development Authority of Walton County, Georgia at the time the subcontractor(s) is retained to perform such services.

_____
Employment Eligibility Verification
User Identification Number

_____ _____
By: Date

Title: _____

Entity:_____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 20____

_____
Notary Public

My Commission Expires:_____

Affidavit B

SUBCONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is engaged in the physical performance of services under a contract with _____ has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____
Employment Eligibility Verification
User Identification Number

_____ _____
By: Authorized Officer or Agent Date

_____
Subcontractor Name

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____DAY OF _____, 20____

_____
Notary Public

My Commission Expires:_____

SECTION 00 05 00

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
WHERE THE BASIS OF PAYMENT IS A STIPULATED SUM

AIA Document A101

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Development Authority of Walton County
132 E. Spring Street
Monroe, GA 30655

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

Development Authority of Walton County Renovation
136 West Highland Avenue
Monroe, GA 30655

The Architect:
(Name, legal status, address and other information)

Precision Planning, Inc.
400 Pike Boulevard
Lawrenceville, GA 30046

The Owner and Contractor agree as follows.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Init.
/

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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

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4 CONTRACT SUM

5 PAYMENTS

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7 TERMINATION OR SUSPENSION

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EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[X] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

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[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

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ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the first day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the last day of the same month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

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§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

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§ 6.2 Binding Dispute Resolution
For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS
§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

Shane Short, Executive Director
Development Authority of Walton County
132 E. Spring Street
Monroe, GA 30656
770-267-6594
shane@choosewalton.com

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

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§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
.3 AIA Document A201™–2017, General Conditions of the Contract for Construction
.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

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[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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SECTION 00 05 30

NOTICE OF AWARD

TO: _____
_____
_____

Project Description

The location of the proposed work is in Monroe, Georgia. The project consists of the following:

BASE BID: (As described in Section 00 00 30 Advertisement for Bids)

Contractor agrees to commence work on or before a date to be specified in a written "Notice to Proceed" from the Owner of the project. Contractor shall fully complete work within _____ consecutive calendar days upon "Notice to Proceed".

Owner has considered the Bid submitted by you for the above-described Work in response to its Advertisement for Bids. You are the apparent successful Bidder and shall be awarded the Contract for the above-described project. You are hereby notified that your Bid has been accepted for the Total Contract Price of $_____
_____
_____,
which is based on the sum of the lump sum Base Bid price given (plus/minus) Alternate(s)s as listed in the Bid Form (Section 00 03 00).

You are required by Section 00 01 00 Instructions to Bidders (A701) to execute the Agreement and furnish three (3) originals of the required Certificates of Insurance, Project Schedule, List of Subcontractors and Non-Collusion Affidavits, within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Acknowledgement within ten (10) calendar days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture as may be granted by law. You are required to return an acknowledged copy of this Notice of Award to Owner.

Dated this _____ day of _____, 20____.

_____
OWNER

BY:_____
Signature

ACKNOWLEDGEMENT OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by _____

_____ (Contractor)

this the _____ day of _____, 20____.

_____

CONTRACTOR

BY:_____

Signature

SECTION 00 05 40

NOTICE TO PROCEED

TO: _____
_____
_____

Project Description

The site of the proposed work is in the **City of Monroe, Georgia.** The project consists of that described in Section 00 00 30 Advertisement for Bids.

You are hereby notified to commence Work in accordance with the Agreement dated _____, 20_____, on or before _____, 20_____, and you are to complete the Work on or before _____, 20_____.

Dated this _____ day of _____, 20____.

_____
OWNER

_____
Print or Type Name

BY:_____
Signature

* * * * * * * * * *

ACKNOWLEDGEMENT OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by _____
_____
this the _____ day of _____, 20_____.

_____
CONTRACTOR

_____
Print or Type Name

BY:_____
Signature

END OF SECTION 00 05 40

SECTION 00 06 10

PERFORMANCE BOND/PAYMENT BOND

PART 1 – GENERAL

1.01 PERFORMANCE BOND

A. The contractor is required to execute a Performance Bond in the amount of 100% of the contract sum.

1.02 LABOR AND MATERIAL PAYMENT BOND

A. The contractor is required to execute a Labor and Material Payment Bond in the amount of 100% of the contract sum.

1.03 SUBMITTALS

A. All bonds included in this section shall be submitted on original AIA Form A312, current edition.

B. Submit each document in duplicate to the Owner along with accompanying Power of Attorney. Each document must contain original signatures.

C. **Submit all documents within ten (10) days of receipt of the fully executed contract agreement.**

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 BOND FORMS

A. Bond forms shall be in the name of the Owner, as follows:

Development Authority of Walton County, Georgia

B. Bond forms must be executed for the Surety company by a person whose name appears on the Power Of Attorney. The Date of the Bond must be the same as the date of the Form of Agreement stipulated in Section 00 05 00.

3.02 SURETY COMPANY

A. The Surety Company must be licensed to do business in the State of Georgia and listed in the Federal Registry, Department of Treasury, Circular 570, current edition. **General Contractor is NOT allowed to write its own bond.**

3.03 CONSENT OF SURETY

A. Written consent of the Surety Company is to accompany any of the following:
   1. Requests for reduction in retainages withheld on the contract.
   2. Execution of Change Order Documents.

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Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30655

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Development Authority of Walton County Renovation
136 West Highland Avenue, Monroe, GA 30655

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Init.
/

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30655

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Development Authority of Walton County
136 West Highland Avenue, Monroe, GA 30655

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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User Notes:

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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SECTION 00 07 00

GENERAL CONDITIONS

AIA Document A201

AIA® Document A201® – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
Development Authority of Walton County Renovation
136 West Highland Avenue, Monroe, GA 30655

THE OWNER:
(Name, legal status and address)
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30655

THE ARCHITECT:
(Name, legal status and address)
Precision Planning, Inc.
400 Pike Boulevard, Lawrenceville, GA 30046

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

Init.
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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall

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continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required

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submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop

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Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals 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 and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of 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 (other than the Work itself), but only to the extent caused by the 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 or not such claim, damage, loss or expense is caused in part by a

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party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed.

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However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

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§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

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§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

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§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon

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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, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the

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Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

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§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract

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Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
.2 failure of the Work to comply with the requirements of the Contract Documents; or
.3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in

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whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party 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 not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, 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 (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional

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insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 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 described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, 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 a 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.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction 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.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be

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sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

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§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

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§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

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§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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SECTION 00 08 00

SUPPLEMENTARY CONDITIONS

PART 1 – GENERAL

1.01 General Conditions

A. The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201, 2017 Edition. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect. The changes and/or modifications found in these Supplementary Conditions shall supersede and prevail over any contrary or conflicting terms found in the General Conditions (AIA Document A201-2017) or any other Contract Document.

ARTICLE 1 GENERAL PROVISIONS

1.1 Basic Definitions

Add the following to Subparagraph 1.1.5:

"Figured dimensions on drawings shall take precedence over measurements by scale, and detailed working drawings and shop drawings are to take precedence over general drawings and shall be considered as explanatory of them and not as indicating extra work."

1.2 Correlation and Intent of the Contract Documents

Add new Subparagraph 1.2.4 as follows:

"1.2.4 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

A. The Agreement.
B. Addenda, with those of later date having precedence over those of earlier date.
C. The Supplementary Conditions.
D. The General Conditions of the Contract for Construction.
E. Drawings and Specifications.

In the case of an 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."

1.4 Interpretation

Add new Subparagraph 1.4.1 as follows:

"1.4.1 Whenever in these Contract Documents the words "as ordered", "as directed", "as required", "as permitted", "as allowed", or words or phrases of like import are used, it shall be understood and agreed that the order, direction, requirement, permission, or allowance of Owner or Architect is intended only to the extent of judging compliance with the terms of these Contract Documents. None of these terms shall imply that Owner or Architect has any authority or responsibility for supervision of Contractor's forces or construction operations, such supervision and the sole responsibility therefore being strictly reserved for Contractor."

Add new Subparagraph 1.4.2 as follows:

"1.4.2 Whenever the term "provided" or "provide" is used in Drawings or Contract Documents, it shall mean "provided complete in place", that is "furnished and installed". Where "as shown", "as indicated", "as detailed", or other words of similar import are used, it is understood and agreed that references to Drawings are intended unless otherwise expressly stated."

1.5 Ownership and Use of Drawings, Specifications and other Instruments of Service

Delete Subparagraph 1.5.1 in its entirety and substitute with the following:

"1.5.1 The Architect and the Architect's consultants shall be deemed the authors of their respective Instruments of Service, including the Drawings and Specifications. The Contractor, Subcontractors, and Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights. Drawings, Specifications, and any and all other Instruments of Service prepared by the Architect shall become and remain the property of the Owner and shall not be used by the Contractor on any other project."

ARTICLE 2 OWNER

2.1 General

Delete Subparagraph 2.1.2 in its entirety.

2.3 Information and Services Required of the Owner

Delete Subparagraph 2.3.6 in its entirety and substitute the following:

"2.3.6 The Contractor will be furnished free of charge two (2) copies of Drawings, Project Manuals, and electronic versions. Additional sets will be furnished at the cost of reproduction, postage and handling."

ARTICLE 3 CONTRACTOR

3.2 Review of Contract Documents and Field Conditions by Contractor

Delete Subparagraph 3.2.2 in its entirety and substitute the following:

"3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. The Contractor shall have the continuing duty to read, carefully study and compare each of the Contract Documents, the Shop Drawings and the Product Data and shall give written notice to the Architect of any inconsistency, ambiguity, error or omission which the Contractor may discover with respect to these documents before proceeding with the affected Work. The issuance, or the express or implied approval by the Owner or the Architect of the Contract Documents, Shop Drawings or Product Data shall not relieve the Contractor of the continuing duties imposed hereby, nor shall any such approval be evidence of the Contractor's compliance with this Contract. The Owner has requested the Architect to only prepare documents for the Project, including the Drawings and Specifications for the Project, which are accurate, adequate, consistent, coordinated and sufficient for construction. HOWEVER, THE OWNER MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO THE CONTRACTOR CONCERNING SUCH DOCUMENTS. By the execution hereof, the Contractor acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be reasonably complete, accurate, adequate, consistent, coordinated and sufficient for construction."

3.7 Permits, Fees, Notices, and Compliance with Laws

Delete the reference to 14 days in Subparagraph 3.7.4 and replace with 3 business days.

3.10 Contractor's Construction and Submittal Schedules

Delete Subparagraphs 3.10.1, 3.10.2, and 3.10.3 and their entireties and substitute the following:

"3.10.1 The Contractor, within fifteen (15) days of commencing the Work, shall submit to the Owner and the Architect for their information, the Contractor's schedule for completing the Work. Additionally, within fifteen (15) days of commencing the Work, the Contractor shall submit to the Owner and the Architect a separate shop drawing and submittal schedule detailing the schedule for the submission to the Architect of all shop drawings, submittals, product date and other similar documents. The schedule shall not exceed time limits under the Contract Documents. Each of the Schedules required herein shall be revised no less frequently than monthly (unless the parties otherwise agree in writing) and shall be revised to reflect conditions encountered from time-to-time and shall be related to the entire Project. Each such revision shall be furnished to the Owner and the Architect. The Contractor shall perform the Work in general accordance with the most recent scheduled submitted to the Owner and Architect. The schedules, and all revisions, shall be in such form, and shall contain such detail, as the Owner or the Architect may require. THE PARTIES SPECIFICALLY AGREE THAT ANY FLOAT CONTAINED IN THE SCHEDULES SHALL BELONG TO THE PROJECT AND IN NO EVENT SHALL THE CONTRACTOR MAKE CLAIM FOR ANY ALLEGED DELAY, ACCELERATION, OR EARLY COMPLETION SO LONG AS THE PROJECT IS COMPLETED WITHIN THE CONTRACT TIME. Strict compliance with the requirements of this Paragraph is a condition precedent for payment to the Contractor, and failure by the Contractor to strictly comply with said requirements shall constitute a material breach of this Contract."

ARTICLE 7 CHANGES IN THE WORK

7.1 General

Add new Subparagraph 7.1.4 as follows:

"7.1.4 Owner may, at any time, without invalidating Contract or any of terms or conditions of the Contract Documents and without notice to the Sureties, make alternations, deviations, additions to, or omissions from the Drawings and other Contract Documents, including an increase or decrease of the quantity of any item or portion of the Work or omit any item or portion of the Work, as may be deemed by Owner to be necessary or advisable and to require such extra work as may be determined by Owner to be required for proper completion of Work as specified herein."

7.2 Change Orders

Revise Subparagraph 7.2.1 by adding after the existing text the following:

"The execution of a Change Order by the Contractor shall constitute conclusive evidence of the Contractor's agreement to the ordered changes in the Work, this Contract as thus amended, the Contract Price and the Contract Time. The Contractor, by executing the Change Order, waives and forever releases any claim against the Owner for additional time or compensation for matters relating to or arising out of or resulting from the Work included within or affected by the executed Change Order."

7.3 Construction Change Directives

Revise Subparagraph 7.3.4 as follows:

In the first sentence, delete the words "an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount." and substitute "an allowance for overhead and profit in accordance with Subparagraph 7.3.11 below."

Revise Subparagraph 7.3.4.5 to read:

".5 Additional costs of supervision and field office personnel directly attributable to the change shall be charged only when the contract time has been modified."

Add new Subparagraph 7.3.11 as follows:

"7.3.11 Fees for overhead and profit shall be limited to 10% for Contractor, subcontractor, or sub-subcontractor performing the work. On work performed by a subcontractor, the Contractor may mark up said work for purposes of administration, overhead and profit by no more than 5%. On work performed by a second tier subcontractor, the subcontractor may mark up said work for the purposes of administration, overhead and profit by no more than 5%; the prime Contractor shall not mark up the work of the second tier subcontractors by more than 2.5%."

ARTICLE 8 TIME

8.2 Progress and Completion

Add new Subparagraph 8.2.4:

"8.2.4 No work past 5:00 p.m. or work on Saturdays, Sundays, and legal holidays requiring the presence of and/or Owner's Representative will be permitted except in case of emergency and then only to such an extent as is absolutely necessary and with the written permission of Architect. Should Contractor desire to perform overtime work on this Contract, such shall be done only after approval of Architect, and all resultant Project Representative costs must be reimbursed to Owner by Contractor at his own cost and expense."

8.3 Delays and Extensions of Time

Add new Subparagraphs 8.3.4, 8.3.5 and 8.3.6:

"8.3.4 Contractor is presumed to have taken all difficulties due to weather conditions into consideration in preparing his proposed Contract Price and in establishing his time for completion of the Work under this Contract. He must be prepared and must take all precautions to protect Work from unfavorable weather and extremes of temperature, whether hot or cold. He shall provide approved facilities for protecting against unfavorable weather at all times, to the entire satisfaction of Architect."

"8.3.5 Completion time will not be extended for normal bad weather. Time for completion as stated in the Contract Documents includes an allowance for calendar days on which work cannot be performed out-of-doors. The term "calendar day" as used in the Contract Documents shall mean Mondays through Fridays, excluding weekends and legal holidays. For the purpose of this Contract, Contractor agrees that he may expect to lose calendar days due to weather in accordance with the following table:

January 14 days	May 6 days	September 2 days
February 14 days	June 3 days	October 3 days
March 10 days	July 4 days	November 5 days
April 7 days	August 2 days	December 9 days

The Contractor agrees that it shall provide written notice to the Owner and the Architect on the day of any adverse weather not anticipated and for which a request for a time extension has been, or will be, made. Said notice shall state with particularity a description of the adverse weather as well as a description of the nature and extent of any delay caused by such weather. Receipt of this notice by the Owner and the Architect is a condition precedent to the submission of any claim for an extension of time. Furthermore, the Contractor shall submit a written claim for extension of time within seven (7) days after the occurrence of the adverse weather and such claim shall be supported by such documentation including, but not limited to, official weather reports, as the Owner or the Architect may require. No extension will be made for days of bad weather occurring after the building is dried in. **Requested working days lost to**

the weather shall be submitted for review with the pay request for that month, any requests later than the billable month will not be considered. To the extent that any of the terms and conditions set forth in this paragraph are in conflict with any of the terms and conditions of this Agreement, the terms and conditions of this paragraph shall govern and control."

"8.3.6 Once the Notice to Proceed is issued and Substantial Completion date is established the architectural construction administration services shall commence. The architect has responsibility to provide basic services until the earlier of the issuance to the Owner of the Final Certificate for Payment of 30 days after the established Substantial Completion date. If the Contractor fails to perform the work as stipulated for contract time in the Owner/Contractor agreement, the Contractor shall be responsible to the Owner for payment for architectural additional services on an hourly rate as described in the Owner/Architect agreement."

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 Contract Sum

Add to the following at the end of the existing text in Subparagraph 9.1.1:

"In connection with any claim by the Contractor against the Owner for completion in excess of the Contract Price, any liability of the Owner shall be strictly limited to direct costs incurred by the Contractor and shall in no event include indirect costs or consequential damages of the Contractor including but not limited to, loss of business opportunity; loss of bonding capacity; loss of use; loss of productivity; home office overhead; or other similar consequential losses or damages. The Owner shall not be liable to the Contractor for claims of third parties, including Subcontractors, unless and until liability of the Contractor has been established therefore in a court of competent jurisdiction."

9.2 Schedule of Values

Delete Subparagraph 9.2 in its entirety and substitute the following:

"9.2 Within ten (10) calendar days of the effective date of this Agreement, the Contractor shall submit to the Owner and to the Architect a Schedule of Values allocating the Contract Sum to the various portions of the Work. The Contractor's Schedule of Values shall be prepared in such form, with such detail, and supported by such data as the Architect or the Owner may require to substantiate its accuracy. The Contractor shall not imbalance its Schedule of Values nor artificially inflate any element thereof. The violation of this provision by the Contractor shall constitute a material breach of this Contract. The Schedule of Values shall be used only as a basis for the Contractor's Applications for Payment and shall only constitute such basis after it has been acknowledged in writing by the Architect and the Owner."

9.3 Applications for Payment

Add the following sentence to Subparagraph 9.3.1:

"The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet."

9.6 Progress Payments

Delete Subparagraph 9.6.1 in its entirety and substitute with the following:

"9.6.1 After the Architect has issues a Certificate of Payment, the Owner shall make payment, unless payment is withheld in accordance with this paragraph, in the manner and within the time period provided in the Contract Documents, and shall so notify the Architect. Notwithstanding anything to the contrary contained herein, the Owner may at its option, withhold making any payment and shall not be obligated to make any payment to the Contractor hereunder if one or more of the following conditions exist:

1. Contractor has failed to perform any of its obligations hereunder or otherwise, or is otherwise in default under any of the Contract Documents;

2. Any part of such payment is attributable to Work which is defective or not performed in accordance with the Contract Documents; provided, however, that such payment, subject to other provisions of these Contract Documents, shall be made as to the part thereof attributable to the Work which is performed in accordance with the Contract Documents and is not defective;

3. Contractor has failed to make payment promptly to the Contractor's Subcontractors or for materials or labor used in the Work; or,

4. If Owner determines in good faith that the portion of the Contract sum then remaining unpaid will not be sufficient to complete the Work in accordance with the Contract Documents whereupon, at the Owner's sole discretion, no additional payments need be made to the Contractor nor, at the Owner's sole discretion, shall such payments be due the Contractor hereunder, unless and until the Contractor at its sole cost, performs a sufficient additional portion of the Work so that thereafter such portion of the Contract Sum then remaining unpaid is in the good faith judgment of the Owner, sufficient to complete the Work in accordance with the Contract Documents."

Add new Subparagraph 9.6.9 as follows:

"9.6.9 In the event the Owner fails to make any payment required hereunder to Contractor in accordance with Article 5 of AIA Document A101 – 2017 said late payment shall bear interest at the rate of eight percent (8%) per annum. Owner and Contractor expressly agree that the above-stated terms shall take precedence over the provisions of the Georgia Prompt Pay Act, O.C.G.A. §13-1-11, et seq., and the parties further agree that said Act shall not be applicable to this Agreement."

9.8 Substantial Completion

Delete Subparagraph 9.8.1 in its entirety and substitute the following:

"9.8.1 Substantial Completion means that stage in the progression of the Work, as approved by the Owner in writing, when the Project is sufficiently complete in accordance with the Contract Documents that the Owner can enjoy beneficial use or occupancy of the entire Project and can utilize it for all of its intended purposes. A condition precedent to Substantial Completion is the receipt by the Owner of all necessary certificates of occupancy or other authorizations for the use and occupancy of the Project required by any governmental or regulatory authority. Owner reserves the right to occupy and use any part, phase or system of the Project when such part, phase or system is substantially completed, but such partial use or occupancy of the Project shall not result in the Project being deemed Substantially Complete, and such partial use or occupancy shall not be evidence of Substantial Completion."

Add new Subparagraph 9.8.6 as follows:

"9.8.6 The Contractor shall pay the Owner the sum of Five Hundred Dollars ($500.00) per day for each and every calendar day of unexcused delay in achieving Substantial Completion of the Project beyond the date set forth in the Contract Documents for Substantial Completion. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the Owner, estimated at the time of executing the Contract. When the Owner reasonably believes that substantial Completion will be unexcusably delayed, the Owner shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving Substantial Completion, or any part thereof, for which the Owner has withheld payment, the Owner shall Promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages."

9.10 Final Completion and Final Payment

Add new Subparagraph 9.10.6 as follows:

“9.10.6 If the Contractor fails to achieve Final Completion of the Project within forty-five (45) days of the date of Substantial Completion, the Contractor shall pay the Owner the sum of One Hundred Dollars ($100.00) per day for each and every calendar day of unexcused delay in achieving Final Completion beyond the date set forth herein for Final Completion of the Work. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing the estimate of delay damages likely to be sustained by the Owner, estimated at or before the time of executing this Contract. When the Owner reasonably believes that Final Completion will be unexcusably delayed, the Owner shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount them believed by the Owner to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving Final Completion, or any part thereof, for which the Owner has withheld payment, the Owner shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages.”

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.2 Safety of Persons and Property

Add new Clause 10.2.4.1 to 10.2.4:

"10.2.4.1 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the Owner reasonable advance notice."

10.3 Hazardous Materials and Substances

Revise Subparagraph 10.3.3 by deleting the words “To the fullest extent permitted by law,” and substituting “To the extent permitted by law, if any,”

ARTICLE 11 INSURANCE AND BONDS

11.1 Contractor's Insurance and Bonds

Revise Subparagraph 11.1.1 by deleting from the second sentence the words "to issue insurance in the jurisdiction where the Project is located" and substituting the words "to issue insurance or licensed to do business in the State of Georgia”.

Add the following Clauses 11.1.1.1, 11.1.1.2, and 11.1.1.3 to 11.1.1:

"11.1.1.1 Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

A. Premises Operations (including X, C and U coverages as applicable).
B. Owner's and Contractors' Protective.
C. Products and Completed Operations.
D. Personal Injury Liability with Employment Exclusion deleted.
E. Contractual, including specified provision for Contractor's obligation under Paragraph 3.18.
F. Owned, non-owned and hired motor vehicles.
G. Broad Form Property Damage including Completed Operations.
H. Blanket Contractual Liability.
I. Fire Legal Liability.”

"11.1.1.2 If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2."

"11.1.1.3 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits, or greater if required by law:

A. Worker's Compensation:

a)	State:	Statutory
b)	Applicable Federal (e.g., Longshoremen's):	Statutory
c)	Employer's Liability:	$100,000 per Accident
		$500,000 Disease, Policy Limit
		$100,000 Disease, Each Employee

B. Comprehensive or Commercial General Liability (including Premises-Operations; Owners' and Contractors' Protective; Products and Completed Operations; Broad Form Property Damage):

a) Bodily Injury:

$500,000	Each Occurrence
$2,000,000	Aggregate

b) Property Damage:

$500,000	Each Occurrence
$2,000,000	Aggregate

c) Products and Completed Operations to be maintained for one (1) year after final payment:

$2,000,000	Aggregate

d) Property Damage Liability Insurance shall provide X, C and U coverage.

e) Broad Form Property Damage Coverage shall include Completed Operations.

C. Contractual Liability:

a) Bodily Injury:

$500,000	Each Occurrence

b) Property Damage:

$500,000	Each Occurrence

D. Personal Injury, with Employment Exclusion deleted:

$1,000,000	Aggregate

E. Business Auto Liability (including owned, non-owned and hired vehicles):

a) Bodily Injury:

$500,000	Each Occurrence

b) Property Damage:

$500,000	Each Occurrence

F. If the General Liability coverages are provided by a Commercial Liability policy, the:

a) General Aggregate shall be not less than $2,000,000 and it shall apply, in total, to this Project only.
b) Fire Damage Limit shall be not less than $300,000 on any one Fire.
c) Medical Expense $10,000 on any one person.

G. Umbrella Excess Liability:
$1,000,000 Each Occurrence"

Delete Subparagraph 11.1.2 in its entirety and substitute the following:

"11.1.2 The Contractor shall furnish separate performance and payment bonds to the Owner. Each bond shall set forth a penal sum in an amount not less than the Contract Price. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the Contractor shall be in form suitable to the Owner and shall be executed by a surety, or sureties, reasonably suitable to the Owner.

11.1.2.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

11.1.2.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney."

Add the following sentence to Subparagraph 11.1.4:

"If this insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a Commercial General Liability policy form, ACORD form 25S will be acceptable."

11.2 Owner's Insurance

Delete Paragraph 11.2 and its parts, paragraphs, subparts and subparagraphs in their entirety (11.2, 11.2.1, 11.2.2, 11.2.3).

Add new Paragraph 11.2 as follows:

"11.2 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

"11.2.1The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract."

11.3 Waivers of Subrogation

Delete Paragraph 11.3 and its parts, paragraphs, subparts and subparagraphs in their entirety (11.3, 11.3.1, and 11.3.2).

Add new Paragraph 11.3 as follows:

"11.3 Property Insurance. The Contractor shall purchase and maintain, in a company lawfully authorized to issue insurance in Georgia, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by

others, comprising the total value for the entire Project at the site on the replacement cost basis without optional deductibles. The insurance shall include interests of the Owner, the Contractor, Subcontractors, and Sub-subcontractors in the Project. Such property insurance shall be maintained until Final Payment under the contract has been made. The form of policy for this coverage shall be Completed Value. If the Owner is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall bear all reasonable costs properly attributable thereto. The Contractor shall provide insurance coverage for portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit."

Add Subparagraph 11.3.1 as follows:

"11.3.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss."

ARTICLE 13 MISCELLANEOUS PROVISIONS

Delete Subparagraph 13.1 in its entirety and substitute the following:

"§13.1 Governing Law
The Contract shall be governed by the laws of the State of Georgia. Additionally, the Owner and Contractor hereby agree that the proper jurisdiction and venue of any disputes arising from this Agreement shall be the Superior Court of Walton County, State of Georgia."

Add the following Paragraph 13.6 to Article 13:

"13.6 Equal Opportunity

13.6.1 The Contractor shall maintain policies of employment as follows:

13.6.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

13.6.1.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin."

Add the following Paragraph 13.7 to Article 13:

"13.7 Georgia Security and Immigration Compliance Act.

13.7.1 Contractor shall comply with the provisions of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor's obligations under this section shall include, but not be limited to, the following:

A. Contractor agrees to execute and comply with the Contractor Affidavit and Agreement attached hereto as Affidavit A and incorporated herein by reference.

B. Prior to the execution of this Agreement, Contractor must check the appropriate category below identifying the number of people employed by the Contractor. In the event the number of employees employed by the Contractor changes such that it would change the category identified below, Contractor agrees to notify the Owner in writing of such change within ten (10) days.

Number of people employed by the Contractor (check one):

500 or more employees	_____
100 or more employees	_____
Fewer than 100 employees	_____

C. Contractor agrees to insure that all subcontractors performing work under this Agreement will comply with the requirements of the Georgia Security and Immigration Compliance Act of 2006 (O.C.G.A. §§ 13-10-90 & 13-10-91) and the Rules of the Georgia Department of Labor implementing the Georgia Security and Immigration Compliance Act of 2006 (Rules 300-10-1-.01 through 300-10-1-.09). Contractor agrees to require all subcontractors performing work under this Agreement to identify in writing the number of people employed by the subcontractor pursuant to the categories set forth in subsection 8 of this section. Contractor further agrees to maintain records of the Subcontractor Affidavit(s) and to make such Subcontractor Affidavit(s) available for inspection by the Owner at any time. See attached Affidavit B."

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

14.4 Termination by the Owner for Convenience

Delete Subparagraph 14.4.3 in its entirety and substitute the following:

"14.4.3 In the case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work completed. In the event the employment of the Contractor is terminated for cause and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a termination for convenience under the terms of this Agreement."

ARTICLE 15 CLAIMS AND DISPUTES

15.1 Claims

Delete Paragraph 15.1 and its parts, paragraphs, subparts and subparagraphs in their entirety (15.1, 15.1.1, 15.1.2, 15.1.3, 15.1.3.1, 15.1.3.2, 15.1.4.1, 15.1.4.2, 15.1.5, 15.1.6.1, 15.1.6.2, and 15.1.7).

15.2 Initial Decision

Delete Paragraph 15.2 and its parts, paragraphs, subparts and subparagraphs in their entirety (15.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5, 15.2.6, 15.2.6.1, 15.2.7 and 15.2.8).

15.3 Mediation

Delete Paragraph 15.3 and its parts, paragraphs, subparts and subparagraphs in their entirety (15.3, 15.3.1, 15.3.2, 15.3.3, and 15.3.4).

15.4 Arbitration

Delete Paragraph 15.4 and its parts, paragraphs, subparts and subparagraphs in their entirety (15.4, 15.4.1, 15.4.1.1, 15.4.2, 15.4.3, 15.4.4, 15.4.4.1, 15.4.4.2, and 15.4.4.3).

Add new Paragraph 15.1 as follows:

"15.1 All Contractor claims shall be initiated by written notice and claim to the Owner and the Architect. Such written notice and claim must be furnished within seven (7) days after occurrence of the event, or the first appearance of the condition, giving rise to the claim. Pending final resolution of any claim of the Contractor, the Contractor shall diligently proceed with performance of this Contract and the Owner shall continue to make payments to the Contractor in accordance with this Contract. The resolution of any claim under this Paragraph shall be reflected by a Change Order executed by the Owner, the Architect and the Contractor."

Add new Paragraph 15.2 as follows:

"15.2 The written notice required hereinabove shall set forth in detail all known facts in support of such Claim and shall cite any applicable provisions of the Contract Documents. Such written notice shall also set forth with specificity all amounts being claimed. Upon discovering an event or condition forming the basis of a Claim for an increase in the Contract Sum or an extension of the Contract Time, the Contractor shall, until the Claim is resolved, commence to maintain separate records evidencing all costs and delays incurred in connection with the event or condition forming the basis of the Claim. The Contractor shall no later than thirty (30) days after the date of submission of the written notice of Claim, shall submit a formal written Claim which shall include at least the following information (1) a concise statement of the occurrence(s) supporting the Claim, dispute or other matter, and the relief sought; (2) identification of the facts giving rise to the Claim, dispute or other matter; (3) the date the Contractor discovered the occurrence(s); (4) a detailed schedule identifying all costs resulting from the Claim, dispute or other matter; (5) documentation supporting the schedule; (6) identification of any impact the Claim, dispute or other matter has on the critical path schedule; and (7) all correspondence, internal memoranda, progress notes, and other documentation relating to the events which form the basis of the Claim, dispute or other matter. The formal Claim shall be verified under oath as to its truthfulness by an officer of the Contractor. The failure to provide a Claim as set forth herein, or the failure to provide such other documents or information requested by the Owner within ten (10) days after written request, shall constitute a waiver of any Claim for additional compensation or time extension related thereto."

Add new Paragraph 15.3 as follows:

"15.3 MEDIATION

15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those, if any, waived herein may be submitted to mediation.

15.3.2 The parties may endeavor to resolve their Claims by mediation. A request for mediation shall be made in writing and delivered to the other party to the Contract. The request may be made concurrently with the filing of legal or equitable proceedings but, in such event, mediation shall proceed in advance of the other proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in Walton County, Georgia, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreement in any court having jurisdiction thereof."

Add new Paragraph 15.4 as follows:

"15.4 In the event any claim is not resolved by agreement between the parties, it is agreed that the dispute shall be subject to litigation in the Superior Court of Walton County and said Court shall have exclusive venue and jurisdiction over the suit and the parties."

Affidavit A

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned Contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is contracting with the Development Authority of Walton County, Georgia has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performances of services pursuant to this contract with the Development Authority of Walton County, Georgia, Contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the Development Authority of Walton County, Georgia at the time the subcontractor(s) is retained to perform such services.

_____
Employment Eligibility Verification
User Identification Number

_____ _____
By: Date

Title: _____

Entity: _____

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 20___.

_____
Notary Public

My Commission Expires: _____

Affidavit B

SUBCONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this Affidavit the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual firm, or corporation which is engaged in the physical performance of services under a contract with _____ has registered with and is participating in a federal work authorization program (any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

_____
Employment Eligibility Verification
User Identification Number

_____ _____
By: Authorized Officer or Agent Date

_____
Subcontractor Name

_____
Title of Authorized Officer or Agent
of Subcontractor

_____
Printed Name of Authorized Officer
or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____DAY OF _____, 20___

_____
Notary Public

My Commission Expires:_____

END OF SECTION 00 08 00

SECTION 00 08 40

ADMINISTRATIVE AND PROCEDURAL ITEMS

PART 1 – GENERAL

1.01 This section of the Contract Documents references the various forms and other documents that will become a part of these Contract Documents during the course of the Work.

PART 2 – MATERIALS

2.01 FORMS AND DOCUMENTS

A. Application for Payment (AIA G702/G703)

B. Change Order (AIA G701)

C. Certificate of Substantial Completion (AIA G704)

D. Contractor's Affidavit of Payments of Debts and Claims (AIA G706)

E. Contractor's Affidavit of Release of Liens (AIA G706A)

F. Consent of Surety to Final Payment (AIA G707)

G. Consent of Surety to Reduction in or Partial Release of Retainage (AIA G707A)

H. Proposal Request (AIA G709)

I. Architect's Supplemental Instructions (AIA G710)

J. Request for Information (PPI standard form)

PART 3 – EXECUTION

3.01 Engineer/Architect shall provide Contractor with sufficient copies of the above listed forms and/or documents where applicable for submittal by Contractor during course of the Work. Examples of the listed forms are included in this Section. Contractor may use these and/or photocopies of same for submittal.

3.02 Engineer/Architect shall use these forms for administrative and procedural duties. Examples of the listed forms are included in this section.

AIA® Document G702® – 1992

Application and Certificate for Payment

TO OWNER:	Development Authority of Walton County 132 E. Spring Street Monroe, GA 30655	**PROJECT:**	Development Authority of Walton County Renovation 136 W. Highland Ave., Monroe, GA	**APPLICATION NO:** 001 **PERIOD TO:**	**Distribution to:** OWNER: ☐
FROM CONTRACTOR:		**VIA ARCHITECT:**	Precision Planning, Inc. 400 Pike Boulevard Lawrenceville, GA 30046	**CONTRACT FOR:** General Construction **CONTRACT DATE:** **PROJECT NOS:** A20-117 / /	ARCHITECT: ☐ CONTRACTOR: ☐ FIELD: ☐ OTHER : ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	$0.00
2. NET CHANGE BY CHANGE ORDERS	$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)	$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	$0.00
5. RETAINAGE:	
a. 0 % of Completed Work (Column D + E on G703)	$0.00
b. 0 % of Stored Material (Column F on G703)	$0.00
Total Retainage (Lines 5a + 5b or Total in Column I of G703)	$0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)	$0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)	$0.00
8. CURRENT PAYMENT DUE	$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$0.00	$0.00
Total approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES by Change Order		$0.00

The undersigned Contractor certifies that to the best of the Contractor's 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 the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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User Notes:

AIA® Document G703® – 1992

Continuation Sheet

AIA Document G702®, Application and Certification for Payment, or G732™, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO: 001
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO: A20-117

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D + E + F)	% (G ÷C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD					
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00%	0.00	0.00
	GRAND TOTAL	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**0.00%**	**$0.00**	**$0.00**

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User Notes:
(3B9ADA58)

AIA® Document G701™ – 2017

Change Order

PROJECT: *(Name and address)*	CONTRACT INFORMATION:	CHANGE ORDER INFORMATION:
Development Authority of Walton County Renovation 136 West Highland Ave, Monroe, GA 30655	Contract For: General Construction Date:	Change Order Number: 001 Date:
OWNER: *(Name and address)*	**ARCHITECT:** *(Name and address)*	**CONTRACTOR:** *(Name and address)*
Development Authority of Walton County 132 E. Spring Street Monroe, GA 30655	Precision Planning, Inc. 400 Pike Boulevard Lawrenceville, GA 30046	

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	CONTRACTOR *(Firm name)*	OWNER *(Firm name)*
Precision Planning, Inc.		Development Authority of Walton County
SIGNATURE	**SIGNATURE**	**SIGNATURE**
Paul D. Hoover, AIA, Project Architect		Shane Short, Executive Director
PRINTED NAME AND TITLE	**PRINTED NAME AND TITLE**	**PRINTED NAME AND TITLE**
DATE	**DATE**	**DATE**

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User Notes: (3B9ADA48)

AIA® Document G704™ – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)* Development Authority of Walton County Renovation 136 W Highland Ave Monroe, GA 30655	**CONTRACT INFORMATION:** Contract For: General Construction Date:	**CERTIFICATE INFORMATION:** Certificate Number: 001 Date:
OWNER: *(name and address)* Development Authority of Walton County 132 E. Spring Street Monroe, GA 30655	**ARCHITECT:** *(name and address)* Precision Planning, Inc. 400 Pike Boulevard Lawrenceville, GA 30046	**CONTRACTOR:** *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.
(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE OF SUBSTANTIAL COMPLETION**

WARRANTIES
The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:
(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED
A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:
(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within ( ) days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: $

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE**
OWNER *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE**

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AIA® Document G706™ – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)* Development Authority of Walton County Renovation 136 West Highland Ave, Monroe, GA 30655	**ARCHITECT'S PROJECT NUMBER:** A20-117 **CONTRACT FOR:** General Construction	OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ SURETY: ☐ OTHER: ☐
TO OWNER: *(Name and address)* Development Authority of Walton County 132 E. Spring Street Monroe, GA 30655	**CONTRACT DATED:**	

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 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. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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AIA® Document G706A™ – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)* Development Authority of Walton County Renovation 136 W Highland Ave, Monroe, GA 30655 **TO OWNER:** *(Name and address)* Development Authority of Walton County 132 E. Spring Street Monroe, GA 30655	**ARCHITECT'S PROJECT NUMBER:** A20-117 **CONTRACT FOR:** General Construction **CONTRACT DATED:**	OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ SURETY: ☐ OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens 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 Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

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

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)* Development Authority of Walton County Renovation 136 W. Highland Ave. Monroe, GA 30656	**ARCHITECT'S PROJECT NUMBER:** A20-117 **CONTRACT FOR:** General Construction	OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ SURETY: ☐
TO OWNER: *(Name and address)* Development Authority of Walton County 132 E. Spring Street Monroe, GA 30656	**CONTRACT DATED:**	OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

, SURETY,

on bond of
(Insert name and address of Contractor)

, 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
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

Attest:
(Seal):

(Printed name and title)

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User Notes: (3B9ADA69)

AIA® Document G707A™ – 1994

Consent of Surety to Reduction in or Partial Release of Retainage

PROJECT: *(Name and address)* Development Authority of Walton County Renovation 136 W. Highland Ave., Monroe, GA 30656	**ARCHITECT'S PROJECT NUMBER:** A20-117 **CONTRACT FOR:** General Construction	OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ SURETY: ☐
TO OWNER: *(Name and address)* Development Authority of Walton County 132 E. Spring Street, Monroe, GA 30656	**CONTRACT DATED:**	OTHER: ☐

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

, SURETY,

on bond of
(Insert name and address of Contractor)

, CONTRACTOR,

hereby approves the reduction in or partial release of retainage to the Contractor as follows:

The Surety agrees that such reduction in or partial release of retainage to the Contractor shall not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

_____
(Surety)

_____
(Signature of authorized representative)

Attest:
(Seal):

_____
(Printed name and title)

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User Notes: (3B9ADA6F)

AIA® Document G709™ – 2018

Proposal Request

PROJECT: *(name and address)*
Development Authority of Walton County Renovation
136 W. Highland Ave., Monroe, GA 30656

CONTRACT INFORMATION:
Contract For: General Construction

Date:

Architect's Project Number: A20-117
Proposal Request Number: 001

Proposal Request Date:

OWNER: *(name and address)*
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30656

ARCHITECT: *(name and address)*
Precision Planning, Inc.
400 Pike Blvd., Lawrenceville, GA 30046

CONTRACTOR: *(name and address)*

The Owner requests an itemized proposal for changes to the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. The Contractor shall submit this proposal within Zero (0) days or notify the Architect in writing of the anticipated date of submission.
(Insert a detailed description of the proposed modifications to the Contract Documents and, if applicable, attach or reference specific exhibits.)

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY THE ARCHITECT:

PRINTED NAME AND TITLE

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User Notes: (3B9ADA5F)

AIA® Document G710™ – 2017

Architect's Supplemental Instructions

PROJECT: *(name and address)*
Development Authority of Walton County
Renovation
136 W. Highland Ave, Monroe, GA 30656

CONTRACT INFORMATION:
Contract For: General Construction

Date:

ASI INFORMATION:
ASI Number: 001

Date:

OWNER: *(name and address)*
Development Authority of Walton County
132 E. Spring Street, Monroe, GA 30656

ARCHITECT: *(name and address)*
Precision Planning, Inc.
400 Pike Blvd., Lawrenceville, GA 30046

CONTRACTOR: *(name and address)*

The Contractor shall carry out the Work in accordance with the following supplemental instructions without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.
(Insert a detailed description of the Architect's supplemental instructions and, if applicable, attach or reference specific exhibits.)

ISSUED BY THE ARCHITECT:

ARCHITECT *(Firm name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

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User Notes: (3B9ADA47)

PRECISION
Planning Inc.

Request for Information

Project: _____ No.: _____ Date: _____
Location: _____

From: _____

Project Manager: _____
Phone No.: _____
Fax No.: _____

To: _____
_____
_____
_____
Attn: _____

Action Requested:
___ Clarification
___ Direction
___ Approval
___ Alternate Proposal
___ Other: _____

Probable Effect:
___ Increase/Decrease Cost
___ Increase/Decrease Time
___ No Change

Response Desired Within _____ Days

Reference: Drawing No.: _____ Detail No.: _____ Spec. Section: _____ Article: _____
Information Needed: _____

_____
_____
_____
_____

Submitted By: _____

_____ Proceed With Recommended Solution _____ Additional Instructions to Follow
Recommendation: _____

_____
_____
_____
_____
_____

g:\standard\arch\rfi response form.docx

_____
By

_____
Date

c:

Attachments

SECTION 01 01 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Project description
   2. Summary by reference
   3. Other contracts

1.03 PROJECT DESCRIPTION

A. Briefly and without force and effect on other requirements of the Contract Documents, the Project of the Contract can be described in summary as follows:

The project is located at 136 West Highland Avenue, Monroe, Georgia. The existing building is vacant and interior has been stripped on interior walls, doors, mechanical, plumbing and electrical systems. The renovation includes new exterior brick and synthetic stucco, new exterior doors/windows, new standing seam metal roof, new gutters and downspouts, new interior wall framing/gypsum board, painting, plastic laminate cabinets, granite countertops, carpet and marble flooring, all new electrical, plumbing and mechanical. The site improvements include new asphalt, concrete pavers, concrete sidewalk, fencing, retaining walls, parking lot striping and signage.

B. Work Included: The intent and meaning of the Contract Documents is that the Contractor, under the General Conditions and other terms of the Contract, shall take all actions necessary and required to provide all labor, plant, materials, supplies, equipment, transportation, facilities, and appurtenances which are indicated or implied by each drawing within the Drawings and each section of the Specifications, all of which are collectively necessary and required for the construction of the described Project.

1.04 SUMMARY BY REFERENCE

A. The Work can be summarized by reference to the requirements of all of the various elements of the Contract Documents, which in turn make references to the requirements of other applicable provisions which control or influence the Work; and these references can be summarized by but are not necessarily limited to the following:

   1. Executed Owner & Contractor Agreement
   2. General Conditions
   3. Drawings as listed on the Index of Drawings located on the first sheet of Drawings prepared by Precision Planning, Inc.
   4. Specifications in Project Manual.
   5. All Addenda to the Contract Documents issued prior to bid.
   6. All Modifications to the Contract Documents made in accordance with the General Conditions and Specifications.

7. Statutory requirements and governing regulations which have a bearing on the performance of the Work.
8. Contractor submittals required by the Contract Documents.

1.05 OTHER CONTRACTS

A. Separate prime contracts are not anticipated on this project, but may be awarded for other work on the Project or the Owner may undertake such work directly. The Contractor should be prepared to coordinate with the Owner if such work does occur. Work expected to run concurrently with the Owner & Contractor Agreement for general construction.

1.06 QUANTITY OF CONTRACT DOCUMENTS

A. Upon or about the time of the Notice to Proceed to the Contractor, the Owner shall provide the Contractor two (2) sets of the Drawings and Technical Specifications as approved for permitting the Work, if requested. Obtaining copies beyond this limit shall be the responsibility of the Contractor, and at their expense.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 01 00

SECTION 01 12 00

CONTRACT RESPONSIBILITIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Owner will furnish equipment, perform work and award other contracts in addition to general construction contract. This Section itemizes known coordination items. Project Coordination Section indicates Contractor's responsibilities under these conditions. The Owner will have items prepared for pick-up or delivered to the site per the Construction Schedule.

B. Exclude from Contract Sum items specifically identified in the following schedule as purchased/provided by Owner or purchased/provided and installed by Owner. Where Contractor has responsibility for installation of an Owner purchased/provided item, include in Contract Sum all costs associated with complete installation of the item and necessary coordination with the Owner.

C. Items provided to Contractor by the Owner are in good repair and working order.
   1. Inspect items at time of delivery; immediately notify Owner of any damage.
   2. Items not identified as "damaged" at the time of delivery or pick-up are the complete responsibility of the Contractor and shall be maintained without damage through Substantial Completion.
   3. Repair or replace immediately items not identified as "damaged" at time of delivery and damaged prior to Date of Substantial Completion.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 SCHEDULES

Construction Item	Contractor Responsibilities	Owner Responsibilities
A. Permits and Fees	Coordination of permit pick-up, maintenance and inspections.	Permit fees waived or paid by the Owner.
B. Utilities	Contractor shall provide all utilities during construction until stipulated time in the Substantial Completion Certificate.	None.

END OF SECTION 01 12 00

SECTION 01 23 00

ALTERNATES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. General provisions of Contract, including General and Supplemental General Conditions and other General Requirement sections, apply to work specified in this section.

1.02 REQUIREMENTS

A. Definitions: Alternates are defined as products, materials, equipment, systems, methods, units of work, or major elements of construction which may, at Owner's option and under terms established by Instruction to Bidders and in the Contract, be selected for work in lieu of requirements of Contract Documents. Selection may occur prior to contract date, or may, by Agreement, be deferred for possible selection at a subsequent date.

B. Alternates may or may not change scope and general character of the Work.

C. Requirements of this section may be related to, but shall not be confused with, requirements of the Contract Documents related to "allowances", "unit prices", "change orders, "substitutions", and similar terms.

D. Refer to Contract and subsequent modifications thereto, if any, for determination of which of several scheduled alternates have been accepted, and therefore are in full force and effect as though included originally in documents for the Base Bid.

E. Notification: Immediately following award of Contract, prepare and distribute to Owner, Architect, Subcontractors and material suppliers, as applicable, a notification of the status of each alternate. Indicate that alternates have been accepted, rejected, or deferred for consideration at a later date. Indicate dates by which Owner must make decisions on deferred alternates in order not to delay project.

1.03 ALTERNATES

A. General: Description herein for each alternate is recognized to be incomplete and abbreviated, but implies that each change must be complete for scope of work affected. Refer to applicable specifications sections and drawings for specific requirement of the Work. Coordinate related work and modify surrounding work as required to properly integrate with the work of each alternate. It is recognized that descriptions of alternates are primarily scope definitions and do not necessarily detail full range of materials and processes needed to the complete the Work as required.

B. Description of Alternates:

Alternate No. 1 – Ceiling Changes:
Remove existing tray ceilings in Offices (102 and 117) and only have one level of gypsum ceiling without framed soffits or trays (crown molding will remain at the ceiling intersection to the wall). Include labor and materials for this deductive change.

END OF SECTION 01 23 00

SECTION 01 25 00

PROCEDURES FOR CONTRACT MODIFICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Change Proposal Request

B. Change Proposal

C. Change Order/Supplemental Agreement

D. Time and Materials Work

E. Architect's Field Directives

1.03 DEFINITIONS

A. Change Proposal Request: Any written request from the Owner or Architect to the Contractor for a quotation, material and labor cost breakdown on a change that is proposed but not yet ordered.

B. Change Proposal: Any written proposal from the Contractor to the Owner or Architect setting forth a change in the Scope of Work and the effect of such change on Contract Time and/or Contract Sum. This document shall identify the scope of work performed by the Contractor and/or subcontractor(s) and be broken down into quantities and cost of material along with the corresponding labor hours and rates.

C. Change Order: A written order to the Contractor, prepared by the Architect and issued by the Owner for directing changes in the Scope of Work of the Contract, adjustments in the Contract Sum or extensions of Contract Time. When executed by all parties, this item, also referred to herein as a Supplemental Agreement to the Contract, is an amendment to the Contract.

D. Modifications: Include Change Orders (Supplemental Agreements to the Contract) prepared by the Architect and signed by the Owner and Contractor; written field directives issued by the Architect to the Contractor, which change the Scope of Work and may affect Contract Sum, but are necessary because of situations described elsewhere in this section; and written orders issued by the Architect for minor changes in the Work with no cost or schedule implications.

E. Time and Material Work: Work which will be paid for on the basis of the actual costs, including materials, labor, equipment and other expenses defined elsewhere herein; and documented by detailed records. This effort is only related to Architect directed Work that is safety related or is determined by the Architect that is time sensitive.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CHANGE PROPOSAL REQUEST

A. The Change Proposal Request is the method by which Owner directed changes in the Scope of work are initiated. These requested changes may originate with the Owner or Architect, may be responses to unexpected site conditions, or may be responses to issues raised by the Contractor through its requests for information or document clarifications.

B. Change Proposal Requests are not directions to change the Work.

C. Unless specified differently on the Change Proposal Request, the Contractor will be expected to respond to all requests within ten (10) calendar days of receipt.

3.02 CHANGE PROPOSAL

A. The Contractor will submit Change Proposals in response to Change Proposal Requests, in response to Architect's field directives as applicable, in accompaniment of substitution requests, and as follow up to previously filed claims for extra cost or time.

B. Every Change Proposal shall include the following information as applicable:
   1. The amount of change in the Contract Sum, if any.
   2. The amount of change in the Contract Time, if any. The change in Contract Time shall be explained relative to the approved Construction Schedule and shall be justified in terms of the critical path of the Work and the requirements of the Contract. Changes in time shall not be allowed for Work that does not affect the critical path of project completion.
   3. Cost breakdowns detailing the applicable work items and inclusive of quantities and unit prices for labor, materials, products, equipment usage, expenses for bonds, insurance and taxes; and overhead and profit. Subcontractor(s) and second tier subcontractor(s) expenses shall be presented at the same level of detail.
   4. The period of time within which the proposed changes in Contract Sum or Time will be valid.
   5. A statement describing the effect the change may have on the work of other prime contractors or the Owner.

C. Fees for administration, overhead and profit shall be limited to 7.5% for the Contractor or subcontractor performing the work. On work performed by a subcontractor, the Contractor may mark up said work for purposes of administration, overhead and profit by no more than 5%. On work performed by a second tier subcontractor the subcontractor markup said work for purposes of administration, overhead and profit by no more than 5%; the prime Contractor shall not mark up the work of second tier subcontractors by more than 2.5%.

D. The Contractor shall not place a reservation on a Change Proposal that holds open the Contractor's right to claim additional costs for indirect or impact damages related to the change such as alleged costs for disruption, interference, delay, acceleration or remobilization.

E. If the Change Proposal is related to a claim for additional cost or time, Contractor shall indicate the origin and date of the initial claim notice and detail the basis of the claim and the associated costs.

3.03 CHANGE ORDER/SUPPLEMENTAL AGREEMENT

A. A Change Order or Supplemental Agreement is the only instrument by which the Contract can be modified to increase or decrease the Contract Sum or Contract Time. For a Change Order to be effective it must be executed by the Owner and Contractor. The cost basis of a Change Order may be a lump sum, unit prices, or time and materials, also referred to as force account. Lump sum changes must be supported by the cost breakdowns required by the Change Proposal.

3.04 TIME AND MATERIALS WORK

A. When no agreement is reached for extra work to be done at lump sum or unit prices, such work may be authorized by the Owner to be done on a Time and Material basis. A Time and Materials estimate that identifies all anticipated costs shall be prepared by the Contractor on forms provided by the Architect. Work shall not begin until the Time and Materials account is approved by the Architect. Payment for Time and Materials work will be in accordance with the following:

1. Labor: For all labor, equipment operators and supervisors, excluding superintendents, in direct charge of the specific operations; the Contractor shall receive the rate of wage agreed to for all hours the designated labor, equipment operators and supervisors are actually engaged in the work. The Contractor shall receive the actual costs paid to the workers inclusive of wages, allowances, health and welfare benefits and pension fund benefits.
2. Bond, Insurance and Tax: For property damage, liability, and worker's compensation insurance premiums, unemployment, insurance contributions, and social security taxes on the Time and Materials work, the Contractor shall receive the actual cost.
3. Materials: For materials and products incorporated in the Work and accepted by the Architect, including Contractor paid freight or shipping expenses; the Contractor shall receive the actual cost.
4. Equipment: For any machinery or special equipment (other than small tools), the use of which is essential to the work and approved by the Architect, the Contractor shall receive fair market rental rates for the actual time that such equipment is in operation on the Work or required to stand by.
5. Overhead and Profit: On the total of all costs described above, the Contractor will be allowed to add 7.5% of that value as compensation for administration, overhead and profit.
6. Miscellaneous: No additional allowance will be made for general requirements costs, superintendence, use of small tools or other costs for which no specific allowance is herein provided.
7. Subcontract Time and Material Work: For work performed by a subcontractor or second-tier subcontractor, all provisions of this section that apply to the Contractor in respect to labor, materials and equipment shall govern. The prime Contractor shall coordinate the work of its subcontractors and will be allowed an amount to cover administrative costs and profit equal to 5% of the subcontractor's amount earned. Mark-up for second-tier subcontractor work will be limited to 2.5% of the amount earned.
8. Compensation: The Contractor shall maintain records on the cost of all work done each day as ordered on a Time and Material basis and shall provide such records to the Architect.
9. Statements: No payment will be made on work performed on a Time and Material basis until the Contractor has furnished the Architect with itemized statements of the cost of such Time and Materials work detailed as follows:
    a. Name, classification, date, daily hours, rate and extension for each laborer, equipment operator and supervisor.
    b. Cost of property damage, liability and worker's compensation insurance premiums, unemployment insurance contributions and social security tax.
    c. Quantity of materials, prices and extensions.
    d. Designation, dates, daily hours, total hours, rental rate and extension for each unit of machinery and equipment.

Statements shall be accompanied and supported by invoices for all materials used, including evidence of transportation charges and taxes. However, if materials used on Time and Materials work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from stock, that quantity claimed was actually used and price claimed represents actual cost to the Contractor.

3.05 ARCHITECT'S FIELD DIRECTIVES

A. The Architect may issue written field directives to the Contractor, which may change the Scope of Work and may affect Contract Sum but are necessary because of any of the following reasons: 1) situations that threaten life and safety, 2) the need to address unknown conditions at the site of the Work, or 3) the need to maintain the timely and orderly sequencing of the Work.

B. The Contractor shall proceed with the work requested in such field directives and if there is a cost associated with such work, Contractor shall submit a Change Proposal as described herein. These costs, when mutually acceptable to the Owner and Contractor, shall be incorporated into the Contract by Change Order.

END OF SECTION 01 25 00

SECTION 01 27 00

UNIT PRICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:
   1. Definition
   2. Administrative and procedural requirements for unit prices.
   3. Schedule of Unit Prices, at the end of this Section.

1.03 DEFINITION

A. A unit price is an amount calculated and proposed by the Contractor in the Bidding Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event certain unexpected work items are encountered or certain estimated quantities of work required by the Contract Documents are increased or decreased.

1.04 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

A. Unit prices as included in the Contract Documents shall include all expenses related to the unit price work items, that is materials, labor, equipment, transportation, general requirements, overhead, profit, taxes and any other costs incidental to the work items.

B. The individual Specification Sections for the construction activities requiring the establishment of unit prices provide for the conditions under which said unit prices will be authorized and the methods of determining payment-quantities. The Contractor will be compensated only for the quantities of unit price work completed.

C. The Schedule of Unit Prices is included with the Bidding Form. Any Specification Sections referenced in that Schedule contain the requirements for materials and/or methods described for each unit price.

D. The Schedule of Unit Prices may be used to determine changes to the Contract Sum. Where quantities of items for which unit prices are provided, they are estimates; and are included in the scope of the Work upon which the Contract Sum is based. The Contractor will be compensated for the actual quantities of unit price items completed at the established unit price rates. These actual extensions of unit prices for work completed, whether requiring a decrease or an increase in the Contract Sum, will be incorporated into the Contract Sum through a modification to the Contract by Change Order. Procedures for such modifications are included in Specification Section 01 25 00.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

SCHEDULE OF UNIT PRICES

Unit Prices shall be included for the following items and **must** be listed on the Bid Form.

Note: Material to be used as direct by the Architect, without restriction at the Unit Prices for replacement of deteriorated material.

SCHEDULE OF UNIT PRICES

ITEM	UNIT
1. REPLACEMENT OF DETERIORATED ROOF DECKING	
a. Removal and disposal off-site of deteriorated roof decking and replacement with new 5/8" (verified at the time of exposure) pressure treated plywood.	300 SF

END OF SECTION 01 27 00

SECTION 01 29 00

PROCEDURES FOR PAYMENT APPLICATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. The Contractor's Application for Payment shall break out the project into component scope for all trades.

B. Section specifies administrative and procedural requirements governing Contractor's Applications for Payment and includes:
   1. Schedule of Values
   2. Applications for payment
   3. Procedures for first payment
   4. Procedures for payment application at Substantial Completion
   5. Procedures for payment application at Final Completion

1.03 DEFINITIONS

A. Schedule of Values: A detailed breakdown of the Contract Sum into individual cost items that will serve as the basis for evaluation of applications for progress payments made during construction.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SCHEDULE OF VALUES

A. Use only the Schedule of Values as the basis for the Contractor's Application for Payment.

B. Correlate the Schedule of Values with other administrative schedules and submittals including:
   1. Contractor Schedule.
   2. List of subcontractors.
   3. Schedule of alternates.
   4. List of principal suppliers and fabricators.
   5. Schedule of submittals.

C. Prepare a Schedule of Values on AIA Document G-703 "Continuation Sheet," and submit it to the Architect for review no later than ten (10) days prior to the submission of the first Contractor's Application for Payment. Submit three (3) copies and identify with the names of the Project, Architect, Owner, and Contractor and the date of submittal.

D. In preparing the Schedule of Values, break down costs into line items for which the Contractor wishes to receive payment in the application for payment. Schedule of Values shall include sufficient detail to allow the Architect to estimate % complete. Coordinate

the line items in the schedule of values with the units or subdivisions of work identified in the Specifications and reference those section numbers from the Specifications. Further divide major work subdivisions and subcontractors into individual cost items. Include in each line item its proportional share of overhead and profit.

E. Costs for General Requirements shall be identified separately and shall be itemized so that costs are identified for the following general items at a minimum:
   1. Performance and Payment Bonds
   2. Field Supervision
   3. Engineering and Layout
   4. Temporary Facilities and Services
   5. Final Cleaning

F. Where applications for payment are likely to include products purchased or fabricated but not yet installed, provide individual line items for material cost, installation cost and other applicable phases of completion. **Shop drawing costs shall be part of the scheduled material cost and will only be paid upon delivery to the job site.** Place cost of production materials delivered and unloaded at Project site with taxes paid under Column F, G-703. List total installed cost, with overhead and profit under Column C, G-703.

G. **For each line item indicate the dollar value to the nearest whole dollar**. Indicate the proportion of the Contract Sum represented by this item to the nearest one-hundredth percent.

H. Unit Price Values: Submit a sub-schedule of unit prices and quantities for items of Work identified in the Bid Form (Section 00 03 00) – Unit Prices. The form of submittal shall parallel that of the Schedule of Values, and the installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values. The standards and procedures for payment of Unit Price Items are described in Specification Section 01 27 00.

I. The Architect will review the Schedule of Values and determine its acceptability. Contractor shall revise and resubmit an acceptable schedule.

J. Submit a revised Schedule of Values when modifications change the Contract Sum or individual line items. Make each modification a new line item and show all information for that line item required for the original submittal.

3.02 APPLICATIONS FOR PAYMENT

Detailed requirements for processing Applications for Payment are outlined below and will be discussed in further detail at the preconstruction conference.

A. Prepare and submit Applications for Payment on Application and Certification for Payment, AIA Document G-702. Include the Schedule of Values modified in format to enable indications of the value of work completed in the application period and for the Contract period. Base the initial application on the accepted Schedule of Values and make all other applications consistent with previous applications as certified and paid.
   1. Submit one initial draft of the pay application to the Owner and Architect electronically before the site visit. The Application for Payment shall coincide with the monthly project meeting for initial review.
   2. Include amounts of Contract modifications fully executed before end of application period. Do not bill for claims or proposals that have not been officially accepted by the Owner.

3. If billing for materials stored on site, attach legible copies of relevant receipts and documentation. Billing for materials stored off-site, shall not be allowed unless approved by the Owner.
4. The Contractor shall prepare and submit an Interim Release of Lien with each Application for Payment.

B. Provide the following information with every application for payment which involves work completed on a time and material basis:
1. Detailed records of work done, including:
   a. Dates and times work was performed, and by whom.
   b. Time records and wage rates paid.
   c. Invoices and receipts for products.
2. Provide similar detailed records for subcontracts.

C. No later than five (5) days prior to the date of the Application for Payment, submit a draft of the application for review by the Architect. Coordinate this submission and subsequent review with Architect's monthly inspection of the Work in place to determine the acceptability of the proposed application. Make any changes if requested by Architect in his review and resubmit the Application for Payment, to the Architect signed, notarized and with a transmittal form itemizing attached documentation.

3.03 PROCEDURES FOR FIRST APPLICATION FOR PAYMENT

A. The first Application for Payment will not be reviewed until the following submittals from the Contractor have been received and accepted by the Architect or Owner as applicable.
1. Schedule of values
2. Contractor's construction schedule
3. Submittal schedule
4. List of subcontractors and principal suppliers and fabricators
5. Inclement weather delay day request with NOAA or Weather.com historic rain event records

4.04 PROCEDURES FOR PAYMENT APPLICATION AT SUBSTANTIAL COMPLETION

A. Administrative actions and submittals that shall precede or coincide with the Application for Payment include:
1. Occupancy permits and similar approvals.
2. Issuance and execution of Certificate of Substantial Completion inclusive of list of incomplete Work recognized as exceptions to the Certificates.
3. Evidence that operations and maintenance training has been provided to Owner.
4. Final report on testing, adjusting and balancing HVAC system.
5. All submittals specified in the Contract Documents to be completed before Substantial Completion.

4.05 PROCEDURES FOR PAYMENT APPLICATION AT FINAL COMPLETION

A. Administrative actions and submittals that shall precede or coincide with this Application for Payment include:
1. Completion of Closeout Procedures in Section 01 77 00.

END OF SECTION 01 29 00

SECTION 01 31 00

PROJECT COORDINATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This section specifies administrative and supervisory requirements necessary for coordination of the Work for the duration of construction, but not necessarily limited to:
   1. Coordination
   2. Administrative and supervisory personnel
   3. General installation provisions
   4. Cleaning and protection

1.03 COORDINATION

A. Coordination Among Trades: Contractor shall coordinate construction activities included under the Drawings and various sections of these Specifications to insure efficient and orderly construction operations included under different sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
   1. If necessary, inform each party involved, in writing, of procedures required for coordination; including requirements for giving notice, submitting reports, and attending meetings.
   2. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
   3. Where availability of space is limited, coordinate installation of different components to insure maximum accessibility for later installations and for required maintenance, service and repair.
      a. Where limited available space may cause conflicts in the locations of installed products, and where required to coordinate installation of products and materials, prepare coordination drawings. Said coordination drawings shall show plan and cross-section dimensions of the available space and include obstructions caused by structural and systems elements.
      b. Coordinate shop drawings and other submittals prepared by subcontractors, suppliers and other entities to facilitate installation of products and systems and avoid field conflicts in the Work.
      c. Prepare plans or schedules describing installation sequences and provide said documents to affected parties.
   4. Make adequate provisions to accommodate items scheduled for later installation.
   5. Inform the Owner when coordination of Owner's work under separate contracts is required. Inform the Owner when Owner's work under separate contracts is incomplete, in non-compliance or prohibits efficient and orderly completion of work under this Contract.
   6. Coordinate dissemination of information between subcontractors or suppliers when information from one is needed by or is of assistance to the other. Distribute interrelated shop drawings between subcontractors or suppliers prior to shop drawing submittal to Architect.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of schedules
   2. Installation and removal of temporary facilities.
   3. Delivery and processing of submittals.
   4. Progress meetings.
   5. Project close-out activities.

C. Continue coordination procedures by actively controlling Project conditions as follows:
   1. Verify and insure that products and materials of all trades are stored in an orderly fashion, under conditions complying with manufacturers' instructions and at planned locations.
   2. Verify and insure execution of the Work is in compliance with environmental conditions established by manufacturers' instructions and specific requirements of relevant Sections of these Specifications.
   3. Verify and insure adherence to tolerances required by these Specifications as the Work progresses.
   4. Inspect job conditions before one trade follows another in compliance with these requirements:
      a. Plan and conduct joint inspections involving the affected trades.
      b. Notify Architect at least one week in advance of such inspections and provide opportunity for Architect's participation in the inspection.
      c. While the Architect may confine his observations and inspections to only limited areas, the Contractor shall be responsible for similar inspections in all involved areas.
      d. Review of job conditions, in whole or in part, by Architect in no way relieves Contractor of his obligation to provide various stages of the Work as well as finished Work complying with Contract Documents.
      e. Allow no work to proceed over unsatisfactory conditions that would prevent execution of new work as specified.

1.04 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. Contractor shall designate a Project Manager for the Project who shall be the primary point of contact and communication for the Owner and Architect the project site. The Project Manager shall be assigned full time to the Project until completion of Final Contract Close-Out. All written communications to the Architect shall be by or through the Project Manager. Architect shall address all his written communications to the Contractor to the Project Manager, unless authorized by Project Manager to communicate directly to others.

B. Contractor shall provide adequate supervision at the Project site at all times.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION PROCEDURES

A. Inspection of Conditions: Require the installer of each component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturers' Instructions: Comply with manufacturers' installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Connection: Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

D. Visual Effects: Provide uniform joints widths in exposed work. Arrange joints in exposed work to obtain the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

E. Temporary Enclosures: Provide and coordinate placement of temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

F. Mounting Height: Where mounting heights are not indicated, contact the Architect for direction prior to proceeding with the work.

G. Access panels: Where access panels are required in any wall or ceiling, and the panel is not specifically located on a drawing, contact the Architect prior to proceeding with the work.

H. Joints: Plan and coordinate work to provide caulk joints at all junctions of dissimilar materials, even if such joints are not called for on Drawings or elsewhere in these Specifications.

I. Costs for Adherence to all specified installation procedures are included in the Contract Sum.

3.02 CLEANING & PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective coverings where required to insure protection from damage or deterioration prior to Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to insure operability without damaging effects.

C. Supervise construction activities to insure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessive high or low temperatures.
4. Excessive high or low humidity.
5. Water or ice.
6. Solvents.
7. Chemicals.
8. Light.
9. Puncture.
10. Abrasion.
11. Heavy traffic.
12. Soiling, staining, and corrosion.

13. Rodent and insect infestation.
14. Combustion.
15. Unusual wear or other misuse.
16. Contact between incompatible materials.
17. Destructive testing.
18. Misalignment.
19. Excessive weathering.
20. Unprotected storage.
21. Improper shipping or handling.
22. Vandalism.

END OF SECTION 01 31 00

SECTION 01 31 20

PROJECT MEETINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Contractor's duties
2. Preconstruction conference
3. Progress and coordination meetings
4. Pre-installation conferences

1.03 CONTRACTOR'S DUTIES

A. Scheduling and Notification: Contractor will notify Owner, Architect and other invited parties of meeting time and place at least five (5) days prior to the date of every progress and coordination meeting or special called meeting. The progress and coordination meetings shall be conducted once every week.

B. Administration: The Contractor will prepare a meeting agenda for the progress and coordination meetings, record and promptly distribute copies of minutes of significant proceedings and decisions of the meetings to each participant no later than five (5) days after each meeting. The Contractor shall update construction schedule after each progress meeting to show current progress and documentation of any revisions that have been made or recognized; issue revised schedule, two-week look-ahead with a list of the planned activities, submittal list and RFI list concurrently with report of each meeting.

1.04 PRE-CONSTRUCTION CONFERENCE

A. A pre-construction meeting will be held prior to the start of construction of the project at a time and place designated by the Owner for the purpose of identifying responsibilities of the Contractor, Owner and Architect and explaining administrative procedures.

B. Attendance:
1. Owner’s representatives.
2. Owner’s Project Manager
3. Architect and key subconsultants.
4. Contractor represented by Project Manager and Superintendent
5. Major subcontractors if requested by Owner, Architect or Contractor

C. Minimum Agenda:
1. Identification and designation of responsible personnel from all parties.
2. Tentative construction progress schedule (to be distributed by Contractor), with discussion of critical work sequencing and staging.
3. Procedures for correspondence and other communications, field decisions, requests for information, design bulletins, requests for changes in the work and claims.
4. Procedures for submittals, including shop drawings, samples and product data.

5. Procedures for preparing and maintaining required Record Documents and Operations & Maintenance Manuals.
6. List of major subcontractors and material suppliers.
7. Use of Project Site, including temporary offices, project staging, storage areas, parking, site use limitations or restrictions, and erosion control.
8. Material and equipment deliveries, storage, protection and priorities.
9. Safety procedures and responsibilities.
10. Security procedures and methods.
11. Housekeeping procedures and methods.
12. Special project requirements or conditions.

1.05 PROGRESS AND COORDINATION MEETINGS

A. Scheduling: Unless otherwise requested by Owner or Architect, a progress and coordination meeting shall be **held once every month** at the Project Site.

B. Attendance:
1. Owner (once a month)
2. Owner's Project Manager
3. Architect and consultants if determined necessary by progress of the Work.
4. Contractor as represented by Project Manager and Superintendent.
5. Sub-contractors and material suppliers as requested by Owner or Architect or as applicable to progress of the Work.

C. Minimum Agenda (topics to be covered as applicable):
1. Review minutes of previous meeting.
2. Status of submittals and impending submittals.
3. Off-site fabrication and delivery schedules; subcontractor schedules.
4. Actual progress of activities in relation to the schedule. Submit schedule updates as required.
5. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
6. Field observations; actual and potential problems affecting construction or job progress; status of RFI's (Requests for Interpretation).
7. Site Utilization; housekeeping, temporary facilities/services.
8. Safety; hazards or risks.
9. Status of corrective work ordered by the Architect; quality and work standards.
10. Change Orders and change order proposals.
11. Documentation of information for payment application (as applicable).

D. Contractor to provide a table for layout of Drawings and chairs for each attendee.

1.06 PROGRESS AND COORDINATION SITE VISITS

A. Scheduling: Unless otherwise requested by Owner or Architect, a progress and coordination site visit shall be **held once a month as needed** at the Project Site.

B. Attendance:
1. Owner's Project Manager
2. Architect and consultants if determined necessary by progress of the Work.
4. Contractor as represented by Project Manager and Superintendent.

1.07 PREINSTALLATION CONFERENCES

A. Scheduling: Conduct a pre-installation conference at the project site before each construction activity that requires coordination with other construction or existing conditions. Comply with particular requirements elsewhere in the Specifications that describe specific pre-installation or pre-demolition meetings and associated notifications to the Architect and Owner.

B. Attendance: The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Notify the Architect and Owner of the scheduled meeting dates as required elsewhere in the Specifications.

C. Prior to the work or installations of, at a minimum, the components listed below, hold a pre-installation meeting for review and observation attended by each entity involved or affected by planned work. Schedule these meetings with Architect at least five (5) working days prior to meeting.

D. Agenda:

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
    a. Contract Document requirements
    b. Purchases
    c. Deliveries
    d. Shop drawings, product data and samples
    e. Review of mockups
    f. Possible conflicts
    g. Compatibility of materials
    h. Acceptability of substrates
    i. Schedule
    j. Weather limitations
    k. Space and access limitations
    l. Temporary facilities
    m. Safety
    n. Manufacturer’s recommendations
    o. Warranty requirements
    p. Inspecting and testing requirements
    q. Required performance results
    r. Recording requirements
    s. Protection
2. The Contractor will record significant discussions and agreements and disagreements of each conference and the agreed to schedule for the work. The Contractor will promptly distribute the record to everyone concerned, including the subconsultants as required.
3. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene conference at earliest feasible date.
4. Regardless of whether the Specifications explicitly require a particular pre-installation conference, the Contractor is responsible for said conferences as an element of his coordination of the Work. Information that can be obtained through a consideration of the items in Paragraph C. of this sub-section is the responsibility of the Contractor and must be included in implementation of the Work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 31 20

SECTION 01 32 00

CONSTRUCTION SCHEDULES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. General description
   2. Form and content of schedules
   3. Updating of schedules

1.03 GENERAL DESCRIPTION

A. The Construction Schedule is a required submittal, which is subject to the approval of the Architect and which shall be revised periodically as specified herein. The Construction Schedule shall be in a bar-chart or network type form that shall provide complete sequence of construction by activity and allow for up-dating and revisions. Schedule shall be based on critical path method (CPM), and shall be prepared with input and cooperation of all subcontractors.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 FORM AND CONTENT OF SCHEDULES

A. **Submit Construction Schedule as described above within ten (10) days after Notice to Proceed**.

B. Provide Construction Schedule with the following format and content:
   1. Provide schedule in the form of a bar chart with individual horizontal lines representing the duration of each major activity. Use vertical lines to scale the schedule at one week intervals.
   2. Use the same items of work as shown on schedule of values or in accordance with Section numbers of Specifications.
   3. Where related activates must be performed in sequence, show relationship graphically.
   4. Incorporate the submittal schedule specified elsewhere.
   5. In developing the schedule, take into account administrative reviews.
   6. Show dates for the following:
      a. Each major activity that influences the construction time (critical path items).
      b. Specified pre-installation meetings and progress review meetings.
      c. Procurements and delivery dates for products requiring long lead time.
      d. Start and completion dates of all major work elements.
      e. Time frame for substantial and final completion procedures, including inspections, reviews and punch list activities.

7. Use the same terminology as that used in Contract Documents and provide legend of symbols or abbreviations used.
8. Submit Construction Schedule in clear, legible, reproducible format.

C. Architect will advise Contractor if originally submitted Construction Schedule is not satisfactory. If so, Contractor shall revise and resubmit within five (5) days.

D. Prepare and distribute copies of approved Schedule to Architect, Owner, subcontractors and other entities whose work will be influenced by schedule dates. Maintain a copy of approved Construction Schedule at Project site office.

3.02 UPDATING OF CONSTRUCTION SCHEDULES

A. Update the Construction Schedule whenever changes occur or are made, or when new information is received, but not less often than at the same intervals at which progress meetings are conducted.

B. In revising the Schedule show all changes **by saving the original schedule as a base line**. Indicate the actual progress or delay of each activity and show revised completion dates. Highlight the activities modified since previous submittal and indicate major changes in scope or revised projections due to changes in the Work (if applicable).

3.03 SCHEDULE AND CONTRACTOR'S REQUESTS FOR CHANGES TO CONTRACT SUM OR TIME

A. The Contractor shall indicate in his Change Proposals for all Contract modifications, if the durations of activities are affected, or if activities are added or activities deleted. The effect shall be indicated for each activity in cost and time as applicable. The Change Proposal shall indicate all additional costs and time impacts of whatever nature; reservations for future determination of impacts will not be allowed or considered. The Contractor shall submit a diagram of that portion of the Construction Schedule affected by the change showing the activities and their costs, man loading, durations and subcontractor or trade responsibility. While changes of a minor nature may require little or no documentation of schedule impact, the Contractor shall be aware that in cases where time is involved, failure to submit such a diagram with the Change Proposal shall constitute a waiver of any claims for time extensions associated with the subject of that Change Proposal. When modifications in the Work are necessitated by Field Directives or other Architect's authorizations prior to Change Proposal submissions to avoid delay, the Contractor shall furnish the Architect within ten (10) days of receipt of the authorizations which changed the Work the same information required for Change proposals. Failure to do so shall constitute a waiver of any claims for time extensions associated with the subject of the work authorization or directive.

B. As applicable, the Contractor shall adjust the Schedule monthly to reflect any adjustments in time related to negotiated or approved Contract modifications. The updated Schedule shall provide revised completion dates by incorporation of approved change order work and excusable delays, and re computation of all dates, durations and float in accordance with the newly incorporated dates. Such revised completion dates shall be the sole basis for time extensions and adjustments to the Contract completion date. Modified activity times to be used to determine the revised Project completion dates shall be agreed to by the Contractor, Architect and Owner.

END OF SECTION 01 32 00

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Definitions
   2. General requirements
   3. Submittal schedule
   4. Submittal coordination
   5. Submittal format and preparation
      a. Shop drawings
      b. Samples
      c. Product data
   6. Contractor review and responsibilities
   7. Architect's review
   8. Return, resubmission and distribution

B. Refer to individual Specification Sections and items requested on the drawings for identified equipment and material for which submittals are required.

C. Do not submit on equipment or materials not requested or are related to construction means and methods.

1.03 DEFINITIONS

A. Submittals: General term including samples, shop drawings and product data, as applicable.

B. Samples: Physical examples prepared to illustrate materials, equipment or workmanship to be installed in the Project and to establish standards by which work will be judged as complying with Contract requirements.

C. Shop Drawings: Drawings, diagrams, illustrations, schedules and performance charts, prepared by the entity that is to do the work to illustrate that portion of the Work in detail.

D. Product Data: Dated, printed literature of a product manufacturer which describes product and installation procedures. Product data may include test and performance data, illustrations, standard brochures and special details.

E. Informational Submittals: Submittals indicated in the Contract Documents as to be submitted for information only.

1.04 GENERAL REQUIREMENTS

A. Submittals shall be in orderly sequence and timed to cause no delay in the Work.

B. Contractor shall commence no portion of the Work requiring submittals until submittal has been reviewed and accepted by Architect.

C. Do not utilize submittal review process as a means of requesting substitutions or changes in the scope of the Work.

D. Job delays occasioned by requirement of re-submission of samples, shop drawings and product data not in accordance with Contract Documents are Contractor's responsibility, and will not be considered valid justification for extension of Contract time.

E. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in shop drawings, product data, samples or similar submittals by the Architect's review thereof.

D. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data, samples or similar submittals to revisions other than those requested by the Architect on previous submittals.

E. Resubmitted shop drawings, product data, samples or similar submittals shall be complete and shall cloud or highlight the changes.

1.05 SUBMITTAL SCHEDULE

A. Submit to the Architect a list of all required submittals organized and referenced by the sections of these Specifications. On the list, indicate the timing for submission of the required submittals and relationship to the construction sequence. Submit the schedule to the Architect within the date required for establishment and submission of Contractor's Construction Schedule.

B. Following approval by the Architect of the submittal schedule, print and distribute copies to the Architect, Owner, subcontractors, suppliers and others required to comply with the submittal dates indicated. Maintain a copy in the field. When revisions are made, distribute to same parties that received initial document.

C. Maintain updated submittal schedule during course of the Work that shows status of all submittals. Provide copies for Architect at progress meetings and when requested.

1.06 SUBMITTAL COORDINATION

A. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal well in advance of performance of related construction activities to avoid delay.

B. Coordinate each submittal with other submittals and related activities--purchasing, fabrication, testing, delivery, etc.--that require sequential activity. Coordinate transmittal of different types of submittals for related elements of the Work so submittals can be reviewed concurrently. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

C. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals. If submittal must be reviewed within a certain time in order to maintain the progress of the Work, state so

clearly on the submittal. Nevertheless, allow a minimum of one (1) week for the first processing of each submittal and allow even more time if the submittal must be coordinated with later submittals. Allow a minimum of one (1) week for processing of resubmittals. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SUBMITTAL FORMAT AND PREPARATION

A. Transmittals:
1. Submittals will be accepted only through transmittal from the Contractor. Submittals received from other entities will be returned without review or action.
2. Each submittal must be accompanied by a transmittal form containing the following information:
a. Project name.
b. Submittal date.
c. Transmittal number.
d. Applicable Specifications Section number.
e. To: Architect's name and address.
f. From: Contractor's name and address.
g. Name of applicable subcontractor(s), supplier(s) or manufacturer(s).
h. Submittal type (shop drawing, sample, product data, informational submittal).
i. Description of submittal.
j. Record of distribution.
k. Action marking.
l. List of any deviations from Contract Document requirements.
m. Comments.

B. Form, Size and Quantity:
1. Label each submittal with the following information:
a. Project name.
b. Date of submittal.
c. Contractor's name and address.
d. Architect's name and address.
e. Subcontractor's name and address.
f. Supplier's name and address.
g. Manufacturer's name.
h. Specification section where the submittal is specified.
i. Numbers of applicable drawings and details.
j. Other necessary identifying information.
2. Provide a space on each submittal for approval stamp and notations.
3. For Shop Drawing or Product Data submittals provide electronic PDF files including a transmittal cover letter for each specification section.
5. For Samples submit three (3) hard copy sets at the same time of the electronic submittal.
6. Contractor shall stamp and sign in to verify he has reviewed the submittal and is in compliance with the Contract Documents.

C. Shop Drawing Preparation and Format:
   1. Shop Drawings shall conform to the following content requirements:
      a. Number drawings consecutively
      b. Indicate working and erection dimensions and relationship to adjacent work at accurate scale.
      c. Show arrangements and sectional views, where applicable.
      d. Show compliance with specific referenced standards, such as materials, gauges, thickness, finishes, and characteristics.
      e. Name specific products or materials used.
      f. Indicate anchoring and fastening details, including information for making connections to adjacent work.
      g. Contractor shall make any and all modifications in red ink and shall sign in red ink.
   2. Reference applicable details, sections and similar information from Drawings from which shop drawing data was developed; include applicable Specification Section numbers and names.
   3. Do not reproduce Contract Documents or copy standard information as basis of shop drawings. Standard information prepared without specific reference to the Project is not considered shop drawings.

D. Sample Preparation:
   1. Required samples shall be submitted for the Architect's selection and review so as to maintain construction progress. Acceptance and color selections will not be made unilaterally where selections regarding adjacent materials must be made for purpose of aesthetics. Submit samples for adjacent and inter-related materials concurrently.
   2. Prepare samples in sizes, shapes and finishes in accordance with provisions of individual Specification sections; attach documentation showing compliance. Where samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product. Submittals will be reviewed and returned with Architect's selection indicated and other action as appropriate.
   3. Samples furnished under this section are not to be confused with full-size, on-the-site "mock-ups," which may be specified in certain sections of the Specifications.
   4. Keep final approved samples or sample sets at Project site for use during progress of the Work.

E. Product Data Preparation and Format:
   1. When Product Data submittals are prepared specifically for the Project (in the absence of standard printed information) submit such information as Shop Drawings.
   2. Content:
      a. Submit manufacturer's standard printed data sheets.
      b. Identify the particular product being submitted; submit only pertinent pages.
      c. Show compliance with properties specified.
      d. Identify which options and accessories are applicable.
      e. Include recommendations for application and use.
      f. Show compliance with the specific standards referenced.
      g. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
      h. Identify dimensions which have been verified by field measurement.
      i. Show special coordination requirements for the product.

3.02 CONTRACTOR'S REVIEW AND RESPONSIBILITIES

A. Review submittals and stamp with approval prior to submission to the Architect. Contractor's stamp shall bear the Contractor's name and word "Approved," date of the approval, and shall be initialed by the individual responsible for reviewing submittals. Enter stamp on a blank, unmarked area on the submittal.

B. By approving submittals, Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

C. Where work is indicated "By others," Contractor shall indicate responsibility for providing and coordinating such work; whether by subcontractor or under separate contracts.

D. Contractor agrees that submittals processed by Architect are not substitutions or changes in scope of the Work; that purpose of submittals by Contractor is to demonstrate that Contractor understands design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing fabrication and installation methods he intends to use.

E. Contractor represents by submitting samples, shop drawing and product data that he has complied with provisions specified above. Submissions made without Contractor's approval indicated thereon will be returned without being reviewed for compliance with these requirements.

F. Accompany submittal with transmittal letter containing Project name, Contractor's name, number of samples or drawings, titles and other pertinent data. Transmittal shall outline deviations, if any, in submittals from requirements of Contract Documents.

G. No portion of the Work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed and accepted by the Architect as specified herein. All such portions of the Work shall be executed in accordance with accepted submittals bearing the Architect's stamp.

3.03 ARCHITECT'S REVIEW AND ACCEPTANCE

A. Architect's review and acceptance is only for conformance with design concept of Project and with information in Contract Documents. Architect's acceptance of a specific item shall not indicate acceptance of an assembly in which item is a component. The Architect’s review is not conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation of equipment or systems, which remain the responsibility of the Contractor. When professional certification of performance characteristics of materials, systems, or equipment is required by the Construction Documents, the Architect shall be entitled to rely upon such certifications to establish the materials, systems or equipment will meet performance criteria required by the Construction Documents.

B. Architect will review each submittal, mark it with appropriate action, and return it to Contractor with reasonable promptness, except where it must be held for coordination, and the Contractor is so advised. Submittals will be marked by Architect as follows:
   1. "Reviewed" indicates the drawings have been reviewed for conformance with design and no exceptions are taken. Proceed with the work.

2. "Make Corrections as Noted" indicates Contractor may proceed with the work as noted.
3. "Amend and Resubmit" indicates drawings to be revised and resubmitted for review prior to proceeding with the work.
4. "Rejected, See Remarks" indicates that the submittal does not comply with Contract Documents.
5. The Architect shall make any and all comments in green ink and shall sign in green ink.

C. Submittals required to be submitted "for Architect's information only" are required to demonstrate that the Work complies with performance requirements of the Contract Documents. Such submittals, if acceptable to Architect, will not be returned to Contractor.

3.04 SUBMITTAL RETURN, RESUBMISSION AND DISTRIBUTION

A. Architect will return the reviewed and accepted submittals electronically for distribution by Contractor.

B. Resubmissions: In making resubmissions, follow the same procedures and formats required for original submissions. Make corrections and changes indicated by Architect on unacceptable submissions. In resubmission transmittals, identify clearly and direct specific attention to any revisions other than corrections requested by Architect on previous submissions.

C. **Incomplete Resubmission Costs: The Contractor is responsible for responding to all submittal comments. If the resubmittal is not complete, the Contractor retainage is subject to reduction for the Owner to recover the additional time the Architect requires to complete the review for acceptance**.

D. Distribution:
1. Contractor is responsible for obtaining and distributing submittals to his subcontractors and material suppliers after final acceptance. Reviewed shop drawings shall carry the Architect's appropriate stamp.
2. Contractor shall maintain a file of accepted submittals bearing the Architect's stamp for duration of project, which shall be delivered to Owner as a part of the Project's Record Documents.
3. The Contractor's superintendent also shall maintain an orderly file of all accepted submittals at the Project site. In the event that the Architect or Owner should question the installation of any aspect of the Work requiring accepted submittal data, the inability of the superintendent to produce the required accepted submittal data upon demand shall constitute cause for a "stop work" order to be issued on that particular questioned aspect of the Work and all relevant appurtenant work. The cause shall be equal to the Contractor's not having received required acceptance of the submittal data. If so issued, such "stop orders" shall not be considered valid justification for extensions of Contract time or claims for additional monetary compensation.

END OF SECTION 01 33 00

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Regulatory Requirements

1.03 REGULATORY REQUIREMENTS

A. The following regulations are applicable to the Work:

B. The Contractor shall have copies of these above referenced regulations at the Project site and said documents shall be readily available to all parties involved in the Project.

C. Other statutory requirements and regulations may affect the Work and the performance of the Contractor. Many of these requirements are referenced or described elsewhere in the Contract Documents, but their absence from the Contract Documents does not relieve the Contractor of the responsibility to perform in accordance with said requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 41 00

SECTION 01 42 00

DEFINITIONS AND EXPLANATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Definitions
   2. Specifications format and content explanation
   3. Drawing symbols
   4. Industry standards

1.03 DEFINITIONS

A. Certain terms used repetitiously in these Specifications and elsewhere in the Contract Documents are defined generally in this section. The definitions and explanations of this section are not necessarily either complete or inclusive, but are general for the Work to the extent such definitions or explanations are not stated more explicitly in another provision of the Contract Documents.

B. Approve: The terms "approve," "review," "inspect" and their variations, where used in conjunction with the Architect's actions on the Contractor's submittals, applications and requests, are limited to the responsibilities and duties of the Architect stated in the General Conditions and elsewhere in these Specifications. Such approvals shall not release the Contractor from his responsibility to fulfill the requirements of the Contract Documents, unless otherwise provided in the Contract Documents.

C. Directed, Requested, etc: Where nor otherwise explained, terms such as "directed," "requested," "authorized," "selected," "required," and "permitted," mean directed by the Architect, requested by the Architect, and similar phrases. However, no such implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

D. Indicated: The term "indicated" is a cross reference to details, notes or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar means of recording requirements in the Contract Documents. Where other terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.

E. Refer: Used to indicate that the subject is defined or specified in further detail at another location in the Contract Documents, or elsewhere as indicated.

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

G. Install: Except as otherwise defined in greater detail, the term "install" is used to describe operations at Project site including the unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable to a material, product or system in each instance.

H. Provide: Except as otherwise defined in greater detail, the term "provide" means to furnish and install, complete and ready for the intended use as applicable in each instance.

1.04 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. General: This section is provided to help the user of the Specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of the Contract.

B. Specifications Production: Portions of these Specifications have been edited by the Owner and Architect and may contain minor deviations from traditional formats. Such deviations are a normal result of the production technique, and no other meaning will be implied or permitted. References to Specifications or Technical Specification, shall mean the same.

C. Specification Format: Although not all portions may fully comply, the format of these Specifications is principally as described below. No meaning or significance is attached to such compliance or non-compliance.

1. Sections and Divisions: For convenience, the basic unit of the Specifications is a "section," each unit of which is named and numbered. These sections are organized into related families of sections which are categorized as "divisions." These divisions are recognized as present construction industry practice on uniform organization and sequencing of specifications. Section titles are not intended to limit the meaning or content of a section, to be fully descriptive of the requirements therein, or to be an integral part of the text.
2. Section Numbering: Sections are given a numeric sequence to assist in cross referencing information in the Contract Documents. The numbering sequence, however, is not complete.
3. Parts: Each section has been divided into three or fewer "parts" (Part 1 - General, Part 2 - Products, and Part 3 - Execution). These titles do not limit the meaning of and are not an integral part of the text of the Specification requirements.

D. Specifications Content: The Specifications have been produced employing conventions in the use of language and in the intended meaning of certain words, terms and phrase when used in particular situations or circumstances. These conventions are explained as follows:

1. Language used in the Specifications is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
2. Specifying Methods: The techniques or methods of specifying requirements vary throughout the Specifications text, and may include "prescriptive," "open generic-descriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work. Except for cases of overlapping or conflicting requirements as described in the following paragraph 3, where more than one set of requirements are specified for a

particular unit of work, the option is intended to be Contractor's regardless of whether specifically indicated as such.

3. Overlapping and Conflicting Requirements: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements is specified, and overlapping of those different standards or requirements establishes two (2) different or conflicting levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into the Contract Documents clearly indicates that the less stringent requirement is to be fulfilled. Refer uncertainties as to which of the two (2) levels of quality is more stringent to the Architect for a decision before proceeding.
4. Imperative Language is generally used throughout the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

E. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as the minimum for work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, the indicated numeric values are either minimum or maximums as noted or as appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.

F. Assignment of Specialists: The Specifications require (or at least imply) that certain specific construction activities shall be performed by specialist or expert entities who must be engaged for the performance of those units of work. These must be recognized as special requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
2. Trade Names: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

1.05 DRAWING SYMBOLS

A. **Graphic symbols used on the Drawings are those recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Tenth edition. Any symbol or graphic hatch pattern shown on the drawings not specifically labeled as to the material indicated shall be interpreted as follows:**

a. Written Clarification by the Architect prior to Bid
b. Industry Standards
c. Drawing Symbol and Hatch Legends

B. **Clarifications shall be requested in writing by the proposer where written direction and clarification will be provided by the Architect in the Addenda issued prior to bid.**

C. **Under no circumstances will additional compensation be considered for uncertainty and lack of clarification on the part of the Contractor regarding drawing symbols and hatch patterns, not clarified during the bid period.**

D. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical Drawings are generally aligned with symbols recommended by ASHRAE. They are supplemented by more specific symbols indicated in legends and, where appropriate, are further supplemented by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

1.06 INDUSTRY STANDARDS

A. Applicability of Standards: Except where Contract Documents include explicit and more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual sections indicate which codes and standards apply and which the Contractor must keep available at the Project Site for reference.
   1. Referenced standards (referenced directly in Contract Documents or by governing regulations) have precedence over non-referenced standards.
   2. Non-referenced Standards: Except as otherwise limited by the Contract Documents, standards not referenced but recognized in the construction industry as applicable will be enforced for performance of the Work. The Architect shall decide whether a code or standards is applicable or which of several are applicable.

B. Publication Dates: Where compliance with an industry standard is required, comply with standard in effect as of the date of the Contract Documents.

C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
   2. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

D. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the publication provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 01 45 00

QUALITY CONTROL PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Contract conditions.
   2. Reference standards.
   3. Procedures for submittal of quality control documentation.
   4. Quality assurance provisions.
   5. Coordination, sequencing and scheduling.
   6. General quality control activities and requirements.
   7. Procedures for specific quality control activities:
      a. Inspecting
      b. Pre-installation review and inspection
   8. Repair and Protection.

1.03 CONTRACT CONDITIONS

A. Certifications and inspections and testing services are required to verify compliance with requirements specified or indicated. These services whether provided by the Contractor or the Owner do not relieve the Contractor of responsibility for compliance with requirements of the Contract Documents.
   1. Certifications, inspections, tests and related requirements specified are not intended to limit the Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
   2. Requirements for the Contractor to provide certifications, inspections, testing and related services by the Architect, Owner and other authorities having jurisdiction are not limited by the provisions of this section.

B. Testing Agencies, whether employed by the Owner or Contractor, shall not approve any portion of the Work and shall not change requirements of the Contract Documents.

1.04 DEFINITIONS

A. Certificate: A written statement that a particular product or a portion of the Work as accomplished conforms to the requirements of the Contract Documents.

B. Installer: Any entity that performs a construction activity, whether an employee, subcontractor, or sub-subcontractor of the Contractor.

C. Testing Agency: Any independent testing and inspection agency employed by the Owner or Contractor to perform certain quality control activities.

D. Reference Standard: Any document incorporated unto the Specifications by reference rather than inclusion of text; including, but not limited to, voluntary specifications prepared by standards and industry organizations.

E. Reports: Certified written documentation of inspections, tests or similar services.

1.05 REFERENCE STANDARDS

A. General: Comply with edition of standards indicated; if date is not indicated, comply with edition in effect as of date of Contract Documents. Compliance with standards that are revised or reissued after that date will not be required unless incorporated into the Contract Documents by modification. When applicable codes, laws or regulations require editions of different dates, obtain instructions from the governing authorities as to which edition is required.

B. The requirements of reference standards are binding on Contractor, just as if they were copied into the Contract Documents, but no provisions of reference standards shall alter the contractual relationship of the parties to the Contract.

C. Maintain at the Project site each reference standard that is indicated elsewhere as to be kept at the site.

1.06 SUBMITTALS

A. Reports: The Owner's Testing Agency shall submit certified written reports of each inspection, test or similar service to the Owner, Architect and Contractor as applicable. If the Contractor is responsible for an inspection, test or similar services and has employed a Testing Agency for such, his reports shall comply with the following:
   1. Reports shall be submitted for informational purposes through the Contractor under cover to the Architect.
   2. Submit other copies of reports to governing or regulatory authorities if so directed.
   3. Submit the report within three (3) working days after date of inspection or test if practicable.
   4. Reports of inspections, tests or similar services shall include, but not limited to the following data:
      a. Date of issue.
      b. Project name.
      c. Name, address and telephone number of testing agency.
      d. Dates and locations of samples and tests or inspections.
      e. Names of individuals making inspections or tests.
      f. Name and signature of reviewing registered engineer and laboratory inspector if applicable.
      g. Related Specifications section(s).
      h. Test method or basis of evaluation.
      i. Ambient conditions at time of sample-taking and testing.
      j. Observations, comments or professional opinions regarding compliance with requirements of Contract Documents.
      k. Recommendations on re-testing if required.

B. Certificates: Submit for information only unless otherwise directed.
   1. Certificates should be signed by the product manufacturer, unless otherwise specified or not applicable.
   2. Include the following information:
      a. Date of certificate.
      b. Project name.
      c. Description of the product or system certified.
      d. Specification section(s) involved.

e. When actual materials to be used are to be certified, include lot identification markings, destination or shipment, and quantity in shipment.
f. Title, name, and signature of person authorized to make certification.

C. Qualifications Statements: Submit for information only unless otherwise directed.

D. Manufacturers' Instructions: Submit for information only unless otherwise directed. Contractor shall identify to Architect any conflicts between manufacturers' instructions and Contract Documents prior to proceeding with affected work.

1.07 QUALITY ASSURANCE.

A. Qualifications of manufacturers and installers shall be as indicated in individual sections of the Specifications.

B. Manufacturer’s field personnel shall be employed directly by the manufacturers and normally perform the activities specified.

C. Qualifications of a Testing Agency, if utilized by Contractor, shall include the following criteria:
1. Testing Agency shall meet "Recommended Requirements for Independent Laboratory Qualification" latest edition, published by The American Council of Independent Laboratories.
2. Testing Agency shall be acceptable to Architect and shall have been regularly engaged in services specializing in types of inspections and tests to be performed for a minimum of five years. If requested by Engineer, submit evidence of satisfactory completion of services performed on projects of similar type and scope within specified period.
3. Testing Agency shall be authorized to perform services by authorities having jurisdiction in State of Georgia.
4. Testing Agency's on-site personnel shall be qualified and certified in the fields of testing required for the Project.

D. Testing Equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to the National Bureau of Standards (NBS) standards or to accepted values of actual physical constants.

1.08 COORDINATION, SEQUENCING AND SCHEDULING

A. Contractor shall coordinate its sequence of activities with any Testing Agency engaged to perform inspections, tests and similar services to accommodate required work with a minimum delay. Contractor shall schedule and coordinate activities to avoid removing and replacing construction to accommodate inspections and tests. Other responsibilities of Contractor for testing are indicated elsewhere in this section.

PART 2 –PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL

A. Provide work of the specified quality level; where quality level is not indicated, provide work of quality customary in similar types of work.
   1. Where codes, laws, or regulations require work of higher quality or performance, provide work complying with those codes, laws, and regulations.
   2. Where two or more quality provisions of the Contract Documents conflict, comply with the most stringent requirement; where requirements are different but apparently equal, and where it is uncertain which requirement is most stringent, obtain clarification from the Architect before proceeding.
   3. Actual quality may exceed the specified quality; verify that such differences are acceptable to the County (other criteria may make excessive quality undesirable).

B. Manage and control products, subcontractors, suppliers, manufacturers, site conditions, installers, and workmanship in such a manner as to produce work of the specified quality. Use installers who are capable of producing work of specified quality.

C. Perform all quality control activities specified unless indicated to be performed by other entities.

3.02 TESTING

A. The requirements indicated below in this section are the Contractor's responsibilities relative to testing performed by the Owner and his Testing Agency as well as testing under the direct supervision of the Contractor.

B. Cooperate with Testing Agency personnel. Provide access to the Work and to material supplier's plant and operations.

C. Provide representative samples of materials proposed for use in the Work, in quantities sufficient for accurate testing and as specified.

D. As necessary for performance of the testing, furnish incidental labor and facilities including but not limited to the following:
   1. Providing access to the Work to facilitate inspections and tests.
   2. Obtaining and handling samples at the Project site under the direction of the Testing Agency or assisting the Testing Agency in taking samples.
   3. Provide facilities for storage and caring of test samples on-site and security and protection of samples and test equipment at site.
   4. Provide preliminary design mixes for materials mixes that require control by Testing Agency.

E. Notify Testing Agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Notify Owner's Testing Agency three (3) working days prior to the date of inspection or testing.

F. Where the Owner has engaged a Testing Agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

G. Contractor shall notify the Architect in writing and receive a written reply prior to proceeding with additional testing beyond that specified in the Contract Documents.

H. Re-testing and Cancellation of Testing:
   1. Contractor shall be responsible for re-testing where results of required inspections, test or similar services are unsatisfactory and do not comply with requirements of Contract Documents, regardless of whether the original test was the Contractor's responsibility.
   2. Costs for correction of deficient work or construction and re-testing shall be borne by the Contractor.
   3. If the Testing Agency is scheduled by the Contractor to perform tests or monitor activities on-site and testing or work to be monitored gets cancelled by the Contractor after the on-site arrival of the Testing Agency, the cost of the Testing Agency from arrival on-site until they are sent back or utilized for another activity including the cost for travel time shall be borne by the Contractor.

I. Materials and work covered without testing and approval, if required, shall be uncovered and subsequently recovered at the Contractor's expense.

3.03 INSPECTING

A. Perform inspections specified. When inspections reveal unsatisfactory work, make whatever changes or repairs are necessary and re-inspect. Submit a report of each original inspection and each re-inspection.

3.04 MANUFACTURERS' FIELD SERVICES

A. Manufacturers' field services are specified in other sections of the Specifications.

B. If Architect should be present, provide Architect with a timely notice of site visit so Architect may be present. After site visit, submit a report that records 1) site conditions, installer procedures, and related activities that are not as recommended by the manufacturer; and 2) instructions and recommendations provided by the representative that differ from manufacturer's standard printed instructions.

3.05 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities or exposed finishes. Comply with requirements of any references to cutting and patching in other divisions of the Specifications.

B. Contractor shall be responsible for repair and protection of Work regardless of assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01 45 00

SECTION 01 50 00

TEMPORARY FACILITIES, CONTROLS AND SERVICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 and 0 Specifications, apply to this Section.

1.02 SUMMARY

A. Section Includes:
1. Definitions
2. Project conditions and scheduling
3. Temporary construction support facilities
4. Temporary utilities and services
5. Special protection requirements
6. Security – Also refer to Division 0 for detailed requirements
7. Vehicular access and parking
8. Termination and removal

1.03 DEFINITIONS

A. Temporary Construction Support Facilities: Construction, structures, fixtures and other built items required to accomplish the Work but which are not incorporated into the finished Work. Included are field offices, storage sheds, temporary roads and paving, temporary enclosures, hoists, dewatering facilities, temporary signs, construction aids and miscellaneous facilities.

B. Temporary Utilities: Sources of electric power, water, natural gas, etc. obtained from public utilities, other main distribution systems or temporary sources that support the Contractor's activities but are not a part of the permanent construction or are not yet incorporated into the permanent construction.

C. Temporary Services: Activities and services required during construction that do not directly accomplish the Work. Included are waste disposal services, rodent and pest control, security and miscellaneous services.

1.04 PROJECT CONDITIONS AND SCHEDULING

A. Comply with requirements of regulations, governing authorities and public utilities as to type, quantity, location and use of temporary facilities, utilities and services. Secure and maintain copies of permits, inspection reports or approvals for installation and use of temporary facilities and utilities.

B. Use of permanent facilities prior to date of Substantial Completion is subject to Owner's conditions. During said approved use, Contractor shall maintain and protect completed work. Specific warranties shall not be reduced or voided by Contractor's use of permanent facilities and systems.

C. Maintain required temporary facilities until not needed or until Substantial Completion. Exceptions to this requirement may be made by Owner as indicated in above paragraph.

1.05 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
   1. Building code requirements.
   2. Health and safety regulations.
   3. Utility company regulations.
   4. Police, fire department, and rescue squad rules.
   5. Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
   1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

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

PART 2 – PRODUCTS

2.01 TEMPORARY CONSTRUCTION FACILITIES

A. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical or aerated recirculation. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

B. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

C. Fire Extinguishers: Provide hand-carried portable UL-rated Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated Class ABC, dry chemical extinguishers or a combination of extinguishers of NFPA recommended classes for the exposures. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

A. Use qualified personnel or services for installation of temporary facilities. Provide each facility ready to use when needed to avoid delay. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as needed. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 CONSTRUCTION SUPPORT FACILITIES

A. Temporary Storage Facilities: Provide weather tight storage facilities with raised floors and of types and sizes required by storage demands at the project site. Locations of temporary storage facilities shall be subject to Owner's acceptance. All material storage and staging shall be within the designated limits of the Project site. Contractor is responsible for identifying Project site

boundaries and insuring that staging and material storage does not occur outside of the site.

B. Provide a dedicated area for the storage of tools and equipment within each phased work area. The Contractor will be required to secure all tools at the conclusion of each work day and maintain a log of equipment and tools located on site. Combustibles and hazardous materials shall not be stored inside the building overnight or at any time when construction personnel are not present. The Contractor shall notify the Owner and all such materials shall be approved prior to bringing items into the building.

C. Temporary Enclosures: As required by the progress and sequencing of the Work, provide temporary enclosures for protection of construction in progress or completed, from exposure to foul weather or other construction operations.
   1. Maintain protective barriers, vehicular barriers, temporary fencing, dust control barriers and sound control devices as needed for all phases of construction until final completion of the Project. Contractor shall be responsible for replacing established protective barriers and devices damaged or removed during construction and shall install any additional protection devices as required to perform the Work under this Contract.
   2. Provide temporary signs as required. Install signs where needed to inform personnel, vendors and public seeking entrance to the Project.
   3. Security, access and working requirements will be discussed at length during the preconstruction meeting and are outlined in Division 0 of these specifications.
   4. The Contractor is responsible for all temporary construction, phasing, scheduling, material deliveries, and other items that affect the sequence of construction or scheduling of the project.

D. Sanitary Facilities: Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. **Comply with regulations and health codes** for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs. Provide applicable paper goods in support of each facility. Provide covered waste containers for used materials.
   1. Toilets: Provide and maintain temporarily sited and self-contained toilet units until Substantial Completion on all Work. Do not allow employees to use permanent toilet facilities of the new construction.
   2. Wash Facilities: Provide and maintain a safety shower/eye wash facility with potable water at a location convenient for personnel.
   3. Drinking Water Facilities: Provide drinking water canisters or fixtures at convenient locations on the Project site. Include cup supply.

3.03 TEMPORARY UTILITIES AND SERVICES

A. General: Utilities shall be provided by the Contractor during construction.

B. Telecommunications Services: Maintain cell phones for Project Manager and Superintendent.

C. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere on Project site. **The Contractor shall provide dedicated dumpsters for construction debris and provide protection from pavement and concrete curb damage.** Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold waste materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.04 VEHICULAR ACCESS AND PARKING

A. Haul Routes: The Contractor shall be responsible for insuring that trucks providing delivery and/or hauling services to or from the Project site shall properly cover loads. Contractor shall keep the roads to the Project site and the project site clear, free of mud, dirt, debris, or other materials that are deposited as a result of Contractor's hauling and delivery services. The Contractor is responsible for coordinating and scheduling hauling activities so that the traffic flow on the access road to the project site is not disrupted at any time.

B. Parking Areas: All parking for Contractor's employees, subcontractors' employees, and for vendors, delivery men, and visitors shall be limited to the site boundary.

C. Traffic Control: The Contractor shall provide all traffic control on streets or drives adjacent to or on the Project site that is needed to facilitate the Contractor's Work and protect staff and the public from activities associated with such work. These controls shall include signs, signals, barricades and flagmen, as necessary. The Contractor shall comply with all local, state, federal rules and regulations concerning the placement and use of traffic control devices.

3.05 TEMPORARY PROTECTION AND CONTROL

A. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Maintain protective barriers, tree protection and erosion control devices until Final Completion of the Project. Contractor shall be responsible for replacing established protective barriers, tree protection and erosion control devices damaged or removed during construction and shall install any additional protection devices as required to perform the Work under the Contract.

3.06 MAINTENANCE, TERMINATION, AND REMOVAL

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

B. Maintenance: Maintain facilities in good operating condition until project completion.

C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when 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 from the 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 the Contractor's property. The Owner reserves the right to take possession of project identification signs.
   2. Remove all trash and debris and restore areas to conditions required by the Contract.

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS AND SELECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for Contractor's selection of products.

B. Related Sections: The following sections contain requirements that relate to this Section:
   1. Division 1 Section; Explanations and Definitions, specifies the applicability of industry standards to products specified.
   2. Division 1 Section; Product Substitutions, specifics administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 DEFINITIONS

A. Definitions used in this section are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
   1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material, "equipment," "system," and terms of similar intent. "Named Products" are item identified by manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature that is current as of the date of the Contract Documents.
   2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
   3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.04 QUALITY ASSURANCE

A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
   1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

B. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Name Plates: Except for required labels and operating date, do not attach or imprint manufacturer or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

PART 2 – PRODUCTS

2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Product Selection Procedures: The Contract Documents and standards, codes and regulations govern product selection. Procedures governing product selection include the following:
    a. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted, except when the product is unavailable, and then the substitution must be under the terms provided in Section 016300, Product Substitution Procedures.
    b. Descriptive Specification Requirements: Where Specifications described a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
    c. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and that are recommended by the manufacturer for the application indicated.
    d. Manufacturer's recommendation may be contained in published product literature or by the manufacturer's certification of performance.
4. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
5. Visual Matching: Where Specifications require matching an established sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
    a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "Substitutions" for selection of a matching product in another product category.

6. Visual Selection: Where specified product requirements include the phrase "…as selected from manufacturer's standard colors, patterns, textures…" or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
7. Contractor Option: Where several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among these named.
8. Comparable or Equal: Where one or more products or manufacturers are specified by name and accompanied by the term "or approved equal," or "or equal", "equal to", or "comparable to", the Contractor may submit a request for substitution prior to bid in accordance with Section 016300, Product Substitution Procedures for any equivalent product or manufacturer that is not specifically named.

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 60 00

SECTION 01 63 00

PRODUCT SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Procedures for substitution requests during bidding.
2. Substitution requests outside of bidding period.
3. Product evaluations.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROCEDURES FOR SUBSTITUTION REQUESTS DURING BIDDING

A. If Contractor wishes to use products different from those indicated in the Contract Documents, the Contractor shall make a written application as described herein. The burden of proving equality of proposed substitutions shall rest with the Contractor. **Substitution requests submitted directly by subcontractors or suppliers will NOT be considered.** Substitutions will not be considered for acceptance when acceptance will require substantial revision of Contract Documents.

B. Except as described elsewhere herein, requests for substitution will be considered only during the bidding period. **Requests for substitutions must reach the Architect by the deadline established in the Invitation to Bid for the receipt of questions and interpretations.** Requests received by the Architect after this date will not be considered. Acceptable substitutions will be added to the Contact Documents by addendum; no verbal approvals will be valid.

C. **Contractor shall submit written request with complete data substantiating compliance of the proposed product with requirements of Contract Documents**. Submit request to Architect on a standard form, with three (3) copies of each request and supporting data. Only one request for each product will be considered. Include the following data with the request:
1. Project name.
2. Contractor name.
3. Date of request.
4. Identification of product by Specification reference.
5. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:
a. Product identification, including manufacturer's name and address.
b. Manufacturer's literature; identify:
1) Product description.
2) Reference standards.
3) Performance and test data.
4) Manufacturer's recommendations for use and installation.

5) Dimensions and space requirements.

c. Samples, as applicable.

d. Drawings, as applicable.

e. Name and address of similar projects on which product has been used, and date of each installation.

f. Reports from independent testing laboratories, verified experience records from previous users and other printed or written information valid in the circumstances will be considered.

6. **Provide an itemized comparison between proposed substitution and product specified; list all variations <u>AND</u> a detailed explanation of how the proposed product meets or exceeds the requirements of the specifications. Website addresses are <u>NOT</u> an acceptable means of compliance with this requirement. The Architect will not perform <u>ANY</u> research in connection with product substitutions. It is the responsibility of the proposer/ contractor to demonstrate full compliance with these specifications and basis of design products.**

7. Net amount of change in Contract Sum (if applicable)

8. Information on any changes caused in construction schedule.

9. Description of any changes that will be required in other work or products if substitute product is accepted.

10. Designation of availability of maintenance services and sources of replacement materials.

NOTE: SUBMISSIONS THAT DO NOT INCLUDE <u>ALL</u> INFORMATION WILL BE DEEMED INCOMPLETE AND NOT CONSIDERED.

D. Architect's determination of acceptability of proposed submissions will be made based only on data submitted. In accepting a substitution, the Architect does not warrant that the product meets all express requirements of the Contract Documents. The approved substitution is subject to the same subsequent review and approval procedures as the products originally specified.

E. Contractor shall coordinate all required components and accessories required to make any substitution complete and operable as intended by the basis of design product indicated in the contract documents including all work required for installation of accepted substitutions with interfacing work. The contractor shall bear any and all design costs required to make approved changes in the Work to properly incorporate substitutions. The contractor shall waive all claims for time and additional costs related to use of acceptable substitutions which become apparent following acceptance, including electrical, structural, mechanical, and plumbing requirements associated with the proposed substitution.

F. Substitute products shall not be ordered or installed without written acceptance by the Architect. Unless substitutions are received and approved as described above, the Contractor shall be responsible for furnishing materials or products in accordance with the Contract Documents.

3.02 SUBSTITUTION REQUESTS OUTSIDE OF BIDDING PERIOD

A. Substitutions will not be considered between the bid date and award of the Contract.

B. In the event that specified items cannot be delivered to the Project site and incorporated into the Work at such times and in such quantities as to cause no delay, provided timely orders are placed, then Contractor may request a substitution in the manner described in this section. Should the accepted substitution provide a cost savings, the contract sum will be adjusted by Supplemental Agreement with Owner receiving the benefit of the net

savings. No increase in the Contract Sum will be allowed on substitutions made after the receipt of bid except where the Contractor can verify a timely placement of orders appropriate to the materials and conditions involved. Contractor's inability to obtain specified items due to failure to place timely orders will not be considered reason for authorizing substitutions. Also substitutions will not be considered when they are indicated or implied on shop drawings or product data submitting without a separate written request.

C. A substitution also may be considered after contract award when the proposed substitution provides a definitive reduction in the Contract Sum. Submittal and consideration of said substitutions shall be at the direction and discretion of the Owner. The process for review of such substitutions will be as described in this section.

3.03 PRODUCT EVALUATIONS

A. In making a formal request for a substitution the Contractor represents that:
   1. He has investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.
   2. He shall provide the same warranties for substitutions as for product specified.
   3. He shall be responsible for determining that materials requested for substitution are free of known hazardous substances.
   4. He shall coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be completed in all respects.

END OF SECTION 01 63 00

SECTION 01 65 00

MATERIAL AND EQUIPMENT HANDLING AND STORAGE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Procedures for transportation and handling.
   2. Procedures for delivery and receiving.
   3. Procedures for storage.

1.03 DESCRIPTION

A. Requirements of this Section are general in nature. Refer to individual sections of the Specifications for additional, specific requirements.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROCEDURES FOR TRANSPORTATION AND HANDLING

A. Require suppliers to deliver manufactured Products to project site in manufacturers' original packaging with labels and seals intact. Labels shall indicate manufacturer, product name, application instructions and fire resistive classifications.

B. Require suppliers to package products and materials in a manner that will protect them from damage during shipping, handling and storage. Arrange to transport products and materials by methods that avoid damage.

3.02 PROCEDURES FOR DELIVERY AND RECEIVING

A. Provide labor and equipment adequate to handle delivery of products and materials by methods that prevent damage. Provide additional protection as necessary during handling to prevent damage to products and packaging. Lift large and heavy components at designated lift points only.

B. Schedule deliveries to minimize long-term storage at the Project site and prevent over-crowding of construction spaces. Coordinate deliveries with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft and other losses.

C. Promptly inspect all materials and products upon delivery to ensure proper material, color, type and quantity, and to ensure that materials are undamaged and properly protected. Verify compliance with requirements of Contract Documents and approved submittals.

D. Clearly mark partial deliveries to identify contents, permit easy accumulation of entire delivery and facilitate assembly.

3.03 PROCEDURES FOR STORAGE

A. Store materials and equipment in a safe and protected manner. Observe manufacturer's recommendations for positioning, separation and ventilation, as applicable.

B. Store materials at the Project site in a manner that will facilitate inspection, measurement, or counting of units. Store unpacked or loose products on shelves, in bins, or in neat groupings of like items.

C. Where materials are required to be stored in protected conditioned environments, maintain temperatures and humidity within ranges required by manufacturer's instructions unless otherwise specified.

D. Store heavy materials in manner that will not endanger supporting construction.

E. Prevent corrosion, soiling, damage, deterioration, or breakage of materials or contact with deleterious materials.

F. Deliver finish materials only to enclosed and conditioned spaces and where adequate indoor storage facilities are available.

G. Store and handle paints and similar products subject to spillage in areas where spills will not deface finished surfaces or other work.

H. Flammable or Hazardous Materials:
1. Store minimum quantities in protected areas.
2. Provide appropriate type fire extinguisher near said storage areas.
3. Observe manufacturer's precautions and applicable ordinances and regulations.
4. Flammable and Hazardous Materials shall not be stored inside the building.

I. Comply with manufacturer's product data in all aspects of basic material storage, usage, handling, and installation, except where more stringent requirements are specified.

J. Provide Material Safety and Data (MSDS) Sheets for all items, materials and products as required by laws, rules, regulations, ordinances or codes.

END OF SECTION 01 65 00

SECTION 01 73 00

CONSTRUCTION EXECUTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. General examination requirements.
   2. General installation procedures and requirements
   3. Installation requirements for building components.
   4. Hot work permit and Safety Requirements
   5. Safety precautions and requirements
   6. Phasing Requirements

1.03 DEFINITIONS

A. Concealed Spaces: Spaces not accessible after completion of construction.

B. Damage: Any sort of deterioration whether due to weather, normal wear and tear, accident, or abuse; resulting in soiling, marring, breakage, corrosion, rotting or impairment of function.

C. Debris: Rubbish, waste materials, litter, volatile wastes, and similar materials.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL EXAMINATION REQUIREMENTS

A. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.

B. Contractor shall be responsible for verifying and obtaining proper substrate conditions, tolerances and material alignments to receive applied or attached materials and construction.

C. Conditions that could have been discovered by examination of Project site and Drawings will not be allowed as cause for claims for extra work. In particular these conditions include:
   1. Underground utilities.
   2. Existing facilities, structures and appurtenances, on the site of the Project with which the Contractor must coordinate during construction and that can be reasonably discerned.
   3. Space requirements of items shown diagrammatically on Drawings.
   4. Limitations on transport and storage of materials and equipment.
   5. Locations of points of connections to utilities.

3.02 GENERAL PREPARATION REQUIREMENTS

A. Take field measurements as required to fit work properly and recheck measurements prior to installing each product. Notify Architect promptly of any discrepancy in dimensions between Drawings and field measurements that will affect a current or anticipated installation.

3.03 WORKING TIMES

A. The basic hours of work for the Contractor shall be 8:30 a.m. through 5:00 p.m., Monday through Friday. No work will be allowed outside of these hours. All observed government holidays will be closed as follows:
   a. New Year's Day (January 1)
   b. Martin Luther King Jr. Day (Third Monday in January)
   c. President's Day (February)
   d. Good Friday (Friday before Easter Holiday)
   e. National Memorial Day (Last Monday in May)
   f. Independence Day (July 4)
   g. Labor Day (First Monday in September)
   h. National Veterans Day (November 11)
   i. Thanksgiving (Fourth Thursday and Friday in November)
   j. Christmas (December 24 and 25)

3.03 GENERAL INSTALLATION PROCEDURES

A. All construction shall be in accordance with all applicable federal, state, and local codes and regulations.

B. Accurately locate the work and components of the work; make vertical work plumb; make horizontal work level. Align materials to give smooth uniform surface planes within specified tolerances.

C. The Contractor is responsible for all temporary construction, phasing, scheduling, material deliveries, and other items that affect the sequence of construction or scheduling of the project and shall coordinate with the Owner's facility operations.

D. Shut down of some utilities will be required in order to construct this project. These shut down activities may need to be performed after business hours and are to be coordinated with the Owner in advance.

E. All mechanical, electrical and plumbing sub-contractors shall submit affidavits for each building permit to the building permits section at least two (2) days before requesting inspections. Affidavit forms are available at building permits department.

F. The Contractor shall verify location of existing utilities before commencing work, and care shall be taken to protect all utilities which are to remain.

G. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.

H. Install work in such manner and sequence as to preclude cutting and patching wherever possible.

I. Install products only at the time and sequence, and under the environmental conditions that will insure best possible results.

J. In finished areas, conceal pipes, ducts, and wiring within construction, unless otherwise indicated.

3.04 INSTALLATION OF COMPONENTS

A. Install all products in accordance with manufacturer's instructions and recommendations, whether conveyed in the Contract Documents or not.

B. Where mounting heights are not indicated, and there is no guidance for mounting, obtain Architect's instructions before proceeding.

C. Separate incompatible materials with suitable materials or spacing. Prevent cathodic corrosion.

D. Provide all anchors and fasteners required and use methods necessary to securely fasten work. In assemblies and installation, allow for thermal expansion and contraction, and for building movement.

E. After installation, adjust operating components to provide for proper operation.

F. The site shall remain secured for the duration of the project.

3.05 CLEANING AND PROTECTION OF INSTALLATIONS

A. Keep the work site free of waste materials and debris; remove such waste periodically. Maintain level of cleanliness necessary for proper execution of the work. Where dust would impair execution of work, broom clean the entire area and keep clean.

B. Remove debris from concealed space prior to enclosing space.

C. Keep installed work clean, and clean again when soiled by other operations. Protect installed work from damage.
   1. Provide protective coverings for work that may be damaged by subsequent operations. Where heavy abuse is expected, use minimum of plywood for protection.
   2. Maintain protective coverings until Date of Substantial Completion.

3.06 SAFETY PRECAUTIONS AND REQUIREMENTS

A. Take precautions to prevent fires and to facilitate fire-fighting operations.
   1. Store flammable materials in non-combustible containers, store away from potential fire sources; remove flammable waste regularly; provide adequate ventilation when using flammable or explosive substances.
   2. Carefully supervise the operation of potential fire sources including on-site welding and cutting.
   3. Keep temporary and permanent fire fighting facilities readily accessible; keep fire fighting routes open.

B. Take precautions to prevent accidents due to physical hazards.
   1. Provide barricades, signs and warning lights as required to protect personnel and public from hazards and inform them thereof. Barricades and temporary safety railings shall comply with applicable safety regulations.
   2. Provide and require use of safety equipment, clothing and accessories as required by the construction activity and applicable safety regulations. This is a hard hat job; protective headgear must be worn at all times in the construction period.

C. Take precautions to prevent pollution of air, water and soil.
   1. Comply with government regulatory requirements for disposal of waste.
   2. Do not dispose of volatile wastes such as petroleum products or other chemicals in storm or sanitary drains or on the grounds surrounding the Project site.
   3. Do not handle or dispose of waste materials, debris, cleaning compounds or other chemicals in a manner that will be harmful to plant life on grounds adjacent to the Project site.
   4. Comply with regulations and authorities having jurisdiction over safety and environmental standards affecting the Project.
   5. Special care shall be taken to prevent newly constructed building phases from dust, mud or other material that may soil or stain the finished building materials.

D. Take precautions not to allow noxious fumes, gases, or excessive amounts of dust to leave the work area. Notify the Owner at least 24 hours in advance of any scheduled activities that might lead to such emissions.

E. Provide temporary supports and construction as required to prevent movement, collapse, or structural failure of the building, site work or any elements thereof.

END OF SECTION 01 73 00

SECTION 01 73 20

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of the building and equipment as required for new work.

B. Related Sections include the following:

1. Division 1 Section "Summary of Work" for use of premises and Owner-occupancy requirements.
2. Division 1 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 1 Section "Cutting and Patching" for cutting and patching procedures.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.04 SUBMITTALS

A. Qualification Data: For demolition firm.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services, if any, in advance.
3. Coordination for shutoff, capping, and continuation of utility services.

4. Locations of proposed dust- and noise-control temporary partitions and means of egress.
5. Coordination of Owner's continuing occupancy of portions of existing building.
6. Means of protection for items to remain and items in path of waste removal from building.

C. **Pre-demolition Photographs: Contractor shall document existing conditions of adjoining construction and site improvements prior to beginning Work, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins**.

1.05 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review areas where existing construction is to remain and requires protection.
4. Coordinate and receive approval from Owner for demolition schedule.

1.06 PROJECT CONDITIONS

A. This building is occupied on a Monday thru Friday basis. Scheduling this work will have to coordinate with Owner’s operations. Owner will occupy portions of buildings immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

1. Noxious/poisonous/toxic/dangerous fumes or products containing a high level of volatile organic compounds (VOCs) shall not be allowed to enter building through any openings including, but not limited to; doors, windows, grilles, louvers, fans, ductwork, etc.
2. Use methods to limit dust and dirt migration. Do not allow dust and debris to enter HVAC ductwork.
3. Protect occupants and equipment of buildings and workers from possible airborne contaminates.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been located, properly marked, disconnected and capped as required in areas to be demolished.

B. Inspect existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect. Pending receipt of directive from Architect, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

D. Perform inspections as the Work progresses to detect hazards resulting from selective demolition activities.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. The location of all overhead power/utility lines shall be determined and marked for equipment clearance during demolition/construction operations.

3.03 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
3. Cover and protect furniture, furnishings, and equipment that have not been removed.

3.04 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Carry out all demolition work in a neat and orderly manner. Keep noise, dust and similar nuisances to a minimum. Do not throw or drop materials.
2. Proceed with selective demolition systematically, from higher to lower level.
3. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
5. Do not use cutting torches.
6. Maintain fire watch and portable fire-suppression devices during demolition operations.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.06 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items indicated to be re-installed, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.07 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 01 73 20

SECTION 01 73 50

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
1. Description
2. Submittals
3. Materials
4. Examination prior to implementation
5. Preparation
6. Workmanship
7. Cutting
8. Patching
9. Cleaning

1.03 DESCRIPTION

A. Contractor shall be responsible for cutting, fitting and patching required to complete the Work including the following:
1. Making parts fit together properly.
2. Uncovering portions of the Work to provide for installation of ill-timed work or to accommodate inspections as required.
3. Removing and replacing defective work or work not conforming to requirements of Contract Documents.
4. Removing samples of installed work as specified for testing.

B. Costs incurred for ill-timed work or uncovering of work shall include costs for services of Owner's consultants.

1.04 SUBMITTALS

A. Prior to cutting and patching of work in place, the Contractor shall submit a written proposal to the Architect. This proposal shall be submitted at least three (3) days in advance of performing any cutting or alterations and shall meet the requirements set forth in this section.
1. The written proposal must be submitted in advance of any cutting that affects the following:
a. Work of Owner or any separate contract.
b. Structural elements of the Project.
c. Integrity or effectiveness of weather-exposed or waterproofed or moisture-resistant elements and systems.
d. Life expectancy, maintenance, efficiency or safety of operational elements.
e. Aesthetic qualities of visually exposed elements.

2. The Contractor shall include the following information in the proposal:
    a. Identification of Project.
    b. Description of affected work.
    c. Extent of cutting and patching and how it is to be performed; indication of why it cannot be avoided.
    d. Anticipated results in terms of changes to construction; including changes to other significant visual elements.
    e. Products proposed for use.
    f. Firms or entities that will perform the work.
    g. Utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
    h. Alternate methods, if applicable.
    i. Dates and times when cutting and patching work is to be performed.
3. Should conditions of the work or the schedule indicate a change of products from the original installation, Contractor shall submit a request for substitution as specified in Product Options and Substitutions Section.

B. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials for patching and replacement of work removed: Comply with Specification Sections for type of work to be performed. Use materials identical to original installed materials. If identical materials cannot be used where exposed surfaces are involved, use materials that match original adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of original materials installed.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Prior to proceeding with work, examine Project conditions and surfaces to receive work including elements subject to damage or movement during cutting and patching operations. Take corrective action if unsafe or unsatisfactory conditions are encountered or anticipated.

B. After cutting, uncovering or removing, inspect conditions affecting installation of products or performance of further work. If unsatisfactory or questionable conditions are encountered, report such conditions in writing to Architect and do not proceed with work until Architect has provided further instructions.

3.02 PREPARATION

A. Temporary Supports: Provide adequate temporary supports for work to be cut and as necessary to insure the structural integrity of the affected portion of the work.

B. Protection:
   1. Protect adjacent construction during cutting and patching work to prevent damage. Provide all materials, devices and methods as required to protect work and adjacent surfaces.
   2. Take precautions necessary to avoid cutting operable pipes, conduits or ductwork serving the building including those scheduled to be removed or relocated until provisions have been made to bypass them.
   3. Protect portions of the work that may be exposed to the elements by cutting and patching.

3.03 WORKMANSHIP

A. Employ skilled workers to perform cutting and patching work. To the greatest extent possible, retain installers or fabricators to perform cutting and patching work, especially for visually exposed finished surfaces and weather-exposed, waterproofed or moisture resistant elements.

B. Perform demolition and cutting work by methods that will not damage adjacent construction and will provide proper surfaces for patching work.

C. Execute work, by methods which will prevent settlement or damage to other work.

D. Elements of a structural or supporting nature, including those which are concealed and exposed after removal of work for repairs or patching, shall be inspected and the Architect notified should additional work be indicated due to loss of structural integrity, rot, rust, corrosion or other similar conditions.

E. Restore work that has been cut and removed so that completed Work is in accordance with requirements of Contract Documents. Perform all installations, fittings, and adjustments of materials or products to comply with manufacturers' product data, its intended functions, specified tolerances and finishes.

F. Fit restored work airtight around pipes, sleeves, ducts, conduit and other penetrations through surfaces.

G. Refinish surfaces to provide an even, uniform finish to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish entire unit.

3.04 CUTTING

A. Perform cutting using methods least likely to damage adjoining construction or elements to be retained. Where possible, review proposed procedures with original installer; comply with original installer's recommendations.

B. Where cutting is required, use tools designed for sawing, cutting and grinding, not hammering or chopping. Cut openings neat to sizes required with minimum disturbances to adjacent surfaces. Cut or drill from exposed or finished side into concealed surfaces to avoid marring finished surfaces.

C. Perform cutting through concrete or masonry using cutting machines designed for this purpose such as carborundum saws or diamond core drills.

D. Where operable utility services are required to be removed, relocated or abandoned, bypass services such as pipes or conduits before cutting. Cut off pipes or conduits in walls or partitions to be removed; and cap, plug and seal remaining potions of pipe after by-passing.

3.05 PATCHING

A. Patch with methods and materials that are the least obvious. Restore exposed finishes of patched areas and adjacent areas in a manner that will be indistinguishable in the finished Work.

B. Where possible, inspect and test patched areas to demonstrate integrity of installation.

C. Gypsum wallboard hot patches are not allowed on this project. All patches shall be from stud to stud.

3.06 CLEANING

A. Clean areas and spaces where cutting and patching has been performed or where such work areas were accessed.

B. Remove excess paint, mortar, oils, putty or other items of similar nature from patched work and adjoining surfaces.

C. Restore any and all damaged or displaced insulation or coverings on pipe, ductwork or in walls or ceiling spaces.

END OF SECTION 01 73 50

SECTION 01 74 00

CLEANING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for cleaning during construction and final cleaning prior to Substantial Completion.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 01 73 00 Construction Execution.
2. Special cleaning requirements for specific construction elements are included in appropriate Sections of Divisions 3 through 33.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

3.01 CLEANING DURING CONSTRUCTION

A. During construction period, Contractor shall keep the building, Project site, and adjacent properties free from accumulation of debris and waste materials at all times. The Contractor shall execute all cleaning procedures necessary to maintain these conditions.

B. Provide adequate on-site containers for waste collection. Place all waste materials and debris in said containers in an expeditious manner to prevent accumulation. Remove waste from Project site when containers become full. Legally dispose of all such waste and debris off Project site. Dispose of no materials in adjacent waterways.

C. Control windblown dust and materials subject to blowing. Wet down materials as necessary to prevent such occurrences.

D. Allow no accumulation of food scraps or organic debris that may contribute to spread of rats, roaches, and other vermin. Contractor shall be responsible for securing services of any pest extermination during construction through Substantial Completion.

E. Allow no graffiti or similar distasteful comments or illustrations to be authored on building materials or on any temporary or permanent construction on the Project site. Contractor shall monitor the Project for violations of this item, and shall take action to clean, cover, or replace subject materials as necessary.

3.02 FINAL CLEANING

A. Prior to Date of Substantial Completion, clean all finished surfaces in accordance with manufacturers' product data and requirements of applicable sections of Specifications. All said cleaning shall be performed prior to Contractor's request that the Project or portion thereof be inspected for Substantial Completion. For the "final cleaning" employ experienced workers or professional cleaners. Quality of cleaning work shall be as expected in standard commercial building cleaning and maintenance programs.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.

1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and foreign substances.
2. Sweep paved areas and concrete surfaces broom clean.
3. Remove petrochemical spills, stains, and other foreign deposits.
4. Remove tools, construction equipment, machinery, and surplus material from the site.
5. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
6. Remove debris and surface dust from limited access spaces, including plenums, shafts, attics, and similar spaces.
7. Broom clean concrete floors in unoccupied spaces.
8. **Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo, if required to remove all stains**.
9. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
10. Remove labels that are not permanent labels.
11. 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.
    a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
12. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
13. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
14. **Replace disposable air filters and clean permanent air filters.** Clean exposed surfaces of diffusers, registers, and grills.
15. Clean ducts, blowers, and coils if units were operated without filters during construction.
16. **Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.**
17. Leave the Project clean and ready for occupancy.

C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.

D. Compliances: Comply with governing regulations and safety standards for cleaning operations. Make Material Safety Data Sheets (MSDS) available as required by applicable legal requirements for all cleaning agents used on the Project site. Remove waste materials from the site and dispose of lawfully. Comply fully with federal, state and local environmental and antipollution regulations.

END OF SECTION 01 74 00

SECTION 01 77 00

CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:
   1. Substantial Completion Procedures
   2. Final Completion Procedures

1.03 DEFINITIONS

A. Substantial Completion: The time at which the Work is sufficiently complete in accordance with the Contract Documents so that the County can occupy or use the Work for it intended purpose.

B. Final Completion: The stage at which all the Work has been satisfactorily completed in accordance with the Contract Documents.

C. List of Incomplete Work: A comprehensive list of items to be completed or corrected, prepared by the Contractor for the purpose of obtaining certification of Substantial Completion. This list is also referred to as a "punch list."

1.04 SUBSTANTIAL COMPLETION PROCEDURES

A. The Architect will perform one (1) inspection for Substantial Completion upon the request of the Contractor. One (1) Certificate of Substantial Completion will be issued for the project; this certificate will include all of the Work and not a portion or portions. If the Architect is unable to issue the Certificate of Substantial Completion because the Work is not considered to be substantially complete, the Contractor shall pay all subsequent inspection costs, including compensation for the Architect’s services.

B. Prior to requesting Architect’s inspection for Certificate of Substantial Completion, complete the following activities and list all known exceptions in the request:
   1. Obtain and submit the Certificate of Occupancy and any applicable operating permits from authorities having jurisdiction. Said certificates and permits (if applicable) shall enable County to have full and unrestricted use of the Work, and unrestricted access to services and utilities.
   2. Touch up and otherwise repair and restore marred exposed finishes and conduct the final cleaning of the Project as directed elsewhere in these Specifications.
   3. Inform Owner of necessary procedures for changing over utilities and services and other operational and maintenance responsibilities.
   4. Conduct for the Owner’s personnel the demonstrations of equipment and systems and provide the operations and maintenance training required by the Contract Documents.
   5. Complete all graphics and signage, paving marking, and traffic control signage.
   6. Remove all temporary facilities from the Project site.
   7. Deliver to the Owner all tools, spare parts, extra stocks of materials, and similar physical items as required by the Contract Documents.

8. Place fire extinguishers charged and ready to use. Extinguishers shall bear tags showing the date tested and by whom.
9. Make changeover to permanent locking system, transmit keys to Owner, and advise Owner's personnel of changeover in security. Accompany keys with Finish Hardware Schedule and tag each key to indicate which lock it operates.
10. Complete all other activities specified by the Contract Documents to be completed before Substantial Completion.

C. Prior to requesting Architect's inspections for Substantial Completion, complete the following submittals (in triplicate unless specified otherwise):
1. Contractor's list of incomplete work.
2. Reports on operations and maintenance training for Owner's personnel.
3. Final report on testing, adjusting, and balancing of the HVAC system.
4. All submittals specified in the Contract Documents to be completed before Substantial Completion.

D. On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following the inspection or advise the Contractor of construction that must be completed or corrected before the Certificate will be issued. In the latter case, any follow-up inspections that must occur prior to granting Substantial Completion will be considered additional services by the Architect and will be compensated by the Contractor. The Certificate of Substantial Completion will be accompanied as necessary by a list of deficient work items (a Punch list) that must be completed or corrected by the Contractor prior to his requesting an inspection by the Architect for final acceptance and final completion of the Project.

E. Upon completion of the inspection and determination that the Work is substantially complete; the Architect's shall prepare a Certificate of Substantial Completion (on AIA Form No. G704, 2000 edition, or its equivalent) establishing a date when the Project is sufficiently complete and suitable for the use it is intended, and identifying a Punch list. The Architect and County shall execute said Certificate.

1.05 FINAL COMPLETION PROCEDURES

A. The Contractor's request for final inspection and final application for payment may coincide. The Architect will perform only one inspection for Final Completion, upon the request of the Contractor. The Contractor should take care that all requirements for Final Completion as indicated in the paragraphs below have been completed prior to submitting their request. If the Architect is unable to issue the certificate for final payment because the Work is not complete, the Contractor shall pay all subsequent inspection costs, including compensation for the Architect's services.

B. Prior to requesting Architect's final inspection for certificate of Final Completion and Final Payment, complete the following items and list any known exceptions in the request:
1. Submit a copy of the Punch list of itemized work to be completed or corrected, stating that each item has been completed, corrected or otherwise resolved for acceptance.
2. Submit final pay application accounting for all changes in Contract Sum, with final releases and support not previously submitted and accepted, including Consent of Surety to Final Payment.
3. Submit special warranties, workmanship bonds, maintenance agreements, final certifications and similar documents required by Contract Documents or related to installed equipment and materials. Submit required closeout submittals listed herein.

C. Closeout Submittals:
1. Warranties: In accordance with Contract Documents, Contractor shall furnish his one-year warranty in writing, on the form bound hereinafter. Warranties for a longer period of

time may be required by the Specifications. These warranties of a longer period also shall be assembled and submitted. Unless otherwise specified, all warranties shall commence on the Date of Substantial Completion. The warranties shall state the date on which they expire.

2. Statutory Affidavit: Before final closeout of the Work, the Contractor and Subcontractors shall furnish a Statutory Affidavit in the form attached to this section.
3. Inspection Reports: Secure and submit to the Owner, through the Architect, a certification from the local government agency or agencies having jurisdiction that the construction has been inspected as required by laws or ordinances, and that the Project is acceptable to the following authorities:
   - Local Building Inspector
   - Local HVAC Inspector
   - Local Plumbing Inspector
   - Local Electrical Inspector
   - Local Dept. of Public Utilities
   - Local Development Inspector
   - Local Fire Marshal
4. Certificate of Substantial Completion and Certificate of Final Completion: A Certificate of Substantial Completion including an accompanying Punch list for the Project will be prepared by the Architect for the purpose of establishing a date when the Project is sufficiently complete and suitable for the use it is intended. On final inspection of the Project, submit a Certificate of Final Completion verifying that Punch list items are complete and that all closing documents and payments are in order (as shown by the accompanying project close-out check list), and establishing a Date of Final Acceptance.
5. Project Record Documents: Submit to the Owner through the Architect the Project Record Documents (Drawings and Project Manual) specified elsewhere in these Specifications.
6. Maintenance & Operations Manuals: Submit to the Owner through the Architect the Operations and Maintenance Manuals specified elsewhere in these Specifications.
7. Materials and Services List: In addition to the Maintenance and Operations Manuals, prepare and submit to the Owner through Architect a list of all subcontractors and major suppliers who provided products, materials and services for the Project. Indicate company names, addresses, phone numbers, and personnel to contact for information or in case of problems. The list shall be typed in legible and organized format.
8. Close Out Documents:
   1. Special Warranties in excess of (1) year sections 3 to 33
   2. Attic Stock
   3. Operations and maintenance data
   4. Project Record documents

PROJECT CLOSE-OUT

CHECK OFF LIST

DOCUMENTS	NO. OF COPIES	DATE RECEIVED
Contractor's Warranty	_____	_____
Statutory Affidavit (Contractor's)	_____	_____
Statutory Affidavit (Sub-contractors')	_____	_____
Inspection Reports:		
County Building Inspector	_____	_____
County Plumbing Inspector	_____	_____
County HVAC Inspector	_____	_____
County Electrical Inspector	_____	_____
County Dept. of Public Utilities	_____	_____
County Development Inspector	_____	_____
Fire Marshal Occupancy Certificate	_____	_____
Planning & Development Occupancy Certificate	_____	_____
Record Drawings and Specifications	_____	_____
Operations and Maintenance Manuals & related Submittals	_____	_____
Certificate of Receipt of Keys and Schedule	_____	_____

PROJECT CLOSE-OUT
CHECK-OFF LIST
(Continued)

	NO. OF COPIES	DATE RECEIVED
Special Warranties (beyond one-year limit): (List appropriate warranties)		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PROJECT CLOSE-OUT

CHECK OFF LIST
(Continued)

	NO. OF COPIES	DATE RECEIVED
DOCUMENTS		
Punchlist Items Completed	_____	_____
Certificate of Substantial Completion	_____	_____
Certificate of Final Completion	_____	_____
Consent of Surety of Final Payment	_____	_____

I certify that, being familiar with the Contract Documents for this Project, to the best of my knowledge, the items checked off hereinabove constitute all that are applicable to this Project.

Date Submitted to the Architect: _____

Date Submitted to the Owner: _____

_____ _____

Contractor: Architect: Precision Planning, Inc.

STATUTORY AFFIDAVIT

STATE OF _____, COUNTY OF _____

FROM: _____
TO: _____

RE: Contract entered into the _____ day of _____ 20 ___, between the above mentioned parties for the construction of _____ _____ at _____

KNOW ALL MEN BY THESE PRESENTS:

1. The Undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all material, men, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character arising out of the performance of the contract which have not been paid and satisfied in full.

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the County.

   The undersigned makes this affidavit as provided by law and for the purpose of receiving final payment in full settlement of all claims arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the County from any and all claims under or by virtue of the contract.

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this day of _____, 20 ___.

Personally appeared before the undersigned, _____ who, after being duly sworn, depose(s) and say(s) that the facts stated in the above affidavit are true.

_____
Notary Public

This _____ date of _____, 20___.

My commission expires_____

CERTIFICATE OF FINAL COMPLETION

OWNER:_____ CONTRACTOR:_____

ARCHITECT:_____ BONDING CO.:_____

PROJECT NAME:_____

CONTRACTOR: _____

(Name, Address) _____

_____

TO (OWNER):

THIS CERTIFICATE COVERS THE ENTIRE PROJECT

By execution of this document, the Contractor and Architect each certify that the work performed under this Contract has been reviewed at a final inspection on _____, and found to be complete as verified by the attached project Close-Out Check-Off list, and the County accepts the Project as complete on the last date of this Certificate. Final payment to the Contractor is authorized. Execution and acceptance of this Certificate by the County, shall in no way waive or void any conditions of the Contract Documents.

A certificate of Substantial Completion has been issued establishing _____, as the date of beneficial use and the commencement of all Warranties and Guarantees required by the Contract Documents.

ARCHITECT	BY	DATE
CONTRACTOR	BY	DATE
OWNER	BY	DATE

END OF SECTION 01 77 00

SECTION 01 78 20

OPERATIONS AND MAINTENANCE DATA

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
   1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
   2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
   3. Instruction of the Owner's operating personnel in the operation and maintenance of building systems and equipment.

B. Related Sections: The following sections contain requirements that relate to this section:
   1. Division 1 Section, Submittals, specifies preparation of Shop Drawings and Product Data.
   2. Division 1 Section, Contract Closeout, specifies general closeout requirements.
   3. Division 1 Section, Project Record Documents, specifies record document requirements.
   4. Appropriate Sections of Divisions 3 through 33 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

1.03 QUALITY ASSURANCE

A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
   1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
   2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.

B. Instructions for the Owner's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the Owner's operation and maintenance personnel.

1.04 SUBMITTALS

A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:
   1. Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit a draft copy of each manual to the Architect for review. Include a complete index or table of contents of each manual. The Architect will return the draft with comments within 15 days of receipt.

2. Contractor must incorporate all of Architect's revisions and comments and submit final acceptable operations and maintenance manuals to Architect prior to requesting Final Completion on the Project.

B. Form of Submittal: **Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel (1 hard copy in a binder(s) and one (1) electronic version in PDF format).** Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.

1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11- inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
   a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
   b. Identify each binder on front and spine, with the printed title "Operation and Maintenance Manual," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the section on each divider.
3. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch white bond paper.
4. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
   a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
   b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.05 MANUAL CONTENT

A. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:

1. General system or equipment description.
2. Design factors and assumptions.
3. Copies of applicable shop drawings and product data.
4. System or equipment identification, including:
   a. Name of manufacturer.
   b. Model number.
   c. Serial number of each component.
5. Operating instructions.
6. Emergency instructions.
7. Wiring diagrams.
8. Inspection and test procedures.

9. Maintenance procedures and schedules.
10. Precautions against improper use and maintenance.
11. Copies of warranties.
12. Repair instructions including spare parts listing.
13. Sources of required maintenance materials and related services.
14. Manual index.

B. Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of product data, supplemented by drawings and written text; and copies of each warranty, bond, and service contract issued.

1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
   a. Subject matter covered by the manual.
   b. Name and address of the Project.
   c. Date of submittal.
   d. Name, address, and telephone number of the Contractor.
   e. Name and address of the Architect.
   f. Cross-reference to related systems in other operation and maintenance manuals.
2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
   a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
3. General Information: Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.
   a. Do not use original Project Record Documents as part of operation and maintenance manuals.
7. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the

Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

1.06 MATERIAL AND FINISHES MAINTENANCE MANUAL

A. **Submit one (1) copy of each manual and one (1) electronic PDF**, in final form, on material and finishes to the Architect for distribution. Provide one section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.
   1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.

B. Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
   1. Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:
      a. Manufacturer's catalog number.
      b. Size.
      c. Material composition.
      d. Color.
      e. Texture.
      f. Reordering information for specially manufactured products.
   2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.

C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.
   1. Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
      a. Applicable standards.
      b. Chemical composition.
      c. Installation details.
      d. Inspection procedures.
      e. Maintenance information.
      f. Repair procedures.

D. Schedule: Provide complete information in the materials and finishes manual on products specified in the following sections:

1.07 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

A. **Submit one (1) copy of each manual and one (1) electronic PDF**, in final form, on equipment and systems to the Architect for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
   1. Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.

B. Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.

1. Description: Provide a complete description of each unit and related component parts, including the following:
    a. Equipment or system function.
    b. Operating characteristics.
    c. Limiting conditions.
    d. Performance curves.
    e. Engineering data and tests.
    f. Complete nomenclature and number of replacement parts.
2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
    a. Printed operation and maintenance instructions.
    b. Assembly drawings and diagrams required for maintenance.
    c. List of items recommended to be stocked as spare parts.
3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
    a. Routine operations.
    b. Troubleshooting guide.
    c. Disassembly, repair, and reassembly.
    d. Alignment, adjusting, and checking.
4. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
    a. Startup procedures.
    b. Equipment or system break-in.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Instructions on stopping.
    f. Shutdown and emergency instructions.
    g. Summer and winter operating instructions.
    h. Required sequences for electric or electronic systems.
    i. Special operating instructions.
5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
7. Coordination Drawings: Provide Contractor's coordination drawings.
    a. Provide as-installed, color-coded, piping diagrams, where required for identification.
8. Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.
9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following:
    a. Electric service.
    b. Controls.
    c. Communication.

C. Schedule: Provide complete information in the equipment and systems manual on products specified in the following sections:

1.08 INSTRUCTIONS FOR THE OWNER'S PERSONNEL

A. Refer to Section 018150 System Demonstration and Training for additional requirements.

B. Prior to the Date of Substantial Completion, instruct personnel designated by the Owner in the operation and maintenance of equipment and systems.
    1. Systems shall include but not necessarily be limited to:

a. HVAC
b. Electrical power and lighting
c. Plumbing and fire protection
d. Fire alarms
f. Security/CCTV/AV and other low voltage items as required

2. For equipment and operable systems, explain all modes of operation. Demonstrate all functions, including startup, operation, control, adjustment, shutdown, servicing, and maintenance.
3. For other building elements and systems describe the installation and indicate manufacturers directed or otherwise preferred means of cleaning, servicing, maintaining or repairing.
4. Review terms of warranties and procedures for obtaining warranty service.
5. Have operating and maintenance data available for use during instruction. Review contents with Owner's personnel. Prepare and insert additional data when need becomes apparent during instruction.

C. Arrange times and places for instruction with Owner. Provide instruction by qualified personnel of Contractor, their subcontractor, or applicable manufacturer's representative.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 78 20

SECTION 01 78 40

WARRANTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 1 Section, Contract Closeout, specifies contract closeout procedures.
2. Divisions 3 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.
3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

A. Contractor's Warranty: Contractor shall provide a warranty on the Project that warrants that all labor and materials furnished and work performed are in accordance with the Contract Documents and will be free from defects due to defective materials and/or workmanship for a period of one year from the Date of Substantial Completion. Warranty shall be provided on the form provided in this Specification Section.

B. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the work or part of the work, the Owner reserves the right to refuse to accept the work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

A. Submit written warranties to the Architect effective on the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution. Refer to Specifications Divisions 3 through 33 for specific Contract requirements and particular requirements for submitting special warranties.

C. Form of Submittal: **Compile two (2) hard copies and one (1) electronic copy** of each required warranty properly executed by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

3. Provide additional copies of each required warranty, as necessary, for inclusion in each required Operations and Maintenance Manual.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 LIST OF WARRANTIES

A. Schedule: Provide warranties on products and installations as specified in the following Sections:

All utilized Sections 1 through 33 as indicated.

3.02 CONTRACTOR'S WARRANTY

A. The format of submission of the Contractor's Warranty is included on the subsequent page in this Specification Section.

CONTRACTOR WARRANTY FORM

PROJECT:

LOCATION:

OWNER:

We, _____, Contractor
(Contractor's Name)

for the above referenced project, do hereby warrant that all labor and materials furnished and work performed are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials and/or workmanship for a period of one year from the Date of Substantial Completion. This Warranty commences on:

_____
(Date of Substantial Completion)

and expires on:

_____
(One Year from Commencement Date)

Should any defect develop during the warranty period due to improper materials, workmanship or arrangement; the same, including adjacent work displaced, shall be made good by the undersigned at no expense to the Owner.

The Owner will give the Contractor written notice of defective work. Should Contractor fail to correct defective work within sixty (60) days after receiving notice, the Owner may at its option, correct defects and charge Contractor costs for such correction. Contractor agrees to pay such charges upon demand.

Nothing in the above shall be deemed to apply to work that has been abused or neglected by the Owner or that was installed by another contractor.

For:_____
(Company Name)

By:_____

Title:_____

Date:_____

END OF SECTION 01 78 40

SECTION 01 81 00

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
1. Maintenance of project record documents
2. Record drawings or "as-builts".
3. Record specifications
4. Operations and Maintenance manuals.

1.02 SUBMITTALS

A. Project Record Documents: Project record documents consist of three (3) submittals—Record Drawings, Record Specifications and Operations and Maintenance Manuals. These submittals shall be provided to the Owner through the Architect after the Date of Substantial Completion inspection.
1. For Record Drawings, submit one (1) electronic set to the Architect in form PDF, marked and altered as required in this Section. Submit all drawings, whether or not they have been modified.
2. For Record Specifications, submit to Architect one legible set marked or altered as required in this Section.
3. For Operations and Maintenance Manuals, submit to Architect two (2) complete hard copy sets and one (1) electronic PDF prepared in the manner described herein.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 MAINTENANCE OF PRODUCT RECORD DOCUMENTS

A. Assign a person responsible for preparing and maintaining all record documents. Maintain the record documents in a secure location at the Project site but insure that they are accessible to Contractor and Architect during normal working hours. Do not use the record documents for any type of construction purposes in the field.

B. Record information on record documents as soon as possible after it is obtained. Mark Drawings and Specifications with a red pencil; make certain all notations are clearly legible. Incorporate into existing sets all new Drawings or Specifications issued by Architect. Mark shop drawings if better suited to show the actual work.

3.02 RECORD FIELD RUN SURVEY

A. **Upon project completion, provide a field run survey including all improvements within the property boundary, including building perimeter, floor elevations, door opening locations, parking, sidewalks, utilities and topographical grades**.

3.03 RECORD DRAWINGS

A. Maintain a complete set of opaque prints of the Drawings, including all sheets issued by Architect for addenda, clarifications or modifications. Record all information that indicates how the actual work differs from the Drawings and shows the details of installation that will not be obvious upon completion of construction, including:

1. Existing conditions in variance with Contract Documents.
2. Locations and depths of underground utilities.
3. Actual equipment locations.
4. Actual duct size and routing.
5. Changes made by Change Order.
6. Changes made following the Architect's written order or directives.
7. Details not on original Contract Drawings.
8. Dimensional or location changes.
9. Finish changes.
10. New and revised details for assemblies, attachments, fittings, adjacencies, etc.
11. Actual routings of plumbing piping and electrical conduits.
12. Revisions to electrical circuits.
13. Sizes and routings of HVAC equipment.
14. Locations particular on other critical system elements concealed in construction.
15. Changes made by Contract modifications, cross-referenced to applicable modification.
16. New information that may be useful to the Owner, which was not shown in Contract Documents or subsequent product submittals, including details or clarifications issued by Architect as responses to Contractor's requests.

B. Where a record drawing also is required as part of Operations and Maintenance Manuals, copy notations and marks to another copy of applicable drawings for said purpose. Also mark shop drawings as may be necessary for use in such manuals.

C. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, shall prepare the markup on Record Drawings. Contractor has responsibility to insure that this record is maintained.
1. Accurately record information in an understandable drawing technique.
2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
3. At time of Final Completion, submit Record Drawings to the Architect for the Owner's records.

3.04 RECORD SPECIFICATIONS

A. Maintain a complete set of Specifications, including all pages issued by Architect for addenda, clarifications, and modifications. Record all information that indicates how the actual work differs from the Specifications, including:
1. Product substitutions.
2. Changes made by Contract modifications, cross-referenced to applicable modifications.
3. New information that may be useful to the Owner, which was not shown in Contract Documents or subsequent product submittals, including details or clarifications issued by Architect as responses to Contractor's requests.

3.05 RECORD PRODUCT DATA

A. During the construction period, maintain one (1) copy of each Product Data submittal for Project Record Document purposes.
1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer'' instructions and recommendations for installation.
2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
3. Note related Change Orders and markup of Record Drawings, where applicable.
4. Upon Final Completion, submit a complete set of Record Product Data to the Architect for the Owner's records.

5. Where Record Product Data is required as part of maintenance manual, submit marked-up Product Data as an insert in the manual instead of submitting as Record Product Data.

3.06 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Final Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Architect for the Owner's records.
   1. Categories of requirements resulting miscellaneous records include, but are not limited to, the following:
      a. Field records on excavations and foundations.
      b. Field records on underground construction in similar work.
      c. Survey showing locations and elevations of underground lines.
      d. Survey showing invert elevations of drainage piping.
      e. Surveys establishing building lines and levels.
      f. Ambient and substrate condition tests.
      g. Certifications received in lieu of labels on bulk products.
      h. Batch mixing and bulk delivery records.
      i. Testing and qualification of tradesmen.
      j. Documented qualification of installation firms.
      k. Load and performance testing.
      l. Inspections and certifications by governing authorities.
      m. Leakage and water-penetration tests.
      n. Fire-resistance and flame-spread test results.
      o. Final inspection and correction procedures.

3.07 OPERATIONS AND MAINTENANCE MANUALS

A. **Submit two (2) sets of hardbound loose-leaf operations and maintenance manuals for the systems, equipment, finishes and other building components listed below in this section and otherwise provided for in the Specifications and one (1) electronic PDF**. Bind in individual heavy-duty, two-inch, three-ring binders, with pocket folders for folded sheet information and dividers with labeled index tabs. Label each manual on front and spine, indicating the project name and the nature of the information included in the manual. All text, drawings and diagrams shall be legible and presented in an organized and coherent fashion.

B. The Operations and Maintenance Manuals shall include information on the following building components:
   1. HVAC system, including equipment, distribution and controls.
   2. Electrical power system, including equipment, distribution, receptacles and connections.
   3. Electrical lighting.
   4. Electrical powered equipment purchased and installed by Contractor.
   5. Plumbing system and fixtures.
   6. Miscellaneous equipment purchased and installed by Contractor.
   7. Building accessories.
   8. Interior finishes, including floor coverings, ceiling tile, paints and wallcoverings and any other finishes requiring special treatment.
   9. Finish hardware.
   10. Doors.

C. For each of these components provide the following information as applicable to the component:
   1. Responsible subcontractor with address and phone number.
   2. Local supplier(s) with address and phone number.
   3. Nearest service organization (if applicable) with address and phone number.
   4. Operating instructions.

5. Emergency instructions.
6. Spare parts/stock list.
7. Warranties
8. Preventive maintenance requirements.
9. Cleaning requirements and instructions.
10. Product data and shop drawings (referenced if maintained elsewhere.)
11. Wiring diagrams.
12. Fixture schedule.

END OF SECTION 01 81 00

SECTION 01 81 50

SYSTEM DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 The work of this section consists of demonstrating systems and equipment to operating personnel. It also includes training of personnel.

1.2 COORDINATION

A. Schedule demonstrations and training periods with Owner. Conduct training sessions after the equipment or system has been fully completed and operational, approved by inspections of manufacturer and/or authorities having jurisdiction as required. Schedule and provide training by manufacturer's representatives where required and as requested at no additional cost to the Owner.

B. Training Schedule: This schedule lists the minimum system requirements for training and demonstration.

1. Mechanical Equipment and Controls Systems
2. Electrical and Lighting equipment and Controls Systems
3. Fire Alarm Systems
4. Elevator
5. Plumbing and fire protection
6. Security/CCTV/AV and other low voltage systems as required

1.3 CLOSEOUT SUBMITTALS

A. As specified in Section 01 77 00.

B. For each training session, the Contractor shall submit for approval a proposed outline of the subjects to be covered. The training shall not be conducted until the outline is approved.

C. Recordings of demonstrations and training sessions:

1. Provide original and one copy of each DVD.
2. Label each DVD with the date of demonstration or training, the instructor's name, and provide an index of the contents. The index shall list the start and end time of each subject covered during the training session. The sequence of the training subjects shall follow the sequence listed in the approved training outline or as actually conducted.
3. Provide a separate DVD for each separate training session.

PART 2 – PRODUCTS

2.1 MEDIA REQUIREMENTS

A. DVD format.

PART 3 – EXECUTION

3.1 TRAINING

A. As specified herein and in individual sections, furnish the services of instructors to train designated personnel in adjustment, operation, including seasonal and emergency operations, if applicable, maintenance, and safety requirements of equipment and systems. Instructors shall be thoroughly trained in operating theory as well as practical operation and maintenance work for each type of equipment or system. The sequence of the training shall follow the approved training outline.

B. Individual sections specify the duration of training required. If no duration is listed, provide training of sufficient duration to adequately cover the subjects. When more than four days of instruction are specified, use approximately one-half of the time for classroom and the other half for hands-on instruction with the equipment or system.

C. Use Operating and Maintenance Data as a training guide.

3.2 TAPING/RECORDING

A. Document all of the above sessions at the recording speed which produces the highest resolution picture. The instructor's voice shall be clearly audible and understandable on the recording. Utilize a supplemental microphone worn by the instructor.

B. DVD’s with poor video or audio quality will be rejected and the training Re-recorded.

END OF SECTION 01 81 50

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Water withheld for later addition at Project site is not permitted.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Shoring Shop Drawings: Shoring of floor members to control slab thickness, concrete ponding, floor level and other tolerances is at the contractor's discretion. Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of floor decking.

1. Shoring and Re-shoring: Indicate proposed schedule and sequence of shoring removal and installing and removing re-shoring. Structural engineer of record will not design or approve actual shoring elements.

E. Samples: For waterstops and vapor retarder.

F. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Waterstops.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.

9. Adhesives.
10. Vapor retarders.
11. Semirigid joint filler.
12. Joint-filler strips.

G. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

H. Minutes of pre-installation conference.

I. Slab-on-grade joint layout drawings: Dimensioned plan drawings indicating location and frequency of control construction joints in slab-on-grade pursuant to the guidelines in the structural contract drawings.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction**,** qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete".
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 318, "Building Code Requirements for Structural Concrete."

E. Concrete Testing Service: Owner shall engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.

d. Concrete subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, shoring and re-shoring procedures, vapor-retarder installation, steel reinforcement installation, and concrete protection.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

2.02 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.03 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. Precast concrete supports are acceptable for on-ground applications. For elevated slab areas, precast concrete supports are not permitted.

B. Mechanical Terminators and Splices: Mechanical terminators and splices shall meet building code requirements. Terminators and splices shall be a positive locking, taper threading type anchor manufactured from high quality steel. The ends of reinforcing shall be tapered using the manufacturer's threading equipment to ensure proper taper and thread engagement. Reinforcing, terminators, and splices shall be installed pursuant to manufacturer's requirements.

2.04 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I or Type III.

a. No other cementitious materials are permitted.

B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded.

1. Maximum Coarse-Aggregate Size: 1 ½ inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94.

2.05 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.06 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

B. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.07 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, to meet or exceed all requirements for Class A, Class B, and Class C. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.08 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Curing compound must be compatible with glue agent utilized for VCT.

2.09 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

1. All exterior expansion joint material shall be "zip strip" type with caulked joints.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. All Building Elements Except those Otherwise Noted: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.55.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 4 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

B. Concrete walls and loading dock slab: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 4 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

D. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.03 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or re-shoring until measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and provide adequate re-shoring to support construction without excessive stress or deflection.

3.05 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer’s recommended tape.

3.06 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Use of chairs or bolster is appropriate for placement of welded wire fabric. Fabric laid on grade or bottom of form to be "pulled up" after concrete is in place will not be permitted.

3.07 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.08 WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.09 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces to receive a rubbed finish.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.

1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for slabs-on-grade or suspended slabs. At suspended slabs, levelness measurements only apply to slabs which are shored at time of testing.
b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade at gymnasium or other areas to receive wood or athletic flooring.

3. Measurements of F(F) and F(L) shall be made as soon as possible, preferably within 24 hours, but not later than 72 hours after placement of slabs-on-grade, and prior to removal of formwork and shoring for suspended slabs.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

E. All slab areas where epoxy floor systems are specified shall be flood tested prior to the installation of epoxy coating.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days. Retain first three subparagraphs below as Contractor's options unless not suited for Project.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.15 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding

agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. or fraction thereof of each concrete mixture placed each day.
2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31.

    a. Cast and laboratory cure a minimum of four cylinder specimens for each composite sample.
    b. Cast and laboratory cure two additional cylinder specimens as necessary for determining early strength for formwork or shoring considerations or for reserve usage.

7. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days and one set of two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
15. Contractor shall provide a secure, protected curing box for the storage of concrete cylinders.

END OF SECTION 03 30 00

SECTION 04 20 00

UNIT MASONRY ASSEMBLIES

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 of this section.

1.02 DESCRIPTION OF WORK

A. This Section includes the following:

1. Concrete unit masonry.
2. Masonry accessories.

1.03 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following installed compressive strengths (f'm):

1. For concrete unit masonry: As follow:

a. f'm = 1,500 psi.

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each different masonry unit, accessory and other manufactured product installed.

C. Samples for verification purposes of the following:

1. Accessories embedded in the masonry.

D. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

1. Each different cement product required for mortar and grout including name of manufacturer, brand, type and weight slips at time of delivery.

E. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:

1. Grout mixes. Include description of type and proportions of grout ingredients.
2. Masonry units.

F. Cold-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

G. Hot-weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

1.05 QUALITY ASSURANCE

A. Unit Masonry Standard: Comply with TMS 402-16 “Building Code Requirements and Specification for Masonry Structures,” except as otherwise indicated.

B. Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization, be equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

C. 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.

D. 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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to protect 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. If units become wet, do not place until units are in an air-dried condition.

1. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type II units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.

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, and contamination avoided.

E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt and oil.

1.07 PROJECT CONDITIONS

A. Protection of Masonry: 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.

1. Extend cover a minimum of 60” down both sides and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surfaces.
2. Protect sills, ledges and projections from droppings of mortar.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

C. Cold Weather Construction:

1. Do not lay masonry units, which are wet or frozen.
2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
3. Remove masonry damaged by freezing conditions.

D. Hot-Weather Construction: Comply with referenced unit masonry standard.

E. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout.

1. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10° F (6° C).

a. 40° F (4° C) to 32° F (0 ° C):

(1) Mortar: Heat mixing water to produce mortar temperature between 40° F (4° C) and 120° F (49° C).
(2) Grout: Follow normal masonry procedures.

b. 32° F (0° C) to 25° F (-4° C):

(1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F (4° C) and 120° F (49° C); maintain temperature of mortar on boards above freezing.
(2) Grout: Heat grout materials to 90° F (32° C) to produce in place grout temperature of 70° F (21° C) at end of work day.

c. 25° F (-4° C) to 20° F (-7° C):

(1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F (4° C) and 120° F (49° C); maintain temperature of mortar on boards above freezing.
(2) Grout: Heat grout materials to 90° F (32° C) to produce in place grout temperature of 70° F (21° C) at end of work day.
(3) Heat both sides of walls under construction using salamanders or other heat sources. Use windbreaks or enclosures when wind is in excess of 15 mph.

d. 20° F (-7° C) and below:

(1) Mortar: Heat mixing water and sand to produce mortar temperatures between 40° F (4° C) and 120° F (49° C).
(2) Grout: Heat grout materials to 90° F (32° C) to produce in place grout temperature of 70° F (21° C) at end of work day.
(3) Masonry Units: Heat masonry units so that they are 20° F (-7° C) at time of laying.
(4) Provide enclosure and auxiliary heat to maintain an air temperature of at least 40° F (4° C) for 24 hours after laying units.
(5) Do not heat water for mortar and grout to above 160° F (71° C).

F. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40° F (4° C) to 32° F (0° C):

   a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. 32° F (0° C) to 20° F (-7° C):

   a. Completely cover masonry with weather-resistive membrane for at least 24 hours.

3. 25° F (-4° C) to 20° F (-7° C):

   a. Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

4. 20° F (-7° C and below):

   a. Except as otherwise indicated, maintain masonry temperature above 32° F (0° C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40° F (4° C) for 48 hours.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. General: Comply with referenced unit masonry standards and the requirements indicated below applicable to each form of concrete masonry unit required.

1. Provide special shapes where indicated and as follows:

   a. For lintels, corners, jambs, sash, control joints, sills, headers, bonding and other special conditions.
   b. Provide square-edged units for outside corners, except where indicated as bullnose.

2. Size: Provide concrete masonry units complying with requirements below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specifications for concrete masonry units.

   a. Hollow Load-Bearing Concrete Masonry Units:

      (1) Manufacturer’s standard units with nominal face dimensions of 16” long x 8” high (15-5/8” x 7-5/8” actual, respectively) x thickness indicated.

3. Exposed Faces: Manufacturer’s standard color and texture, unless otherwise indicated.

B. Hollow Load-Bearing Concrete Masonry Units: Comply with the latest revision of ASTM C 90, Grade N, and as follows:

1. Unit Compressive Strength:

a. Not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.
b. Weight Classification: Medium weight.

C. UL-Labeled Concrete Masonry Units: Provide where fire-resistant-rated partitions are indicated/required.

2.02 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

B. Ready-Mixed Mortar: Cementitious materials, water and aggregate complying with requirements specified in this article, combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

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. Aggregate for Grout: ASTM C 404.

F. Water: Clean and potable.

2.03 MISCELLANEOUS MASONRY ACCESSORIES

A. Preformed Control Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene Rubber Compound: ASTM D 2000, Designation 2AA-805.

2.04 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.

2.05 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including coloring pigments, 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. Limit cementitious materials in mortar to Portland cement-lime.
2. Use Type M mortar for CMU masonry below grade and in contact with earth, and where indicated.

3. Use Type S mortar for CMU masonry above grade.

D. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of reinforced and nonreinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement, which will completely fill all spaces intended to receive, grout. Grout shall have a minimum compressive strength of 2,000 psi.

1. Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated.
2. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.

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 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-driven 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 dry cutting saws to cut concrete masonry units.

H. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

I. Do not proceed until unsatisfactory conditions have been corrected.

3.02 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10', or 3/8" in a story height not to exceed 20', nor 1/2" in 40' or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20' maximum, nor 1/2" in 40' or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10', 1/2" maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20' maximum, nor 1/2" in 40' or more. Fortop

surfaces of bearing walls do not exceed 1/8” between adjacent floor elements in 10’ or 1/16” within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2” in any bay or 20’ maximum, nor 3/4” in 40’ or more.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4” nor plus 1/2”.

E. Variation in Mortar Joint Thickness: Do not exceed bed joint thickness indicated by more than plus or minus 1/8”, with a maximum thickness limited to 1/2”. Do not exceed head joint thickness indicated by more than plus or minus 1/8”.

3.03 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. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than 4” horizontal face dimensions at corners or jambs.

1. One-half running bond with vertical joint in each course centered on units in courses above and below.

D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2”. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4” horizontal face dimensions at corners or jambs.

E. 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.

F. Built-in Work: As the work progresses, built-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.
2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
3. Fill cores in hollow concrete masonry units with grout 3 courses (24”) under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

3.04 INSTALLATION OF REINFORCED UNIT MASONRY

A. General: Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.

B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.05 MORTAR BEDDING AND JOINTING

A. 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.

B. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8” joints.

C. Cut joints flush for masonry walls, which are to be concealed or to be covered by other materials, unless otherwise indicated.

D. For CMU masonry, tool exposed joints slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

E. 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.

3.06 LINTELS

A. For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as indicated and filled with concrete.

B. Provide minimum bearing of 8” at each jamb, unless otherwise indicated.

3.07 REPAIRING, POINTING AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units. Install 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 exposed 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. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.

D. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer that ensures unit masonry is without damage and deterioration at time of Substantial Completion.

3.08 MASONRY WASTE DISPOSAL

A. Remove excess masonry waste and legally dispose of off the Owner's property.

END OF SECTION 04 20 00

SECTION 04 21 13

BRICK VENEER

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   2. Face brick
   3. Through wall flashing
   4. Ties and anchors

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 7 Section "Flashing and Sheet Metal" for exposed sheet-metal flashing installed in masonry.
   2. Division 7 Section "Joint Sealants" for sealing joint in mockup.

C. Products installed but not furnished under this Section include the following:
   1. Steel lintels for unit masonry specified in Division 5, Section "Structural Steel Framing."
   2. Wood nailers and blocking built into unit masonry specified in Division 6 Section "Rough Carpentry."

1.3 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following installed compressive strengths (f'm) at 28 days.
   1. For Concrete Unit Masonry: As follows, based on net area:
      a. As indicated on structural drawings.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for field and accent brick, accessories, and other manufactured product specified.

C. Samples for verification of the following:
   1. Full-size units for each different brick veneer required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
   2. Colored-masonry mortar samples for each color required showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on the Project. Label samples to indicate type and amount of colorant used.
   3. Accessories embedded in the masonry.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility for Brick Veneer: Obtain exposed brick veneer of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

C. Mockup: Prior to installing unit masonry or brick veneer, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects as well as other qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
   1. Locate mockup on site in a location as directed by Architect.
   2. Build mockups for the following types of masonry in sizes approximately 72 inches long by 72 inches high by full thickness, including face and back-up as well as accessories. Include a sealant-filled joint at least 16 inches (406 mm) long in each mockup.
      a. Typical exterior wall including masonry and brick veneer with banding.
   3. Clean one half of the exposed faces of mockups with masonry cleaner indicated.
   4. Notify Architect one week in advance of the dates and times when mockups will be constructed.
   5. Protect accepted mockups from the elements with weather-resistant membrane.
   6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
      a. Acceptance of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
      b. Acceptance of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
      c. When directed, demolish and remove mockups from Project site.
   7. Provide necessary lateral support for mockup with braces and masonry reinforcing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store brick on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and mortar splatter by placing 2” of gravel or 3” of wheat straw from the wall surface up to 4’ from the veneer.
   2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:
1. Cold-Weather Construction: Comply with ACI 530.1/ASCE 6-99/TMS 602-99 "Specification for Masonry Structures", Section 1.8C.
   a. 40 to 32 deg F (4 to 0 deg C): Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F (4 and 49 deg C).
   b. Do not conduct masonry operations when temperature falls below 32 deg F (0 deg C).
2. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
   a. 40 to 25 deg F (4 to -4 deg C): Cover masonry with a weather-resistant membrane for 48 hours after construction.
3. Cold-Weather Cleaning: Use cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.

D. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and above.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Face Brick
   a Traingle
   b. Cherokee Brick – (basis of design)
   c. Architect approved equal.
3. Mortar:
   a Argos/Lafarge North America, Inc. – (basis of design)
   b. Coosa Masonry Cement.
   c. Giant Cement Co.
   d. Holcim Masonry Products.
   e. Lehigh Portland Cement Co.
   f. Architect approved equal.
4. Joint Reinforcement, Ties, Anchors and Cell Vents:
   a. Dur-O-Wal / Hohmann & Barnard Company – (basis of design)
   b. Masonpro.
   c. Wire-Bond.
   d. Architect approved equal.

2.2 BRICK

A. General: Provide shapes indicated and as follows for each form of brick required:
1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces (no exposed holes in exposed brick).

B. Face Brick: ASTM-C 652: Type HBS; Grade-SW for Hollow Brick, and as follows:
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
   2. 24-Hour Cold Water Absorption: Does not exceed 8.0%.
   3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "non effloresced."
   4. Size: Manufactured to the following actual dimensions:
      a. Modular: 3-1/2 inches wide by 2-1/4 inches high by 7-5/8 inches long.
   5. Application: Use where brick is exposed, unless otherwise indicated.
   6. Products:
      a. Field Brick: M/S, Velour Maroon
      b. Accent Brick Types: Random Mix (75%) Acme 132 Velour Alluvial Medium, (25%) Acme 131 Ruff Alluvial Light

2.4 MORTAR AND GROUT MATERIALS

A. Hydrated Lime: ASTM C 207, Type S.

B. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm), use aggregate graded with 100 percent passing the No. 16 (1.18 mm) sieve.

D. Aggregate for Grout: ASTM C 404.

E. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

F. Water: Potable.

G. Products: Subject to compliance with requirements, provide one of the following:
   1. Colored Masonry Cement:
      a. At locations of specified field brick, use the following:
         1. Argos/Lafarge Crimsib, Type N
      b. At locations of specified accent brick, use the following:
         1. Cemex Beige, Type N

2.7 ADJUSTABLE MASONRY-VENEER ANCHORS

A. General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

B. Screw-Attached, Masonry-Veneer Anchors at metal stud framing:
   1. HB-200-HS by Hohmann & Barnard, Inc.
   2. Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.
   3. Wire (carbon steel): Prefabricated from cold-drawn steel wire conforming to ASTM A82/A82M
   4. Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum
   5. Hot-dip Galvanized after fabrication: ASTM A153/A153M-B (1.5 oz/ft^2)

C. Screw-Attached, Masonry-Veneer Anchors at concrete:
   1. HB-200 by Hohmann & Barnard, Inc.

2. Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.
3. Wire (carbon steel): Prefabricated from cold-drawn steel wire conforming to ASTM A82/A82M
4. Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum
5. Hot-dip Galvanized after fabrication: ASTM A153/A153M-B (1.5 oz/ft^2)

D. Masonry-Veneer Anchors at CMU:
1. Lox-All Truss Reinforcement #170 Truss Eye-Wire by Hohmann & Barnard, Inc.
2. Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.
3. Conforms to ASTM A951/A951M-06, ACI/ASCE 530 and ASTM A82/A82M
4. Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum
5. Hot-dip Galvanized after fabrication: ASTM A153/A153M-B2 (1.5 oz/ft^2)

2.8 EMBEDDED FLASHING MATERIALS

A. Thru-Wall Flashing: ExoAir TWF Self-adhered thru-wall flashing membrane by Tremco. Refer to Division 7 Fluid Applied Vapor Permeable Membrane Air Barriers.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Weeps:
1. Cell Vents: Ultra Violet Resistant Polypropylene cell vent tested in conformance with ASTM D2240, D790B, D638 and D1238B.
a. Quadro-Vent by Hohmann & Barnard, Inc.
b. #3601 Cell Vent by Wire-bond.
d. Color to be selected from standard color samples.

B. Cavity Wall Drainage System:
1. Trapezoidal shaped mortar dropping collection device with bug screen.
a. Hohmann & Barnard, Inc. - Mortar Trap (Basis of Design)
b. Or Wire-Bond – Cavity Net DT
c. Or Architect approved equal prior to bid.

2.10 MASONRY CLEANERS

A. Brick shall be cleaned only with Sure Klean Vana Trol.
1. Prosoco, Inc., 3741 Greenway Circle, Lawrence KS, 66046. Phone: 800-255-4255

B. Apply with a hand sprayer and once activated, use a bucket and brush and scrub lightly. Wash off with clean water. Do not clean with a wire brush or high pressure washer which could result in removing the face color of the brick.

C. Sample area shall be approved by the Architect prior to full cleaning.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.

B. Mortar for brick veneer: Comply with BIA M1, Proportion Specification, for types of mortar indicated below:
1. For all exterior non load-bearing brick masonry, use type indicated below:
a. Type: N

C. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.

2.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

2.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown.

B. Cut brick with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

2.3 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet, nor 1/2 inch maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2 inch in 20 feet , nor 3/4 inch in 40 feet or more.

D. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8 inch. Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch. Do not vary head-joint thickness from adjacent head-joint thickness by more than 1/8 inch. Do not vary from collar-joint thickness indicated by more than minus 1/4 inch or plus 3/8 inch.

2.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations. **Units less than 3" will not be acceptable**, adjacent two bricks shall be cut to allow for half-size units.

B. Lay concealed masonry on straight wall segments with all units in a wythe in running bond. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-in Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

2.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick as follows:
1.a Lay vertical-cell units with full head joints, unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.
2.a Lay horizontal-cell units with full bed joints, unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit in place and one side of unit to be placed.
3.a Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch joints.

B Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

2.6 CAVITIES/AIR SPACES

A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
1.a Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.

B. Tie exterior wythe to back-up with individual metal ties. Stagger alternate courses.

2.7 CONTROL AND EXPANSION JOINTS

B. General: Install control and expansion joints in brick where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form expansion joints in brick made from clay or shale as follows:
1.a Form open joint of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Maintain joint free and clear of mortar.

2.8 LINTELS

A. Install steel lintels over window and door openings, for sizing refer to structural (otherwise provide 4”x6”x3/8” LLV at each opening up to 6’-0” wide).

B. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

C. Steel Lintels shall be painted to match the brick.

2.9 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep vents in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall and where indicated.

B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.

C. Install flashing as follows:
   1. At masonry walls, extend flashing from 1/2" from exterior face of veneer, through the veneer, up interior wall back-up at least 8 inches above mortar net and terminate per air barrier membrane manufacturer's written requirements.
   2.a At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn up not less than 2 inches to form a pan.

D. Install weep vents in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:
   1.a Install weeps with product specified in Part 2 of this Section.
   2.a Space weep vents as indicated on the drawings.

E. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

2.10 FIELD QUALITY CONTROL

A. The Contractor shall employ and pay a qualified independent testing agency to perform the following testing for field quality control. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Evaluation of Quality-Control Tests: In the absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality-control tests comply with minimum requirements indicated.

2.11 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.

C. In-Progress Cleaning: **Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints, this is not negotiable.** Non-conforming progress cleanings will be considered unacceptable if not performed while placing the masonry.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean brick by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised, using the following masonry cleaner:
   a. Sure-Clean.
7. If efflorescence occurs after final cleaning, the contractor is responsible for hand rubbing with brushes and mild soap and water to remove surface salts.

E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION 04 21 13

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Architecturally exposed structural steel.
3. Grout.

1.02 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges (2010)", that support design loads.

B. Architecturally Exposed Structural Steel: Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.03 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details and procedures indicated in AISC's " Steel Construction Manual," Parts 9 through 15.
2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.
3. Connections for a beam which cannot conform to AISC typical connection details shall be designed and detailed in accordance with the following.

a. Where beam reactions are not shown on the drawings, connections shall be designed for one-half the maximum uniform load which the beam will support (as simple span) for the span shown on the drawings for non-composite beams or three-quarters of the maximum uniform load which the beam will support (as simple span) for the span shown on the drawings for composite beams.
b. Where connections support beams which are subject to concentrated loads, such concentrated loads shall be taken into account when designing the connections.
c. Where connections are subject to eccentricity, such eccentricity shall be taken into account when designing the connections.
d. End connections of floor members shall accommodate end rotations of simple, unrestrained beams. For this purpose, inelastic action in the connection is permitted.
e. Coped or cut ends of members shall be reinforced where required to sustain the specified reactions.

B. Design Responsibility: The Fabricator shall be responsible for all errors of detailing on the shop drawings, errors in fabrication, and for the correct fitting of the structural steel members.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
5. For structural-steel connections indicated to comply with design loads, include structural analysis data prepared by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.
4. Nonshrink grout.

E. Source quality-control test reports.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer with not less than 5 years' experience in the erection of structural steel who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance, and who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges (AISC 303-10)".

a. Paragraph 4.4.1 (b) of the above Code is hereby modified by the revision: "Confirmation that the Owner's Designated Representative for Design has reviewed the Connection details shown on the Shop and Erection Drawings and submitted in accordance with Section 3.1.2, if applicable; and,"
b. Paragraph 4.4 of the above is hereby modified by the revision: "The shop and erection drawings shall be returned to the Fabricator within 23 calendar days."

2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's Specification for Structural Steel Buildings—AISC 14th edition (2010).
4. AISC's "Specification for Structural Joints Using High-Strength Bolts (2009)."

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.07 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992.

B. Channels, Angles**,** M, S-Shapes: ASTM A 36.

C. Plate and Bar: ASTM A 36.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain
2. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type.

a. Finish: Plain

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.

1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type, plain.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain.

D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

E. Headed Anchor Rods: ASTM F 1554, Grade 55, straight.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Plate Washers: ASTM A 36 carbon steel.
3. Washers: ASTM F 436 hardened carbon steel.
4. Finish: Plain.

F. Threaded Rods: ASTM A 36

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM F 436 hardened ASTM A 36 carbon steel.
3. Finish: Plain

G. Clevises and Turnbuckles: ASTM A 108, Grade 1035, cold-finished carbon steel.

H. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.

2.03 PRIMER:

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.04 GROUT:

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's Specification for Structural Steel Buildings—AISC 14th edition (2010).

B. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.
2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

C. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

2.06 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless otherwise indicated on the drawings or where pretensioned or slip-critical joints are recommended or required by RCSC or AISC.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. For architecturally exposed structural steel, remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.07 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.08 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify elevations of concrete and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments with steel erector present, for compliance with requirements.

3.02 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

E. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

F. No burning or welding of steel shall be performed unless shown on the drawings and specifications or directed by the Structural Engineer of Record. Any burning performed to elongate hole openings or to otherwise facilitate erection shall not be permitted and all affected steel members shall be removed and replaced.

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.04 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless otherwise indicated on the drawings or where pretensioned or slip-critical joints are recommended or required by RCSC or AISC.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings—AISC 14th edition (2010) for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

    a. Grind butt welds flush.
    b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3. Contractor shall clean and prime all joints and bolts within 72 hours of installation.

3.05 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures if the quality of project welds cannot be confirmed by visual inspection alone. Testing procedure shall be the option of the testing agency.

    a. Liquid Penetrant Inspection: ASTM E 165
    b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    c. Ultrasonic Inspection: ASTM E 164.
    d. Radiographic Inspection: ASTM E 94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

E. Contractor shall not request engineer approval or acceptance of any determined deficiency with the Contract Documents.

F. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.

3.06 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 05 12 00

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Exterior non-load-bearing wall framing.

1.02 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated.
2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

a. Exterior Non-Load-Bearing Framing: Horizontal deflection of L/240 of the wall height.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

a. Upward and downward movement of 1 inch.

B. Cold-formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing – Header Design."
2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.03 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

C. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C Welding certificates: Copies of certificates for all welding procedures and personnel shall be submitted for review and retained on the job-site at all times.

D. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:

1. Steel sheet.
2. Expansion anchors.

3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

F. Research/Evaluation Reports: For cold-formed metal framing.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:

1. Clark Steel Framing.
2. Craco Metals Manufacturing, LLC.
3. Custom Stud, Inc.
4. Dale/Incor.
5. Dietrich Metal Framing; a Worthington Industries Company.
6. MarinoWare; a division of Ware Industries.
7. United Metal Products, Inc.

2.02 MATERIALS

A. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G90 or equivalent.

B. Steel Sheet for Vertical Deflection and Drift Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G90.

2.03 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Minimum Flange Width: 1-3/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.

C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Minimum Flange Width: 1 inch plus the design gap for 1-story structures.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

2.04 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.05 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.

B. Anchor Rods: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.06 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.07 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.03 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.04 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:

1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single-leg deflection tracks and anchor to building structure.
2. Connect vertical deflection clips to infill studs and anchor to building structure.
3. Connect drift clips to cold formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

a. Install solid blocking at 96-inch centers maximum

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.05 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.06 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 05 40 13

LIGHT GAUGE STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Light gauge steel wall framing.

B. Related Sections:

1. Division 7 Section “Thermal Insulation”
2. Division 9 Section “Gypsum Board Assemblies”.

1.02 SUBMITTALS

A. Reference Section for Submittal Procedures; submit following items:

1. Product Data for each size proposed.
2. Manufacturer’s Installation Instructions for framing members and framing accessories.
   a. Indicate type of defection track proposed.

1.03 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturers’ Qualifications: Minimum five years experience in producing products of the type specified.
2. Installer Qualifications: Minimum three years experience in installation of the type of products specified.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect light gauge steel framing components from rust and damage.

B. Deliver to the project site in manufacturer’s unopened containers or bundles, fully identified with name, brand type and grade.

C. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Studs and Accessories:

1. Refer to Cold Formed Steel Framing for approved manufacturers.

B. Studs: ASTM A 653/653 M steel, G60 (Z180) galvanized, channel shaped with lipped flanges, punched web, size as shown on Drawings, thickness and grade as noted on drawings.

C. Tracks: ASTM A 653/653 M steel, same designation, coating, and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as noted on drawings.

2.02 FRAMING ACCESSORIES

A. Material: ASTM A 653 (653M) steel; SS Grade 50 (340), Class 1, 50 ksi (340 MPa) minimum yield strength, 65 ksi (450 Mpa) minimum tensile strength, G60 (Z180) hot-dipped galvanized coating, except as otherwise noted.

B. Miscellaneous Items:

1. Joist Hangers: Rigid attachment to structure and joist web, 68 mils (1.72 mm) thick. Provide hanger type and size as required by structural design calculations.
2. Joist Plate: Hole reinforcing plates designed for screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.
3. Web Stiffeners: Channel shaped stiffener. Screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.

2.03 FASTENERS

A. Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural design calculations, or as recommended by The STEEL Network for the specific condition and thickness of materials being joined.

B. Powder Actuated Fasteners: Federal Specification FF-P-395b. Manufacturer from AISI 1062 1065 steel, tempered to a minimum core hardness of 50 to 54 HRC and zinc plated in accordance with ASTM B 633. Provide fasteners listed or approved by one or more of the following and of type, diameter and length as required by structural design calculations:

1. Underwriters Laboratory
2. Factory Mutual
3. International Conference of Building Officials
4. Southern Building Code Congress

2.04 FABRICATION

A. General:

1. Framing components may be prefabricated into panels prior to erection.
2. Fabricate panels plumb, square, true to line and braced against racking with joints welded.
3. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.

2.06 IDENTIFICATION

A. On all studs, provide a legible sticker, stamp, stencil, or embossment, spaced a maximum of 4 feet on center and located on the web of the framing member.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which work will be installed.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.02 GENERAL INSTALLATION

A. Install light gauge steel framing plumb, square, true to line and securely fasten as required by structural design calculations.

B. Follow manufacturer's installation instructions. If installation instructions conflict with these specifications or Drawings, adhere to specifications or Drawings.

C. Cut members by shearing or sawing.

D. Install members in single piece lengths.

.

E. Install insulation in framing spaces of insulated assemblies made inaccessible after erection.

F. Tolerances:

1. Variation from plumb, level, and true to line: 1/8 inch in 10 feet (1:960).
2. Member Spacing: Not more than 1/8 inch (3 mm) plus or minus from spacing indicated.

3.03 FRAMING MEMBER INSTALLATION

A. Studs:

1. Secure bottom and top tracks in place to meet manufacturer's and Code requirements.
2. Install studs at spacing as shown on Drawings, at each side of openings, and not more than 2 inches (50 mm) from abutting walls.
   a. Frame corners with three studs.
   b. Frame wall openings wider than stud spacing with double stud at each jamb.
3. Install supplementary framing or blocking to support work attached to framing. Where type of support is not shown, comply with industry standards.
4. Install studs plumb, except as needed for diagonal bracing or required for non-plumb wall or warped surfaces and similar requirements.
   a. Attach studs to top and bottom runner tracks by self-drilling screw as defined below at both inside and outside flanges.
   b. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.

B. Runner Tracks

1. Install continuous tracks sized to match studs in gauge and width, unless noted otherwise. Align tracks accurately to layout at base and tops of studs.
2. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" o.c. spacing for nailing or powder-driven fasteners, or 16" o.c. for other types of attachments, or as otherwise noted on the drawings.
3. Provide fasteners at corners and ends of tracks.

3.04 QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspection agency to provide reports of inspections.

B. Testing agency shall demonstrate, to the satisfaction of the authorities having jurisdiction, competence to perform special inspections.

C. Testing agency shall provide the following special inspections:

1. Periodic inspection of screw attachments bolting, anchoring and other fastening of components within the bracing systems, including struts braces and hold-downs.
2. Verify that fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.

3.05 FIELD CONDITIONS AND PROTECTION

A. Light gauge metal framing shall be installed when the roof is completed. Metal studs shall be kept from rusting due to exposure to water. Any studs that are damaged do to rusting shall be removed and replaced.

B. Light gauge metal framing shall be protected from damage during construction, damaged or bent studs shall be removed and replaced.

END OF SECTION 05 40 13

SECTION 05 52 13

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior steel railings.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Shop drawing shall show the existing conditions of the retaining wall it will be attached. Field verification shall be indicated on the shop drawings.

B. Costs associated with shop drawing generation is the cost of work for material and labor. Such costs shall be paid only when the material is shipped to the job site.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before shop drawing production.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 45 00 "Quality Control Procedures," to design railings, including attachment to structural elements.

B. Structural Performance: Railings, including attachment to construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.

2.3 STEEL RAILINGS

A. Fabricators: Subject to compliance with requirements of the structural steel specifications.

B. Source Limitations: Obtain each type of railing from single source from single fabricator.

C. Tubing: ASTM A500/A500M (cold formed).

D. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations.

E. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

A. Fastener Materials:

1. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
2. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

1. For steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations and where indicated on Drawings, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water.

1. Provide weep holes where water may accumulate.
2. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection, using an epoxy structural adhesive, if this is manufacturer's standard splicing method.

J. Form changes in direction as follows:

1. As detailed.
2. By bending or by inserting prefabricated elbow fittings.
3. By bending to smallest radius that will not result in distortion of railing member.

K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
2. Coordinate anchorage devices with supporting structure.
3. Provide socket covers designed and fabricated to resist being dislodged.
4. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize indicated steel railings, including hardware, after fabrication.
2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate to verify that locations of concealed attachment is stable and will support new work.

3.2 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.
2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
5. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

C. Leave anchorage joint exposed with anchoring material flush with adjacent surface.

D. Anchor posts to metal surfaces with flanges, angle type, or floor type, as required by conditions, connected to posts and to metal supporting members as follows:

1. For steel railings, weld flanges to post and bolt to metal supporting surfaces.

3.4 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

    a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

3.5 CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.6 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 52 13

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Wood blocking, cants, and nailers.
5. Wood furring.
6. Sheathing.
7. Plywood backing panels.

B. Related Sections include the following:

1. Division 6 Section “Finish Carpentry” for nonstructural carpentry items exposed to view and not specified in another Section.

1.03 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Exposed Framing: Dimension lumber not concealed by other construction.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA – Northeastern Lumber Manufacturers Association.
2. NLGA – National Lumber Grades Authority.
3. RIS – Redwood Inspection Service.
4. SPIB – Southern Pine Inspection Bureau.
5. WCLIB – West Coast Lumber Inspection Bureau.
6. WWPA – Western Wood Products Association.

1.04 SUBMITTALS

A. Products Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. 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 Board of Review.

C. Research / Evaluation Reports: For the following, showing compliance with International Building Code, 2018 edition:

1. Preservative-treated wood.
2. Engineered wood products.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.
6. Metal framing anchors.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

B. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Laminated-Veneer Lumber (LVL):

a. Boise Cascade

b. Weyerhaeuser

2. Metal Framing Anchors:

a. Simpson Strong-Tie Company, Inc.

2.02 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to review a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sized are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated.
5. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's publish values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Wood Structural Panels:

1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated on structural drawings.
2. Oriented Strand Board: DOC PS 2.
3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
4. Factory mark panels according to indicated standard.

2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:

a. Chromated copper arsenate (CCA).
b. Ammoniacal copper zinc arsenate (ACZA).
c. Ammoniacal, or amine, copper quat (ACQ).
d. Copper bis (dimethyldithiocarbamate)(CDDC).
e. Ammoniacal copper citrate (CC).
f. Copper azole, Type A (CBA-A).

g. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 18 inches above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.04 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Joists, Rafters, and Other Framing: Pursuant to structural drawings.

C. Exposed Exterior Framing Indicated to Receive a Stained or Natural Finish: Provide material hand-selected for uniformity of appearance and freedom from characteristics that would impair finish appearance.

1. Species and Grade: As indicated above for load bearing construction of same type.

2.05 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Rooftop equipment bases and support curbs.
2. Blocking.
3. Cants.
4. Nailers.
5. Furring.
6. Grounds.

B. For items of dimension lumber size, provide No. 2 grade lumber with 19 percent maximum moisture content and the following species:

1. Southern Yellow Pine (SYP) or Spruce-Pine-Fir (SPF)

C. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.06 ENGINEERED WOOD PRODUCTS

A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Products has the following allowable design values as determined according to ASTM D 5456:

1. Extreme Fiber Stress in Bending, Edgewise: 2900 psi for 12-inch nominal depth members.
2. Modulus of Elasticity, Edgewise: 2,000,000 psi.

2.07 SHEATHING

A. Plywood Wall Sheathing:

1. Span Rating: Not less than 24/0.
2. Thickness: Not less than ½ inch.

B. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 79, with water-resistant material incorporated into the core and with water–repellent paper bonded to core's face, back, and long edges.

1. Type and Thickness: Regular, ½ inch, Type X, 5/8 inch thick.
2. Edge and End Configuration: square ends.
3. Size: 48 by 96 inches for vertical or 48 by 108 inches for vertical installation.

C. Plywood Roof Sheathing: Exterior Exposure 1, sheathing.

1. Span Rating: Not less than 32/16.
2. Thickness: Not less than ½ inch.

2.08 FASTENERS

A. General: Provide fasteners of size and type of indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.09 METAL FRAMING ANCHORS

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:

1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall by determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

D. Joist Hangers: U-shaped joist hangers with 2-inch long seat and 1-1/4 inch-wide nailing flanges at least 85 percent of joist depth.

1. Thickness: 0.062 inch.

E. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.

1. Strap Width: 2 inches.
2. Thickness: 0.062 inch.

F. Bridging: Rigid, V-section, nail less type, 0.062 inch thick, length to suit joist size and spacing.

G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch- minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.

H. Joist Ties: Flat straps, with holes for fasteners, for typing joists together over supports.

1. Width: 1-1/4 inches.

2. Thickness: 0.062 inch.
3. Length: 24 inches minimum or as indicated on plans.

I. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 48 inches long.

J. Hold-Downs: Pursuant to structural drawings.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 23-II-B-1, “Nailing Schedule,” and Table 23-II-B-2, “Wood Structural Panel Roof Sheathing Nailing Schedule,” in the Uniform Building Code.
4. Table 2305.2, “Fastening Schedule,” in the BOCA National Building Code.
5. Table 2306.1, “Fastening Schedule,” in the Standard Building Code.
6. Table 602.3(1), “Fastener Schedule for Structural Members,” and Table 602.3(2), “Alternate Attachments,” in the International One- and Two-Family Dwelling Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrilled as required.

F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.02 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screening or attaching other work. Form to shapes indicated and cut as require for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.03 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Do not splice structural members between supports.

D. Where built-up beams or girders of 2-inch nominal-dimension lumber of edge are required, fasten together with 2 rows of 20d nails spaced not less than 32 inches o.c. Locate one row near top edge and other near bottom edge.

1. For continuous members, locate end joints over supports.

3.04 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist, nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal-size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal-size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.05 TIMBER FRAMING INSTALLATION

A. Install timber with crown edge up and provide not less than 4 inches of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports if not continuous.

B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2 inch air space at sides and ends of wood members.

C. Install wood posts using metal anchors indicated.

D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.06 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations contained APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below

1. Sheathing:

a. Nail or staple to wood framing.
b. Space panels 1/8 inch apart at edges and ends.

2. Plywood Backing Panels: Nail or screw to supports.

END OF SECTION 06 10 00

SECTION 06 20 23

INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Interior Standing and Running Trim.

1.2 SUBMITTALS:

A. Product Data: For accessories and finishing materials and processes.

B. Shop Drawings: Show location of each trim profile, dimensioned plans and elevations, large-scale details, attachment devices, and field verified other built components (such as light switches, electrical outlets, fire extinguisher cabinets, fire alarm pull station).

C. Samples:

1. Trim sample 12” long for each for painted finish for each profile.

1.3 QUALITY ASSURANCE:

A. Installer Qualifications: Fabricator of woodwork shall have 5 years of experience in finished trim.

B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver no components to project site until areas are ready for installation.

B. Handle materials to prevent damage to finished surfaces and edges.

C. Provide protective coverings to prevent damage or staining following installation for duration of project.

D. Store components on edge, fully supported at 10 degrees off vertical, indoors where atmospheric conditions are controlled to avoid temperature extremes and exposure to ultraviolet light and moisture.

PART 2 - PRODUCTS

2.1 INTERIOR STANDING AND RUNNING WOOD TRIM:

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Acceptable manufacturers:

a. Basis of Design:
   1) Pierce & Pierce Moldings
b. Optional:
   1) Randall Brothers Inc.
c. Other manufacturers desiring approval comply with front-end document on alternate approval process.

B. Material:
1. Provide all base, base cap, half round, panel moulding and chair rail trim in paint grade poplar with no visible knots.
2. Provide picture and crown mould with pine or fur with no visible knots.

C. Trim profiles are identified on the drawings for:
1. Crown moulding
2. Picture moulding
3. Chair rail
4. Panel moulding
5. Base trim, cap and half-round

2.2 SHOP PRIME:

A. Finish prefabricated trim at architectural woodwork fabrication shop. Defer only final painting and cleaning until after installation.

B. Back priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming.

B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Shim as required with concealed shims.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber/material available) to greatest extent possible. Scarf running joints and stagger in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base.

3.2 ADJUSTING

A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; replace woodwork where not possible to repair. Adjust joinery for uniform appearance.

3.3 CLEANING

A. Clean, lubricate and make final adjustments for correct operation.

3.4 PROTECTION

A. Cover woodwork to protect during remainder of construction.

END OF SECTION 06 20 23

SECTION 06 40 23

INTERIOR ARCHITECTURAL WOODWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Plastic-laminate cabinets.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section "Rough Carpentry" for exposed framing and for furring, blocking, shims, and hanging strips for installing interior woodwork.
2. Division 12 Section “Stone Countertops”

1.3 DEFINITIONS

Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction prior to woodwork installation.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each type of product indicated, including cabinet hardware and accessories.

C. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show woodwork details to scale.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
4. Show materials, finishes, edge and backsplash profiles for countertops with methods of jointing and terminations.

D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Plastic laminates.

E. Samples for verification of the following:

1. Plastic-laminate-clad panel products, 8 by 10 inches, for each type, color, pattern, and surface finish, with separate samples of un-faced panel product used for core.
2. Solid surface materials, 6” square.
3. Edge profiles for solid surface materials.
4. Exposed cabinet hardware and accessories, one unit for each type and finish.

F. Product certificates signed by woodwork fabricator certifying that products comply with specified requirements.

G. Qualification data for firms and persons specified in the "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.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delaying the Work.

B. Single-Source Responsibility for Fabrication and Installation: Engage a qualified woodworking firm to assume undivided responsibility for fabricating, finishing, and installing woodwork specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Additional Environmental Limitations: Do not deliver or install woodwork until HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the construction period.

C. Field Measurements: Check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

1.9 WARRANTY

A. Solid Surface Manufacturer's Warranty: Manufacturer and installer agree to repair or replace sheet material not free from defects in materials, fabrication, or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Provide materials where the following products are part of interior woodwork, with requirements of the referenced product standards that apply to product characteristics indicated:

1. Cabinet Core Materials: All core material shall be cabinet grade hardwood plywood as follows.
   a. 1/4” Nominal thickness maple hardwood plywood with MDF core (Grade A-4).
   b. 1/2” Nominal thickness maple hardwood plywood with 5 ply veneer core (Grade A-1)
   c. 3/4” Nominal thickness maple hardwood plywood with 7 ply veneer core (Grade A-1)
2. Toe Kick Materials: All toe kicks shall be constructed of pressure treated lumber as follows:
   a. 3/4” nominal thickness pressure treated plywood
   b. 2”x4” nominal thickness pressure treated lumber

B. Thermoset Decorative Panels: Hardwood plywood core finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.

1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
   a. Wilsonart International, Inc. (Basis of Design)
   b. Formica
   c. Laminart
   d. Architect approved equal.
2. Colors and Patterns: Refer to Finish Drawings.

2.2 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Cabinet Hardware Schedule: Refer to schedule at end of this Section for cabinet hardware required for architectural cabinets.

C. Hardware Standard: Comply with BHMA A156.9 for items indicated by reference to BHMA numbers or referenced to this standard.

D. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA code number indicated.

2.3 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.

1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

E. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

2.4 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:

1. Grade: Custom.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch thick or less: 1/16 inch.
2. Edges of rails and similar members more than 3/4 inch thick: 1/8 inch.

D. Complete fabrication, including assembly, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

E. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings.

2.5 PLASTIC-LAMINATE CABINETS

A. Grade: Custom.

B. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: HGS.
2. Post formed Surfaces: HGP.
3. Vertical Surfaces: HGS.
4. Provide interior surface materials indicated below:
   a. Surfaces Other Than Drawer Bodies: **Tan melamine**.
   b. Drawer Sides and Backs: **Tan melamine**.
   c. Drawer Bottoms: **Tan melamine**.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. Colors shall be selected from manufacturer's full range of colors and finishes selected by the Architect.

PART 3 – EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) for plumb and level (including tops).

B. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

C. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

D. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm)

penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

B. Clean, lubricate, and adjust hardware.

3.5 CABINET HARDWARE AND ACCESSORY SCHEDULE

A. Manufacturers and BHMA numbers are used below to designate hardware requirements, except as otherwise indicated.

B. Concealed Hinges steel hinges made from 0.095-inch thick metal, and as follows:

1. Concealed Hinges for Overlay Doors: BHMA A156.9- 1994 Grade 1 criteria.

C. Wire Pulls: Back mounted, 4 inches long, 1-1/2 inches deep, and 5/16 inches in diameter, satin stainless steel finish.

D. Shelf Rests: BHMA A156.9, B04013.

E. Drawer Slides: Side-mounted, full-extension with steel ball bearings, melamine coated drawer slides, BHMA A156.9, Grade 1 and rated for the following loads:

1. Box Drawer Slides: 100 lbf
2. File Drawer Slides: 200 lbf
3. Keyboard Slide: 100 lbf

F. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

END OF SECTION 06 40 23

SECTION 07 13 26

SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

Installation of sheet membrane waterproofing on surfaces indicated on drawings, consisting of preparation of existing and repaired masonry surfaces, sealing of cracks and joints, and application of CCW MiraDRI 860/861 Sheet Membrane Waterproofing.

1.2 RELATED SECTIONS

A. Division 07 – Joint Sealants

1.3 REFERENCES

A. ASTM D 412 Tests for Rubber Properties in Tension

B. ASTM E 154 Puncture Resistance

C. ASTM E 96 (B) Water Vapor Transmission of Materials

D. ASTM D 1970 Self-Adhering Polymer Modified Bituminous Sheet Materials

E. ASTM D 882 Test Method for Tensile Properties

F. ASTM D 3767 Practice for Rubber – Measurement of Dimensions

G. ASTM D 751 Test Method for Coated Fabrics

H. ASTM D 570 Test Method for Water Absorption of Plastics

I. UL 790 Tests for Fire Resistance of Roof Covering Materials

J. GSA-PBS 07121 Test for Decay from Soil Burial

K. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

L. ASTM D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel).

1.4 SYSTEM DESCRIPTION

Product provided by this Section is a self-adhesive membrane of not less than 60 mils thickness, consisting of 56 mils of rubberized asphalt membrane laminated to a 4 mil cross-laminated polyethylene film.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01 30 00.

B. Product Data: Submit manufacturer's product literature and installation instructions.

C. Subcontractor’s approval by Manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.

D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.7.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials and shall be specifically approved in writing by the membrane manufacturer.

B. Regulatory Requirements: Comply with applicable codes, regulations, ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).

1.7 WARRANTY

A. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 5 years.

B. The formation or presence of mold or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Carlisle and Carlisle shall not be responsible for any claims, repairs, restoration, or damages relating to the presence of any irritants, contaminants, vapors, fumes, molds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with following information.
   1. Name of material.
   2. Manufacturer's stock number and date of manufacture.
   3. Material safety data sheet.

B. Store materials in protected and well ventilated area.

1.9 PROJECT CONDITIONS

A. Do not apply membrane when surface temperature is below or inclement weather conditions conflict with manufacturer’s published requirements.

B. Coordinate waterproofing work with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the installation.

C. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.

D. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post “NO SMOKING” signs.

E. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Provide CCW MiraDRI 860/861 Sheet Membrane Waterproofing System as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane, Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076.

B. Approved Manufacturers**:**
1. Tremco Commercial Sealant and Waterproofing
2. W.R. Meadows, Inc.
3. Architect Approved Equal prior to Bid.

2.2 PRODUCTS

A. Self-Adhesive Sheet Membrane Waterproofing: Shall be CCW MiraDRI 860/861consisting of a 56 mil rubberized asphalt membrane laminated to 4 mil cross-laminated polyethylene film, and shall meet or exceed the following requirements:
1. Tensile Strength: 325 psi minimum, ASTM D 412
2. Ultimate Elongation: 350% minimum, ASTM D 412
3. Puncture Resistance: 60 lbs. minimum, ASTM E 154
4. Permeance: 0.05 Perm maximum, ASTM E 96 (B)
5. Low Temperature Flexibility: Unaffected at -45ºF, ASTM D 1970, 1" mandrel
6. Tensile to Film: 5000 psi, ASTM D 882
7. Thickness: 60 mils, ASTM D 3767
8. Hydrostatic Head: 230 ft., ASTM D 751
9. Water Absorption: 0.1% by wt., ASTM D 570

B. For application temperatures between 25 and 65ºF, use CCW-861 Sheet Membrane and CCW-702. For application temperatures above 40°F use CCW MiraDRI 860 sheet membrane and CCW-702, CCW-714 primer, or CCW-AWP.

2.3 ACCESSORY PRODUCTS

A. Surface Primer: Shall be CCW-702LV Solvent-Based Contact Adhesive, 702WB or Cav-Grip.

B. Mastic: Shall be CCW-704 Mastic.

C. Sealants: Shall be CCW-703 Vertical Grade Liquiseal[7] Membrane, one component approved sealant by CCW, CCW-201 two-component Polyurethane Sealant or CCW LM-800XL

D. Backing Rod: Shall be closed-cell polyethylene foam rod.

E. Provide all components in the base bid required by the manufacturer to provide a warranty listed above.

PART 3 - EXECUTION

3.1 INSPECTION

A. Before any waterproofing work is started the waterproofing applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.

B. Condition of Existing Concrete and Masonry Surfaces:

1. The concrete surfaces shall be of sound structural grade and shall have a smooth finish, free of fins, ridges, protrusions, rough spalled areas, loose aggregate, exposed course aggregate, voids or entrained air holes. Rough surfaces shall receive a well-adhered parget coat.
2. Concrete or masonry repairs shall be cured by water curing method. Any curing compounds must be of the pure sodium silicate type and be approved by the Carlisle representative.
3. Concrete or masonry repairs shall be cured at least 7 days and shall be sloped for proper drainage.
4. Voids, rock pockets and excessively rough surfaces shall be repaired with approved non-shrink grout or ground to match the unrepaired areas.
5. Surfaces at cold joints shall be on the same plane.

3.2 SURFACE PREPARATION

A. The concrete and masonry surfaces must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.

B. Install a 3/4" face, 45 degree cant of CCW-201 Polyurethane Sealant or CCW LM-800XL at all angle changes and inside corners including penetrations through the deck, walls, curbs, etc.

C. All cracks over 1/16" in width and all moving cracks under 1/16" in width shall be routed out to 1/4" minimum in width and depth and filled flush with an approved sealant by CCW or CCW-201 polyurethane sealant.

D. All expansion joints less than 1" wide shall be cleaned, primed, fitted with a backing rod and caulked with CCW-201 Polyurethane Sealant. For larger joints, contact Carlisle representative.

E. Allow all sealant to cure at least overnight.

F. Stir Primer. Apply a thin film of primer 10" wide, centered over sealed cracks and joints, hairline cracks, and cold joints. Apply primer 8" on each side of all corners. Prime concrete around drain flanges. Allow primer to dry per manufacturer=s recommendations.

G. Install an 8" wide strip of CCW MiraDRI 860/861centered over joints and cracks. Install a 12" wide strip of CCW MiraDRI 860/861centered over the axis of all corners.

3.3 APPLICATION

A. Priming: Clean surfaces to remove residual dust before priming. Stir primer. Apply by spray or roller at a rate recommended by manufacturer. Allow to dry per manufacturer’s recommendation.

B. Horizontal surfaces: Install sheet membrane from low to high point, so that laps will shed water. Overlap edge seams 2½”, end laps 5". Stagger end seams. Roll in place with an 18 to 24" wide, 100 lb. (min.) resilient roller. Ensure that all laps are firmly adhered and that there are no gaps or fish mouths.

C. Vertical Surfaces: Apply in lengths of 8' or less. Overlap edge seams 2½”. On walls over 8' high, apply in 8' sections, starting at the lowest point with the higher section overlapping the lower section 5". Roll in place using firm pressure with a hand roller.

D. Terminations: Consult Carlisle 860-9 Details for proper terminations. Roll terminating edges firmly. Apply CCW-704 mastic to all terminations and >T= joints. Apply CCW-704 Mastic or CCW-703-V Liquiseal to laps at angle changes, extending 9" in each direction.

3.4 INTEGRITY TESTING

A. Test is required for all expanded warranties beyond the standard material warranty of horizontal applications.

B. The test can be done with Electronic Vector Mapping or flood testing. Flood testing requires 2” minimum head of water for a period of 24 hours.

3.5 PROTECTION COURSE

A. VERTICAL APPLICATION:

Install CCW QuickDRAIN Perimeter Drainage System as the first course of drainage composite immediately after membrane has been installed on vertical surfaces. Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation), CCW Protection Board-V Protection Course or CCW 200V on remainder. Stop drainage composite 6" below final grade level.

B. HORIZONTAL APPLICATION:

Install CCW MiraDRAIN Drainage Composite (consult CCW for recommendation) or CCW Protection Board-H Protection Course or CCW 300HV immediately after flood testing on horizontal surfaces. If flood testing is delayed, install a temporary covering to protect the CCW MiraDRI 860/861membrane from damage by other trades.

END OF SECTION 07 13 26

SECTION 07 21 00

THERMAL INSULATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:
   1. Rigid cavity wall building insulation.
   2. Formaldehyde-free concealed building insulation.
   3. Formaldehyde-free concealed sound control batts.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 9 Section "Gypsum Board Assemblies" for insulation installed as part of metal-framed soffit assemblies.

1.03 REFERENCES

A. ASTM International:
   1. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
   2. ASTM C1320 Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
   3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   4. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
   5. ASTM C665 Standard Specification for Mineral Fiber Blanket, Thermal Insulation.
   6. ASTM C1014 Standard Specification for Spray-Applied Mineral Fiber Thermal and Sound Absorbing Insulation.

1.04 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of insulation product specified.

C. Installation instructions.

1.05 QUALITY ASSURANCE

A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

C. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

C. Handle boards carefully so corners are not broken off or boards are otherwise damaged.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:
1. Johns-Manville (Basis of Design)
2. Owens Corning
3. Certainteed
4. Dow Chemical
4. Architect approved equal prior to Bid

2.02 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

B. Extruded-Polystyrene Board Insulation: Rigid closed cell extruded polystyrene thermal board insulation. Comply with ASTM C 578-95 and with other requirements indicated below::
1. Type IV, density 1.6 lb/cu. ft. min., compressive strength 25 psi (ASTM D 1621-94).
2. Thermal resistance: 5-year aged R-values of 5.4 and 5.0 min. deg F-ft^2-h/Btu^2/inch at 40deg F and 75deg F respectively (ASTM C 518-91).
3. Water absorption: Max 0.1% by volume (ASTM C 272-91(96)).
4. Surface-Burning Characteristics:
   a. Flame-spread: 5.
   b. Smoke Developed: 165.
5. Thickness: 1”

C. Formaldehyde-free™ Unfaced Faced Batts:
1. Thermal Resistance (R-Value) (ASTM C518):
   a. R-13 at infill around exterior wall structural framing

b. R-38 above finished ceiling
2. Combustion Characteristics (ASTM E136): Pass.
3. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft2 × s (0.12 W/cm2).
4. Water Vapor Permeance (ASTM E96): N/A
5. Water Vapor Sorption (ASTM C1104): 5% or less.
6. Odor Emission (ASTM C1304): Pass.
7. Corrosiveness (ASTM C665, 13.8): Pass.
8. Fungi Resistance (ASTM C1338): Pass.
9. Flamespread (ASTM E84): 25, maximum.
10. Smoke Developed (ASTM E84): 50, maximum.
11. Material Standard: ASTM C665, Type I

D. Formaldehyde-free™ Kraft Faced Batts: (At exterior walls not to receive gypsum board)
1. Thermal Resistance (R-Value) (ASTM C518):
a. R-13 at infill around exterior wall structural framing
b. R-30 at 8" metal framed exterior walls
2. Combustion Characteristics (ASTM E136): Pass.
3. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft2 × s (0.12 W/cm2).
4. Water Vapor Permeance (ASTM E96): 0.05 perm (3 ng/Pa × s × m2).
5. Water Vapor Sorption (ASTM C1104): 5% or less.
6. Odor Emission (ASTM C1304): Pass.
7. Corrosiveness (ASTM C665, 13.8): Pass.
8. Fungi Resistance (ASTM C1338): Pass.
9. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.
10. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.
11. Flamespread (ASTM E84): 75, maximum.
12. Smoke Developed (ASTM E84): 150, maximum.
13. Material Standard: ASTM C665, Type III, Class B, Category 1.

E. Formaldehyde-Free Sound Control Batts: comply with requirements indicated below:
1. Product: Johns-Manville MinWool® Sound Attenuation Fire Batts
2. Thickness: 4"
a. Provide one (1) layer of 4" sound batt insulation in 4" partitions as indicated on Drawings.
b. Provide two (2) layers of 4" sound batt insulation in 8" partitions as indicated on Drawings.
c. Provide one layer of 4" sound batt insulation over restroom gypsum ceilings.
3. Noncombustible per ASTM E136.
4. Flamespread (ASTM E84): 5 or less.
5. Smoke Developed (ASTM E84): 0 or less.
6. Material Standard (ASTM C665): Type I.

2.03 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates and as recommended by Manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulations, including removing all projections that interfere with insulation attachment.

3.03 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Apply necessary layers of insulation to produce thickness or R value indicated.

3.04 INSTALLATION OF CAVITY WALL INSULATION

A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

3.05 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install glass-fiber blankets in cavities formed by framing members using blanket widths and lengths that fill the cavities formed by framing members.

3.06 PROTECTION

A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

B. Remove and replace any insulation that is exposed to moisture or rain. Necessary precautions shall be taken to prevent water from reaching insulation.

C. Protect air barrier materials from damage during installation and the remainder of the construction period, according to manufacturer's written instructions.

1. Coordinate with installation of materials which cover the air barrier assemblies, to ensure exposure period does not exceed that recommended by the manufacturer.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION 07 21 00

SECTION 07 26 00

UNDER-SLAB VAPOR RETARDER

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Vapor retarder, seam tape and mastic for installation under concrete slabs.

B. Application of an under-slab vapor retarder.

1.02 RELATED SECTIONS

A. Division 3 Section “Cast-In- Place Concrete”.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
   2. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs.
   3. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
   4. ASTM E1643 – Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
   5. ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

B. American Concrete Institute (ACI)
   1. ACI 302.2R-06 Guide for concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.04 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Submit manufacturer's product data, samples and application instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer's instructions.

C. Stack membrane on smooth ground or wood platform to eliminate warping.

D. Protect materials during handling and application to prevent damage or contamination.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply on frozen ground.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Stego Industries, LLC, 216 Avenida Fabricante, Suite 101, San Clemente, CA 92672. (877) 464-7834. Fax (949) 257-4113; Web Site www.stegoindustries.com. (basis-of-design)

B. W.R. Meadows., P.O. Box 338, Hampshire, IL 60140-2100. (800) 342-5976. Fax (864) 683-4544, Web Site www.wrmeadows.com.

C. Architect approved equal prior to bid. Refer to Section 01 63 00 "Product Substitution Procedures".

2.02 MATERIALS

A. Plastic Vapor Retarder
1. Performance Based Specification: Vapor Retarder membrane must meet or exceed all requirements of ASTM E1745 Class A, B & C.
a. Under Slab Vapor Retarders: ASTM E1745 Class A, B & C – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs: Exceeds Class A, B & C.
b. Water Vapor Permeance: ASTM F1249 – Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor: 0.0086 perms.
c. Puncture Resistance: ASTM D1709 – Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method: 2266 grams.
d. Tensile Strength: ASTM D882 – Test Method for Tensile Properties of Thin Plastic Sheeting: 70.6 lbf/in.
e. Permeance After Conditioning (ASTM E1745 Sections 7.1.2 – 7.1.5)
ASTM E154 Section 8, F1249 –Permeance after wetting, drying and soaking: 0.0098 perms
ASTM E154 Section 11, F1249 –Permeance after heat conditioning: 0.0091 perms
ASTM E154 Section 12, F1249 –Permeance after low temperature conditioning: 0.0097 perms
ASTM E154 Section 13, F1249 –Permeance after soil organism exposure: 0.0095 perms
f. Thickness: ACI 302.1R-04 – Minimum Thickness: 15 mils
2. Products:
a. Stego Wrap Class C Vapor Retarder 10 mils by Stego Industries.
b. Perminator 10 mil vapor barrier by WR Meadows.

2.03 ACCESSORIES

A. Seam Tape
1. Use only manufacturer approved seam tape and mastic in accordance with manufacturer's installation requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive membrane. Ensure that base material is approved by Geotechnical Engineer. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643.

B. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete pour.

C. Lap vapor barrier over footings and/or seal to foundation walls.

D. Overlap joints 6 inches and seal with manufacturer's tape.

E. Seal all penetrations (including pipes) per manufacturer's instructions.

F. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.

G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches beyond the damaged area in all directions and taping all sides with manufacturer's recommended tape.

END OF SECTION 07 26 00

SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. A fluid-applied membrane and accessory products for use as an air barrier in exterior walls.

B. Materials and installation to bridge and seal the following air leakage pathways and gaps:
1. Connections of the walls to the roof air barrier
2. Connections of the walls to the foundations
3. Seismic and expansion joints
4. Openings and penetrations of window frames, door frames, store front, curtain wall
5. Barrier pre-cast concrete and other envelope systems
6. Door frames Piping, conduit, duct and similar penetrations
7. Masonry ties, screws, bolts and similar penetrations
8. All other air leakage pathways through the walls

1.2 RELATED SECTIONS

A. Division 3 Section “Cast-In-Place Concrete”

B. Division 4 Section “Unit Masonry”

C. Division 7 Section “Self-Adhering Sheet Waterproofing”

C. Division 7 Section “Thermal Insulation”

D. Division 7 Section “Sheet Metal Flashing and Trim”

E. Division 7 Section “Joint Sealants”

F. Division 8 Section “Hollow Metal Doors and Frames”

G. Division 9 Section “Gypsum Assemblies”

1.3 REFERENCES

A. American Association of Textile Chemists and Colorists (AATCC) Test Method 127. “Water Resistance – Hydrostatic Pressure Test”

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2010 “Energy Standard for Buildings Except Low-Rise Residential Buildings”

C. ASTM C 920 Standard Specification for Elastomeric Joint Sealants

D. ASTM D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep slope roofing Underlayment for Ice Dam Protection.

E. ASTM D 4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

F. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.

G. ASTM E 783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

H. ASTM E 1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference

I. ASTM E 2178 Standard Test Method for Air Permeance of Building Materials

J. ASTM E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

K. Canadian General Standards Board (CGSB) 71-GP-24M Standard for: Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation

1.4 PERFORMANCE REQUIREMENTS

A. Installed product and accessories constitute a continuous air barrier, as described in ASHRAE Standard 90.1-2010 Section 5.4.3.1.

B. Installed product and accessories shall perform as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration.

C. Installed product and accessories shall exhibit an air leakage rate, infiltration and exfiltration modes, measured after pressure cycling, not to exceed 0.2 L/s*m^2 at 75 Pa (0.040 CFM/ft^2 at 1.57 PSF) according to ASTM E 2357.

D. Product shall be a nominal 0.040 inch (40 mils) thickness membrane, with dry film thickness of installed product measuring a minimum of 0.030 inch (30 mils) with a comb gauge.

E. Product shall meet the following requirements:

REQUIREMENT	**RESULT**	**TEST METHOD**
Air Permeance – on Porous Substrate	Not more than 0.02 L/s*m^2 at 75 Pa (0.002 CFM/ft^2 at 1.56 PSF)	ASTM E-2178, mod sprayed on CMU
Air Permeance – Free Film	Not more than 0.02 L/s*m^2 at 75 Pa (0.002 CFM/ft^2 at 1.56 PSF)	ASTM E-2178
Low Temperature Flexibility	No cracking at minus 29 degrees F, 180 degree bend over 1 inch mandrel	ASTM D 1970
Fastener Sealability	No water leaking through nail penetration after 24 h.	ASTM D 1970
Water Resistance	Product spray-applied to CMU and gypsum sheathing with joint shall resist a 55 cm (22 inch) column of water for 5 hours, no leaking or wet through.	AATCC-127 - mod, static head generated with 5”diameter PVC pipe sealed to specimen

REQUIREMENT	RESULT	TEST METHOD
Pull Adhesion	Not less than 16 lbf per square inch (or report value at substrate failure) on glass-faced gypsum sheathing and concrete masonry unit (CMU)	ASTM D 4541, modified 4 inch wood puck
Water Vapor Permeance	Not more than 1 Perm	ASTM E-96, Method B

1.5 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00.

B. Shop drawings showing locations and extent of air barrier and details of all typical conditions.

C. Manufacturer's technical data sheets and material safety data sheets for product and accessories.

D. Manufacturer's installation instructions.

E. Certification of compatibility by manufacturer, listing all materials on the project with which the product and accessories may come into contact.

F. Free film sample of product at representative cured thickness, minimum 2 inch by 3 inch size.

G. Sample of detail flashing and transition membrane, minimum 2 inch by 3 inch size.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Shall be experienced in applying the same or similar materials and shall be specifically approved in writing by Manufacturer.

B. Single-Source Responsibility: Obtain product and accessories from single manufacturer.

C. Product and Accessories shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

D. Pre-Installation Meeting: Convene one (1) week prior to commencing Work of this Section, in accordance with Division 1 Section "Project Meetings".

E. Field-Constructed Mock-Ups: Prior to installation on Project, apply product and accessories on mock-up to verify details under shop drawing submittals, to demonstrate tie-ins with adjoining construction and other termination conditions and to become familiar with properties of materials in application:

1. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing, building corner condition, junction with roof system foundation wall and typical penetrations and gaps; illustrating interface of materials and seals

F. Allow full cure of product and test mock-up in accordance with ASTM E 783 and ASTM E1105 for air and water infiltration

G. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed product unless it has been inspected, tested and approved.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, lot number and directions for storage.

B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.

C. Avoid spillage. Immediately notify Owner if spillage occurs and start clean up procedures. Clean spills and leave area as it was prior to spill.

1.8 PROJECT CONDITIONS

A. Do not apply product or accessories during rain or accumulating snowfall.

B. Apply product and accessories within approved ambient and substrate temperature range stated in manufacturer’s literature.

C. Do not apply product or accessories over incompatible materials.

D. Observe safety and environmental measures indicated in manufacturer’s MSDS, and mandated by federal, state and local regulations.

1.9 WARRANTIES:

A. Provide the manufacturer’s minimum five (5) year material warranty.

PART 2 PRODUCTS

2.1 MANUFACTURER:

A. Basis of Design: Carlisle Coatings & Waterproofing, Incorporated, 900 Hensley Lane, Wylie, TX 75098. Phone: 1-800-527-7092. Website: http://www.carlisleccw.com.

B. Approved Manufacturers:
1. Tremco Commercial Sealant and Waterproofing
2. W.R. Meadows, Inc.
3. Architect Approved Equal prior to Bid.

2.2 PRODUCTS

A. Spray Applied: Barritech VP

B. Roller-Applied: Barritech VP

2.3 ACCESSORIES: Provide as manufactured by Carlisle Coatings & Waterproofing, Incorporated.

A. Detail Flashing: CCW-705. 40 mil thickness, self-adhering flashing consisting of polymeric film laminated with modified asphalt adhesive. Provided in rolls of various widths

B. Sheathing Joint Tape: Barritape. 20 mil thickness, self-adhering flashing consisting of polymeric film laminated with modified asphalt adhesive. Provided in 4 inch X 100 foot rolls.

C. Foil-Faced Tape: AlumaGRIP-701. 30 mil thickness, self-adhering flashing consisting of 0.020 inch [2 mil] aluminum foil laminated with non-asphalt butyl adhesive. Provided in rolls of various widths

D. Contact Adhesive:
1. CCW-702 Solvent-Based

E. Detail Mastic: LM 800 XL

F. Transition Membrane: CCW SURE-SEAL Pressure-Sensitive Elastoform. 90 mil composite membrane consisting of 60 mils un-cured EPDM laminated with 30 mils of synthetic rubber pressure-sensitive adhesive.

G. Transition Membrane Primer:
1. SURE-SEAL HP-250 Primer

H. Reinforcing Fabric: DCH Reinforcing Fabric. Woven polyester fabric offered in rolls of various widths.

I. Glass Mat: LiquiFiber-W. Randomly-oriented glass strands held in water- soluble binder. Offered in rolls of various widths.

J. Fill Compound:
1. CCW-703 V Modified polyurethane, 2-part

2.3 RELATED MATERIALS BY OTHERS

A. Paintable Sealant, select any:
1. Sonneborn NP-1 1-part polyurethane sealant
2. Sikaflex 2C NS 2-part polyurethane sealant by Sika Corporation
3. Other product approved by air barrier manufacturer

B. Silicone Sealant, select any:
1. Dow 790, 791, 795
2. Pecora 890, 891, 895
3. GE Silpruf, Silpruf LM
4. Other product approved by air barrier manufacturer

Silicone is not compatible with rubberized asphalt. Silicone sealants are suitable for installation OVER foil or poly-faced flashing materials.

C. Polyurethane Foam Sealant, select any:
1. Great Stuff by Dow Chemical Company
2. Froth Pack by Dow Chemical Company
3. Other product approved by air barrier manufacturer

D. Insulation Adhesive, select any
1. Sonneborn Premium Adhesive
2. QB-300 Multi-Pupose Construction Adhesive by OSI
3. PL-300 VOC Foamboard Adhesive by Loctite
4. Other product approved by air barrier manufacturer

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions affecting installation of the air and vapor barrier and accessory products for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Verify that wall assemblies are dried in, such that water intrusion will not occur from above, behind or around the air barrier installation.

C. Concrete and masonry shall be cured for a minimum of seven days. It shall be smooth, with sharp protrusions such as form joints ground flush. Honeycomb and holes/cracks exceeding ¼ inch across shall be filled with grout or mortar.

D. Surfaces shall be sound, dry and free of oil, grease, dirt, excess mortar or other contaminants.

E. Surfaces shall be supported and flush at joints without large voids or sharp protrusions.

F. Mortar joints shall be struck flush and shall be free of voids exceeding ¼ inch across. Mortar droppings shall be removed from brick ties and all other surfaces accepting air barrier.

G. Sheathing boards shall be flush at joints, with gaps between boards according to building code and sheathing manufacturer's requirements. Sheathing boards shall also be securely fastened to the structure with proper fastener type, technique and spacing according to building code and sheathing manufacturer's requirements. Sheathing boards shall be repaired or replaced if inspection reveals moisture damage, mechanical damage or if sheathing boards have exceeded the exposure duration or exposure conditions as required by the sheathing manufacturer.

H. Inform Architect in writing of:
   1. Cracks in concrete and masonry.
   2. Gaps or obstructions such as steel beams, angles, plates and projections which cannot be spanned or covered by Product or Accessories.
   3. Anticipated problems applying product and accessories over substrate.

3.2 SURFACE PREPARATION

A. This project will have fluid-applied Membrane Air Barrier material applied to the cavity side of the existing and new CMU. Special attention and care must be taken to provide a smooth, filled surface to receive the membrane. The care is necessary to insure the design performance of the selected materials. Concrete masonry unit (CMU) wall shall be prepared as follows to accept the air & vapor barrier:
   1. Surfaces shall be free of contaminants such as grease, oil and wax on surfaces to receive membrane.
   2. The CMU surfaces shall be free from projections.
   3. Strike all mortar joints flush to the face of the concrete block.
   4. Fill all voids and holes greater than ¼ inch across at any point with mortar, sealant or other approved fill material.
   5. Surface irregularities exceeding ¼ inch in height or sharp to touch shall be ground flush or made smooth.
   6. Fill around all penetrations with mortar, sealant or other approved fill material and strike flush.

7. If the surfaces cannot be made smooth to the satisfaction of the manufacturer's technical representatives, it will be the responsibility of the trade to alternatively apply a parge coat (typically one part cement to three parts sand) in the base bid over the entire surface to receive Air & Vapor Barrier Membrane.
8. Remove mortar droppings on brick ties, shelf angles, brick shelves or other horizontal obstructions.

B. Fill cracks, gaps and joints exceeding ¼ inch width with fill compound or paintable sealant.

C. Fill rough gaps around pipe, conduit and similar penetrations with mortar, non-shrink grout, fill compound or polyurethane foam sealant shaved flush.

D. Apply a 3/4 inch cant of fill compound at the intersection of the base of the wall and the footing.

3.3 DETAILING

A. Additional materials and installation are required at joints, transitions, openings, terminations, penetrations and similar surface irregularities. Perform detailing before or after product installation.

B. Install product and accessories in details as directed in manufacturer's literature.

C. Sheathing joints, use any of the following methods:
1. Sheathing joint tape, centered over joint
2. 4 inch foil-faced tape, centered over joint
3. 4 inch detail flashing centered over joint.
4. 4 inch reinforcing fabric imbedded in product and centered over joint.
5. Paintable sealant or fill compound, tooled as shown in details.

D. Sheathing inside and outside corners. Flashing or reinforcement shall bear 3 inches minimum onto either side of angle change. Use any of the following methods:
1. Minimum 9 inch detail flashing centered over angle change
2. Minimum 9 inch foil-faced tape, centered over angle change
3. 12 inch reinforcing fabric centered over angle change and imbedded in roller-applied product
4. 12 inch glass mat centered over angle change and imbedded in roller- applied product

E. Window openings. Flashing or reinforcement shall bear onto wall 3 inches minimum and shall return into window opening according to Project drawings. Use any of the following methods:
1. Detail flashing
2. Glass mat imbedded in roller-applied product

F. Pipe or duct penetrations. Flashing or reinforcement shall bear onto wall 3 inches minimum and shall bear onto pipe or duct 3 inches, or according to Project drawings. Select any:
1. Detail flashing
2. Glass mat imbedded in roller-applied product

G. Expansion or deflection joints. Flashing shall bear 3 inches minimum onto either side of joint. Select any:
1. Detail flashing bellows or expansion bulb
2. Transition membrane expansion bulb

H. Interface of dissimilar substrates: Flashing or reinforcement shall bear 3 inches minimum onto either side of joint. Select any:
   1. Minimum 9 inch detail flashing
   2. 12 inch reinforcing fabric imbedded in roller-applied product
   3. 12 inch glass mat imbedded in roller-applied product

3.4 INSTALLATION

A. Apply product over opaque wall surfaces as indicated in Project drawings.

B. Spray or roller-apply product to achieve specified thickness in accordance with manufacturer's literature.

3.5 SCHEDULE

A. Wall substrates and roof or temporary roof shall be in place, effectively enclosing interior space, before proceeding with air barrier installation.

B. Seal penetrations made through installed product according to manufacturer's instructions and drawings.

C. Seal fenestration to product with detail membrane, foil-faced tape, transition membrane, polyurethane sealant, silicone sealant or polyurethane foam sealant according to Project drawings.

D. Through-wall flashing may be installed before or after product. Seal termination of metal through-wall flashing to product with 6 inch width counter-flashing strip consisting of any of these:
   1. Detail flashing
   2. Reinforcing fabric imbedded in product
   3. Glass mat imbedded in product

E. Cladding shall be installed after product.

F. Rigid or semi-rigid insulation installed over product shall be attached with insulation adhesive and mechanical fastening according to insulation manufacturer and air barrier manufacturer's instructions.

G. Sequence Work to enable air barrier continuity at wall-to-foundation, shelf angle, wall-to-roof, fenestration, different wall assemblies and other conditions providing challenges to air barrier continuity.

3.6 REPAIR AND PROTECTION

A. Protect from damage during application and remainder of construction period.

B. Inspect before covering. Repair or replace damaged material according to manufacturer's literature.

C. Product and accessories are not designed for permanent exposure. Cover with insulation or exterior cladding as soon as schedule allows.

D. Outdoor exposure of installed product and accessories shall not exceed 30 days.

END OF SECTION 07 27 26

SECTION 07 61 13

STANDING SEAM METAL ROOF

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section covers pre-finished, pre-fabricated standing seam metal roof system. All metal trim, accessories, fasteners, and sealants indicated on the Drawings as part of this section.

B. Related Sections:
1. Division 6 Section “Rough Carpentry” for wood blocking and wood nailers.
2. Division 7 Section “Sheet Metal Flashing and Trim” for flashing and trim.
3. Division 7 Section “Joint Sealants”.

C. Performance Requirements:
1. Water Penetration: No evidence of water penetration at an inward static air pressure of differential of not less than 6.24 psf (43 kPa) and not more than 12.0 psf (83 kPa) as per ASTM E331/1646.
2. Static Air Infiltration: Completed roof system shall have a maximum of .06 cfm/sq. ft. with 6.24 kPa air pressure differential as per ASTM E283/1680.
3. Roof System shall be designed to meet International Building Code wind load requirements.
4. Wind-Uplift: Roof panel assembly shall comply with UL Classification 580 for UL Classified 90 rated assemblies.

1.03 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.
B. Roof slopes shall be field verified and stated on the shop drawings.

C. Shop Drawings:
1. Submit detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim locations and type of sealants. Shop drawings indicating such details shall be of a scale not less than 1 1/2 inches per 12 inches.
2. Submit shop drawings showing roof plans, elevations, methods of erection, and flashing details. Roof plans shall show all locations of roof penetrations. Roof plans shall be of a scale not less than 1/8 inches per 12 inches.
3. Submit shop drawings showing soffit plans and installation details.
4. Submit shop drawings showing all other details required for a water-tight assembly.
5. Submitted shop drawings shall distinguish between factory, shop and field-assembled work.

D. Coordination Drawings:
1. Roof plans drawn to scale on which the following are indicated and coordinated with each other based on input from the installer of the items included:
a. Including but not limited to roof mounted items such as lightning protection if selected by Owner during bidding period.

E. Finish Samples:
   1. Submit selection and verification of samples for finishes and colors.

F. Quality Assurance Submittals:
   1. Submit certification, based on independent testing laboratory, indicating that no water penetration or air leakage through the system when tested in accordance with ASTM E-1680-95 and ASTM E-1646-95.
   2. Submit manufacturer's installation instructions.
   3. Submit calculations with signed and sealed by Contractor's registered Structural Engineer in the state of Georgia, verifying roof panels and attachment methods resist wind-pressures imposed on it pursuant to applicable building codes as governed by the local jurisdiction.

G. Warranty:
   1. Submit, for Owner's acceptance, manufactures standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not limited of, other rights the Owner may have under the Contract Documents.

H. Closeout Submittals:
   1. Submit operation and maintenance date for installed products in accordance with Division 01 Contract Closeout and Operations and Maintenance Data. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
   2. Submit record Documents for installed materials in accordance with Division 01 Contract Closeout and Operations and Maintenance Data.

1.04 QUALITY ASSURANCE

A. Petersen Aluminum Corp, Acworth, GA, products establish a minimum of quality required.

B. Contractor's Installer Qualifications:
   1. Panel Applicator must have a minimum of ten (10) years' experience in the application of structural standing seam metal roof systems.
   2. Panel Applicator must be factory trained by the metal roof system manufacturer prior to the bid date in order to obtain a contract for installation.
   3. Use adequate members of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
   4. Use equipment of adequate size, capacity and numbers to accomplish the work of this Section in a timely manner.
   5. Single Source Responsibility: Provide all items of structural standing seam metal roof system work specified herein by a single roofing contractor to provide undivided responsibility.

C. Mockups:
   1. Before work of this section begins, fabricate for acceptance sample roofing panel using materials and methods identical to those to be used on Project.
   2. Sample panel may include typical seam, fasteners, curbs, ridges, eaves, gutters, soffit, downspouts, and/or valleys.
   3. Accepted mockup constitutes minimum Project standards and shall be maintained for comparison with finished Work.
   4. Dispose of mockup when directed by the Architect.

D. Pre-installation Conference: Contractor shall conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's Testing and Inspecting Agency Representative, Contractor's metal panel Installer, metal panel Manufacturer's Representative, Contractor's

structural-support Installer, and Contractor's Installers whose work interfaces with or affects metal panel roofing.

2. Agenda: Agenda shall be prepared by Contractor and at a minimum shall include the following topics:
   a. Review and verify status of Roofing Submittals and any submittals associated with other conditions which might affect roofing installation.
   b. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   c. Review governing regulations and requirements, certificates, testing and inspecting as applicable.
   d. Review flashing details, roof drainage, roof insulation, roof penetrations and other construction and conditions that might affect metal roof panel installation.
   e. Review lightning protection details that might affect metal roof panel installation.
   f. Examine roof deck or substrate conditions for compliance with requirements for flatness and tolerance of structural members.
   g. Review structural limitations of roof deck or purlins and rafters during roofing installation.
   h. Review temporary protection requirements for metal roof panels during and after installation.
   i. Review repair procedures after metal panel installation.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver components, sheets, metal roofing panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.

B. Unload, store, and erect metal roofing panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal roofing panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Stack radiused metal roofing panels as recommended by the manufacturer. Store metal roofing panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective coating on any metal coated product from exposure to sunlight and high humidity, except to the extent necessary for material installation.

1.06 COORDINATION

A. Coordinate metal roofing panel assemblies with rain drainage work, flashing, trim, and construction of other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.07 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roofing panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members, radius of roofing components and verify roof opening dimensions by field measurements before metal panel fabrication, and indicate measurements on Shop Drawings.

1.08 WARRANTIES

A. Type/Term: Provide 20-year manufacturer's water-tight warranty. Warranty shall include all products supplied and approved for use by metal roof system manufacturer; including all roof system edge metal and all roof flashings.

B. Type/Term: Provide a 30-year manufacturers finish warranty for Kynar 500 or Hynar 5000 finish for the standing seam roof system, including all flashings, sheet metal, and soffit panels as supplied by the manufacturer and roofing contractor. This warranty shall be for a period of 20 years from the date of Substantial Completion and shall cover chalking in accordance with ASTM D-4214-89 method A (D659) number 8 rating; fading with a color change of less than or equal to 5.0 Hunter E units as determined by ASTM Method D-2244-02 after removal of external deposits and chalk, and overall integrity of the finish against cracking, checking, peeling or loss of adhesion.

C. Coverage:
   1. Limit of Liability: No Dollar Limitation or Full system flashing
   2. Scope of Coverage: Repair any leak in the roofing system caused by the ordinary wear and tear of the elements, manufacturing defects in materials, and the workmanship used to install these materials.
   3. The Contractor's installing Roofing Contractor shall supply to the Owner their own company's industry standard two (2) year warranty, which covers leak repairs due to their company's workmanship for the first two years after installation of the new roof system.

PART 2 – PRODUCTS

2.01 PANEL DESIGN

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates and accessories required for a weather tight installation.

B. Roof panels shall be standing seam in 16" widths with 1 3/4" high snap on seams.

C. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are non-staining, and do not damage panel finish
   1. Sealant Tape: Butyl
   2. Joint Sealant: One Part Poly
   3. Butyl-Rubber-Based, Solvent Release Sealant: ASTM C 1311

D. Panels to be produced with Striations.

E. Panels to be designed for attachment with concealed fastener clips, spaced as required by the manufacturer to provide for both positive and negative design loads, while allowing for the expansion and contraction of the entire roof system resulting from variations in temperature.

F. Forming: Use continuous end rolling method. No end laps on the panels. Field forming of roof panels shall be permitted on this Project due to the length of panels required.
   1. No installer-owned or installer-rented machines will be permitted.
   2. Forming machines shall be approved for use or supplied by the approved metal panel roofing system manufacturer.
   3. Forming machines shall have been calibrated within the last 6 months prior to start of metal panel roofing system work.

4. Any panels damaged or stripped of factory finish as a direct result of the forming process shall be replaced at no additional cost to the Owner.

G. Panel Accessories: Provide components required for a complete, weather-tight panel system including trim, copings, fasciae, mullions, sills, corner units, panel clips, flashings, sealants, gaskets, fillers, panel closures, and similar items. Match material and finish of metal panels unless otherwise indicated.

2.02 ACCEPTABLE MANUFACTURERS

A. Fabral, Jackson, GA 800-884-4484, Snap On Seam high profile. (Basis of Design)
   1. This Project is designed and detailed around this system.
B. Pac Clad
C. MBCI
D. Or Architect approved equal prior to bid.

2.03 MATERIAL AND FINISHES

A. Metal Roof Panels:
   1. Preformed roofing panels shall be fabricated of 24 gauge steel.
   2. Panel Top Side: Finish color selected from Fabral colors. **Basis of Design color shall be "Sierra Tan" SR: 0.35, IE 0.86, SRI 37**.
   3. Panel Underside: Polyester wash coat with dry film thickness of 0.3 mils.
   4. Finish shall be Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over 0.25 to 0.3 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil, to meet AAMA 621. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
      a. Strippable coating shall be applied on the coil to the top side to protect the finish during fabrication, shipping and field handling. This strippable coating shall be removed prior to installation.
      b. Contractor shall provide field protection at the job site so material is not exposed to weather and moisture.

B. Exposed Flashing and Trim:
   1. Unless otherwise specified, all exposed adjacent flashing and trim shall be of the same material and finish as panel system.
   2. All exposed flashing and trim types, profiles, materials and finishes shall be approved in writing by the metal panel roof system manufacturer.
   3. Trim: Trim shall be fabricated of the same material and finish to match the profiled sheeting and press broken in lengths of 10 to 12 feet. Trim shall be formed only by the manufacturer or their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on Drawings. Miter conditions shall be factory welded material to match the sheeting.
   4. Closures: Use composition or metal profiled closures at top of each elevation to close ends of the panels. Metal closures to be made in the same material and finish as face sheet.

C. Roof Underlayments:
   1. On all surfaces to be covered with roofing material, furnish and install a 40 mil "Peel & Stick membrane" for high temperature applications, required as outlined by metal panel manufacturer to attain the 20 year water-tightness warranty.
      a. Basis of Design shall be Carlisle WIP 300HT.
      b. Or Architect Approved Equal Prior to Bid.
   2. Material: Cold applied, self-adhering membrane composed of a rubberized asphalt adhesive and inter-wound with a disposable release sheet. An embossed, slip resistant surface is provided on the high performance film with UV barrier properties.

a. Membrane Thickness: 75 mils (1.02 mm) per ASTM D3767 Method A.
b. Maximum Permeance: 0.05 perms (2.9 ng/sgms Pa) per ASTM E96.
c. Service Temperature: 240 degrees F (115.6 degrees C) per ASTM D1204
d. Adhesive: Rubberized asphalt adhesive containing post-consumer recycled content, contains no calcium carbonate, sand or fly ash.
e. Exposure: Can be left exposed for a maximum of 120 days from date of installation per ASTM G90 – EMMAqua test.
f. Codes: Must comply with all national building codes as well as those specified in this specification section.

D. Decking:
1. Attach the standing seam metal roof panels to the existing wood roof deck over wood trusses.
2. Refer to Drawings section details.

E. Sealants:
1. Provide two part polysulfide class B not sag type for vertical and horizontal joints, or;
2. One part polysulfide not containing pitch or phenolic extenders, or;
3. Exterior grade silicone sealant recommended by roofing manufacturer, or
4. One part non-sag, gun grade, exterior type polyurethane recommended by roofing manufacturer.

2.04 FABRICATION

A. Comply with dimensions, profile limitations, gauges and fabrication details shown and, if not shown, provide manufacturer's standard product fabrication.

B. Fabricate components of the system in factory, ready for field assembly (if available).

C. Fabricate components and assemble units to comply with fire and performance requirements specified.

D. Apply specified finishes in conformance with manufacturer's standards, and according to manufacturer's instructions.

E. All exposed adjacent flashing shall be of the same material and finish as the roof panels.

F. Hem all exposed edges of flashing on underside, ½ inch.

G. Roof panels shall be full length from eave to ridge.

H. Form and fabricate sheets, battens, strips, cleats, valleys, ridges, edge treatments, integral flashings and other components of specified metal roofing panels to profiles, patterns and drainage arrangement shown, and as required for permanent leak-proof construction, and as recommended by SMACNA's "Architectural Sheet Metal Manual".

I. Provide for thermal expansion and contraction of work.

J. Conceal fasteners and methods of expansion where possible. Do not use exposed fasteners on faces of accessories where exposed to view.

2.05 ACCESSORIES

A. Pipe Penetrations: ITW Buildex Dektite flexible pipe flashing system.
1. **Pipe Penetrations shall be centered in roof panel and shall not be installed across any metal roof panel seam. Relocation of the pipe penetration or prefinished sheet metal plates may be necessary.**

PART 3 – EXECUTION

3.01 INSPECTION

A. General:
   1. Install metal roofing system consisting of nonstructural sheet metal panels held to substrate with concealed fasteners.
   2. Provide ridges, hips, valleys, eaves, rakes, fascia and other exposed trim and flashings for a watertight roofing system.

B. Substrate:
   1. Examine alignment of existing framing and related supports prior to installation and do not proceed until the defects are corrected by the responsible Contractor.
   2. Examine existing wood decking to ensure proper attachment to framing.
   3. Prior to beginning installation, examine rough-in location for items penetrating metal roof panels and coordinate with seam locations.

C. Underlayment:
   1. High Temperature Ice and Water Shield underlayment to be used as underlayment for all roofing applications.

3.02 PREPARATION

A. Panels shall be installed plumb and true in proper alignment and relation to the existing framing. The erector must have at least five years successful experience with similar applications.

B. Install metal panels, and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation.

C. Coordinate Work of this section with flashing, trim, and other construction to provide a permanently leak-proof, secure, and non-corroding installation.

D. Dissimilar Metals: Prevent galvanic action of dissimilar metals.

3.03 INSTALLATION

A. General:
   1. Lay out to place seams equidistant from corners.
   2. Coordinate work of this section with flashing, trim, and other construction to provide a permanently leak-proof, secure and noncorroding installation.
   3. Apply roofing only in dry weather and where weather conditions permit.
   4. Install in accordance with manufacturer’s written instructions and warranty requirements.
   5. Shim or otherwise plumb substrates receiving metal panels.
   6. Comply with recommendations of the SMACNA “Architectural Sheet Metal Manual.”
   7. Install metal roofing fascia consisting of nonstructural sheet metal panels held to substrate with concealed fasteners.
   8. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
   9. Install starter and edge trim before installing roof panels.
   10. Remove protective strippable film prior to installation of roof panels.
   11. Attach panels using manufacturer’s standard clips as fasteners, spaced in accordance with approved shop Drawings.
   12. Install sealants for performed roofing panels as approved on shop Drawings.
   13. Conceal expansion joint provisions wherever possible in exposed Work; locate so as to

minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

14. Dissimilar Metals: Do not allow panels or trim to come into contact with dissimilar materials.
    a. Separate from each other where electrolysis might occur.
    b. Separate metal panels where contact with corrosive substrates may occur.
    c. Separation is satisfactorily accomplished by coating metals with \isolation Paint.
    d. Comply with various metals producers' recommendations for other forms of protection against contamination from corrosive materials or agents.
15. Lap metal flashing over metal roof panels to allow moisture to run over and off the material.
16. Cutting and Fitting: Neat, square, and true. Saw cut panels, deburr, and use touchup paint immediately as recommended by roofing panel manufacturer. Torch cutting is prohibited.
17. Flashings:
    a. Straight, weather-tight, exposed surfaces free of dents, scratches, abrasions, stains, and other visible defects.
    b. Extend gutter lining under metal roofing 6 inches minimum and terminate in 3/4-inch folded edge secured by cleats.
18. Do not allow traffic on completed roof.
19. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
20. Remove and replace any panels or components which are damaged beyond successful repair. Repair or replace defaced or disfigured finishes caused by work of this section to new condition. The Architect shall review any repaired areas and approve the quality of the repair or cleaning work that has been performed.

B. Underlayment:
1. Install underlayment on roof sheathing, unless otherwise recommended by metal roof panel manufacturer.
2. Apply underlayment single-ply lapped shingle fashion, 3 inches at head and 6 inches at sides.
3. Install no more than can be covered by metal roofing, or other approved protection, in same day.
4. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under metal roof panels.

C. Metal Roofing Panels:
1. Install as recommended by metal roof panel manufacturer's installation instructions and recommendations.
2. Begin at eaves. Rigidly fasten ridge of metal roof panels with a zee bar and allow eave end free movement for thermal expansion and contraction (allowing no exposed fasteners).
3. Install clips in panel side joints at location, spacing, and with fasteners as recommended by manufacturer for type of substrate and wind loading specified.
4. At eaves cut upturned edges and bend panel down to form fascia.
5. At intersections of roof slope with ridge, turn up edges of roof panel 1-inch.

D. Edges:
1. Extend gutter lining under metal roofing 6-inches minimum and terminate in ¾-inch folded edge secured by cleats.
2. Hook lower end of roofing into lock strip to form ¾-inch wide loose-lock seam.

E. Ridge Covers: Secure in-place using Z-closer clips and fasteners. Seal joints where necessary for weather tightness.

F. Metal Roofing, Gutters, Downspouts, and Flashings: Straight, weathertight, exposed surface free of dents, scratches, abrasions, stains, and other visible defects.

G. Cutting and Fitting: Neat, square, and true. Saw cut panels, deburr, and use touchup paint immediately as recommended by roofing panel manufacturer. Torch cutting is prohibited.

H. Fascia Panels: Align bottom edge for a straight true line. Flash and seal panels with weather closures where metal fascia panels meet walls, along lower panel edges, and at perimeter of all openings and joints.

I. Protection:
1. Protect building surfaces and finishes from roofing work.
2. Protect surfaces where traffic must continue over finished roofing system.

J. Cleaning:
1. Clean any grease, finger marks or stains from the panels per the manufacturer's recommendations.
2. Peel off strippable film.
3. Where needed, clean metals in conformance with metals industry recommendations.
4. Remove excess materials, trash, debris, equipment, and parts from the work area on a daily basis.

K. Final Cleanup:
1. Remove debris, metal clips, nails, and other materials that could prevent adequate drainage or produce corrosion products through electrolysis.
2. Repair and touch up damage.
3. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair.

3.04 FINAL INSPECTION

A. Final inspection and approval will be performed as required by manufacturer to validate warranties.

B. Field inspections of installed panel roof system by Metal Panel Manufacturer Factory approved/authorized inspector will be required for the 20-year, no dollar limit, water-tightness warranty. A minimum of two (2) inspections by the factory inspector will be required with written reports of these inspections.

END OF SECTION 07 61 13

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society for Testing and Materials (ASTM):
   a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   b. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   c. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
   d. B32, Standard Specification for Solder Metal.
   e. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
   f. B370, Standard Specification for Copper Sheet and Strip for Building Construction.
   g. D1187, Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
   h. D4586, Standard Specification for Asphalt Roof Cement, Asbestos-Free.
2. Federal Specifications (FS): QQ-L-201F(2), Lead Sheet.
3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual, 5th Edition.

1.2 RELATED DOCUMENTS

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

B. Related Sections: Section(s) related to this section include:

1. Division 4 Section “Masonry Veneer”.
2. Division 7 Section “Fluid Applied Membrane Air Barriers”.
3. Division 7 Section “Standing Seam Metal Roof”.
4. Division 7 “Section “Joint Sealants”.

1.3 SUMMARY

A. This Section includes sheet metal flashing and trim in the following categories:

1. Metal Flashing an Trim
2. Reglets.
3. Gutters and Downspouts
4. Gutter Leaf Guard

1.4 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 8-inch- (200-mm-) square Samples of specified sheet materials to be exposed as finished surfaces or
2. 12-inch- (300-mm-) long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

E. Qualification data for firms and persons specified in the "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.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.7 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS

A. Galvanized Steel Sheet: ASTM A 526, G 90 (ASTM A 526M, Z 275), commercial quality, or ASTM A 527, G 90 (ASTM A 527M, Z 275), lock-forming quality, hot-dip galvanized steel sheet with 0.20 percent copper, mill phosphatized where indicated for painting; not less than 0.0396 inch (1.0 mm) thick, unless otherwise indicated.

2.2 FLASHING AND REGLETS

A. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.

B. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

C. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

D. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.

E. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing lower edge.

1. Material: 24 ga. galvanized steel.

F. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. For Concrete:
   a. Fry Reglet Corporation; Fry Springlok Type CO and Springlok Flashing.
   b. Cheney Flashing Co.; Type A reglet and Snap Lock Cap Flashing.
   c. Architect approved equal prior to bid.
2. For Masonry:
   a. Fry Reglet Corp.; Fry Springlok Type MA and Springlok Flashing.
   b. Cheney Flashing Co.; Type B and Snap Lock Cap Flashing.
   c. Architect approved equal prior to bid.
3. Surface Mounted:
   a. Fry Reglet Corp.; Fry Springlok Type SM and Springlok Flashing.
   b. Cheney Flashing Co.; Type D and Snap Lock Cap Flashing.
   c. Architect approved equal prior to bid.

2.3 GUTTERS AND DOWNSPOUTS

1. Manufacturer:
   a. Petersen Aluminum Corporation, Acworth, GA 800-272-4482 (Basis of Design)
   b. Or Architect approved equal prior to Bid**.**
2. Quality Assurance
   a. Conform to SMACNA Manual for nominal sizing of components for rainfall intensity determined by a storm occurrence of 1 in 100 years.
3. Delivery, Storage and Handling
   a. Stack preformed and pre-finished material to prevent twisting, bending, or abrasion, and to aid ventilation. Slope to drain.
   b. Prevent contact with materials during storage which may cause discoloration, staining, or damage.
4. Products
   a. Components
      a) Gutters: SMACNA ‘6” Ogee profile’
      b) Downspouts: SMACNA ‘Rectangular fluted’.
      c) Downspout elbows.
      d) Anchorage Devices: SMACNA Requirements for bracket supports.
   b. Finish
      a) Manufacturer’s Standard Colors.
      b) Color: To be selected by Architect
   c. Fabrication
      a) Gutters and downspouts of profiles to SMACNA requirements.
      b) Field measure site conditions prior to fabricating work.
      c) Fabricate with required connection pieces.
      d) Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion of defects detrimental to appearance or performance. Allow for expansion at joints.
      e) Hem exposed edges of metal.
      f) Seal metal joints to create a water-tight condition.
      g) Fabricate downspouts and seal watertight.

2.4 GUTTER TOPPER / LEAF GUARD

1. Manufacturer:
   a. Leaf Filter, www.leaffilter.com, 800-290-6106 (Basis of Design)
   b. Gutter Topper-Needle Guard, www.guttertoppper.com, 800-915-5888
   c. Or Architect approved equal prior to Bid**.**
2. Delivery, Storage and Handling
   a. Stack material to prevent twisting, bending, or abrasion, and to aid ventilation.
   b. Prevent contact with materials during storage which may cause discoloration, staining, or damage.
3. Finish
   a. Manufacturer's Standard Colors.
   b. Color: To be selected by Architect

2.5 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

B. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.

C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

D. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

E. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints, and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal, and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

G. Paper Slip Sheet: 5-lb/square (0.244 kg/sq. m) red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.

H. Polyethylene Underlayment: ASTM D 4397, minimum 6-mil- (0.15-mm-) thick black polyethylene film, resistant to decay when tested according to ASTM E 154.

I. 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; noncorrosive; size and thickness required for performance.

2.6 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

E. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

F. Expansion Provisions: Space movement joints at maximum of 40 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

G. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

H. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

I. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

J. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.7 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Exposed Trim, Gravel Stops, and Fascia:

1. Factory Finished Steel: 24 ga. or as indicated on Drawings.

C. Base Flashing: Fabricate from the following material:

1. As indicated on Drawings.

D. Counterflashing: Fabricate from the following material:

1. Galvanized Steel: 24 ga. or as indicated on Drawings.

E. Drip Edges: Fabricate from the following material:

1. Galvanized Steel: 24 ga. or as indicated on Drawings.

F. Equipment Support Flashing: Roofing Manufacturer’s Standard Material (See Division 7)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." 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 that will be permanently watertight and weatherproof.

B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Seams: Fabricate nonmoving seams in metal with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

D. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing stainless steel or aluminum directly on cementitious or wood substrates, install a slip sheet of red-rosin paper and a course of polyethylene underlayment.
2. Bed flanges of Work in a thick coat of roofing cement where required for waterproof performance.

E. Counterflashings: Coordinate installation of counterflashings with installation of assemblies to be protected by counterflashing. Install counterflashings in reglets or receivers. Secure in a waterproof manner by means of snap-in installation and sealant, lead wedges and sealant, interlocking folded seam, or blind rivets and sealant. Lap counterflashing joints a minimum of 2 inches (50 mm) and bed with sealant.

F. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 07 62 00

SECTION 07 84 13

PENETRATION FIRE-STOPPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes firestopping for through-penetrations and joints in or between the following fire-resistance rated assemblies, including both blank openings, linear openings, and openings containing penetrating items:

1. Walls and partitions.
2. Smoke barriers.

B. Related Sections include the following:

1. Division 7 Section “Joint Sealants”
2. Division 9 Section “Gypsum Board Assemblies”
3. Division 22 Section “Plumbing Sections”
4. Division 23 Section “Mechanical Sections”
5. Division 26 Section “Electrical Sections”

1.3 PERFORMANCE CRITERIA

A. FIRE TEST REQUIREMENTS

1. Underwriters Laboratories, Inc. (UL):
   a. ANSI/ UL1479, “Fire Tests of Through Penetration Firestops”.
   b. ANSI/ UL2079, “Tests for Fire Resistance of Building Joint Systems”.
   c. ANSI/ UL263, “Fire Tests of Building Construction and Materials”.
   d. ANSI/ UL723, “Surface Burning Characteristics of Building Materials”.
2. American Society of Testing and Materials (ASTM):
   a. ASTM E814, “Fire Tests of Penetration Fire Stops”.
   b. ASTM E1966, “Test Method for Fire Resistive Joint Systems”.
   c. ASTM E119, “Fire Tests of Building Construction and Materials”.
   d. ASTM E84, “Surface Burning Characteristics of Building Materials”.
   e. ASTM E2307, “Fire Tests of Perimeter Fire Barrier Systems Using Intermediate Scale, Multi-Story Test Apparatus”.
   f. ASTM E2837, “Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies”.
   g. ASTM E2174, “Standard Practice for On Site Inspection of Installed Fire Stops”.
   h. ASTM E2393, “Standard Practice for On Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers”.

B. REFERENCES

1. Underwriters Laboratories (UL) of Northbrook, IL “Fire Resistance Directory”:
   a. Through Penetration Firestop Systems (XHEZ)
   b. Joint Systems (XHBN)

c. Perimeter Fire Containment Systems (XHDG)
d. Continuity Head-of-Wall Joint Systems (XHBO)
e. Fill, Void or Cavity Materials (XHHW)
f. Firestop Devices (XHJI)
g. Forming Materials (XHKU)
h. Wall Opening Protective Materials (CLIV)

2. All Major Building Codes:
   a. International Building Code published by ICC.
3. National Fire Protection Association (NFPA) of Quincy, MA: "NFPA 101: Life Safety Code".
4. National Fire Protection Association (NFPA) of Quincy, MA: "NFPA 70: National Electrical Code".
5. Factory Mutual Approvals (FM) of Norwood, MA: "FM 4991: Standard for Approval of Firestop Contractors".
6. Underwriters Laboratories (UL) of Northbrook, IL: "UL Qualified Firestop Contractor Program".

C. PERFORMANCE REQUIREMENTS

1. Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
2. When intumescent products are used, provide products that do not contain sodium silicate or any other water soluble intumescent ingredient in the formulation.
3. Provide firestop products that do not contain ethylene glycol.
4. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
5. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
6. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall be:
   a. Capable of retrofit around existing cables
   b. Designed such that two or more devices can be ganged together
   c. Maintenance free such that no action is required to activate the smoke and fire sealing mechanism
7. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
8. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
9. Provide fire-resistive joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards, ASTM E1966, or ANSI/ UL 2079.
10. Provide penetration firestop systems, fire-resistive joint systems, or perimeter fire barrier systems subjected to an air leakage test conducted in accordance with Standard, ANSI/ UL1479 for penetrations and ANSI/UL2079 for joint systems with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.
11. Provide T-Rating Collar Devices tested in accordance with ASTM E814 or ANSI/UL1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.
12. Provide a fire-rated grommet for all individual or small grouped cable applications up to 0.53 in. (14 mm).

13. Provide moisture-curing products where inclement weather or greater than transient water exposure is expected.

1.4 SUBMITTALS

A. Product Data: For each type of firestopping product indicated.

B. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each firestopping system configuration for construction, joint opening width and/or penetrating items.

C. Product Certificates: Certificate of conformance signed by manufacturers of firestopping products certifying that products comply with requirements.

D. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other pertinent information.

1.5 QUALITY ASSURANCE

A. Provide firestopping systems that comply with the following requirements and those specified in "Performance Criteria" Article:

1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
2. Firestopping products bear classification marking of qualified testing and inspection agency.

B. Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.

C. **Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer**.

D. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings".

E. The intent and requirement of this specification is to require that all firestopping assemblies are provided by one manufacturer throughout entire project on all buildings and installed by a qualified firestopping subcontractor. Multiple firestopping installers will not be acceptable or approved.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multi-component materials.

B. Store and handle materials for firestopping products to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

1.7 PROJECT CONDITIONS

A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.

B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.

C. Do not use materials that contain flammable solvents.

1.8 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestopping systems.

C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

PART 2 – PRODUCTS

2.1 FIRESTOPPING, GENERAL

A. Provide firestopping products that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by firestopping products manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

2.2 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through-penetration firestop systems and/or wall opening protective materials and/or joint systems and/or perimeter fire containment systems and/or continuity head-of-wall joint systems listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Manufacturer:
   a. Specified Technologies, Inc. (Basis of Design)
   b. Hilti, Inc.
   c. 3M Building and Commercial Services Division
   d. Or Architect approved equal prior to bid.
   e. Single Source: Obtain firestopping systems from a single manufacturer.

2.3 MATERIALS

A. General: Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.

B. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant

C. Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum ±25 percent movement, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray
2. Specified Technologies, Inc. (STI) SpecSeal Series ES Elastomeric Sealant

D. Firestop Devices: Factory-assembled steel collars lined with intumescent material capable of expanding a minimum 30 times sized to fit specific outside diameter of penetrating item, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars
2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars

C. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings, the following products are acceptable:

1. Specified Technologies Inc. (STI) EZ-Path Fire Rated Pathway

F. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24" (610 mm), the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads
2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads

G. Firestop Putty: Intumescent, 100% solids, non-hardening, water resistant, butyl rubber based putties containing no solvents or silicone compounds, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty

H. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series RED2 Wrap Strip
2. Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip

I. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame retardant poly bag, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows

J. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar

K. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag), the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal SIL300 Silicone Firestop Sealant
2. Specified Technologies, Inc. (STI) SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant'

L. All-Weather Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal FT305 Firestop Spray

M. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:

1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam

N. Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil capable of sustaining a minimum 2,500 lbs (1,134 kg) when subjected to load testing, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal CS Composite Sheet

O. Cast-In-Place Firestop Device: Single component molded firestop device installed on forms prior to concrete placement with totally encapsulated, tamper-proof integral firestop system and smoke sealing gasket, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal CD Cast-In Firestop Device

P. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal FyreFlange Firestop Angles

Q. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350°F (177°C) for use in blank openings and cable sleeves, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series FP Firestop Plug

R. Fire-Rated T Rating Collar Device: Louvered steel collar system with synthetic aluminized polymer coolant wrap installed on metallic pipes where T Ratings are required by applicable building code requirements, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal T-Collar Device

S. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 in. (14 mm) diameter, the following products are acceptable:

1. Specified Technologies, Inc. (STI) Ready Firestop Grommet (RFG1 or RFG2)

T. Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications, the following products are acceptable:

1. Specified Technologies, Inc. (STI) SpecSeal Series CF34 Closet Flange Firestop Gasket

PART 3 – EXECUTION

3.1 PREPARATION

A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.

C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FIRESTOPPING INSTALLATION

A. General Requirements: Install through-penetration firestop systems and fire-resistive joint systems in accordance with "Performance Criteria" Article and in accordance with the conditions of testing and classification as specified in the published design.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of firestopping products.

1. Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.
4. Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.
5. Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920, "Specification for Elastomeric Joint Sealants".

3.3 FIELD QUALITY CONTROL

A. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems in accordance with ASTM E2174, "Standard Practice for On Site Inspection of Installed Fire Stops" or joint systems in accordance with ASTM E2393, "Standard Practice for On Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers". NOTE: Manufacturers are not qualified inspection agencies, and it is a conflict of interest for the manufacturer to perform inspections of installed firestopping systems according to the aforementioned inspection standards.

B. Keep areas of work accessible until inspection by authorities having jurisdiction.

C. Where deficiencies are found, repair or firestopping products so they comply with requirements.

3.4 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION 07 84 13

SECTION 07 92 00

JOINT SEALANTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Exterior sealants.
2. Exterior polyurethane traffic sealants.
3. Interior sealants.
4. Interior latex sealants.
5. Interior sanitary silicone sealants.
7. Threshold and sheet metal bedding sealants.
8. Joint accessories.

B. Related Sections:

1. Division 7 Section “Fluid Applied Vapor Permeable Membrane Air Barriers”
2. Division 8 Section “Hollow Metal Doors and Frames”
3. Division 8 Section “Aluminum Entrances and Storefronts”
4. Division 8 Section “Glazing” for Glazing sealants

1.02 REFERENCES

A. ASTM International Inc.

1. ASTM C 510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
2. ASTM C 719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
3. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
4. ASTM C 834 - Standard Specification for Latex Sealants.
5. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
6. ASTM C 1193 - Standard Guide for Use of Joint Sealants.
7. ASTM C 1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
8. ASTM C 1311 - Standard Specification for Solvent Release Sealants.
9. ASTM D 2203 - Standard Test Method for Staining from Sealants.

1.03 SUBMITTALS

A. Shop Drawings:

1. Submit details to show installation and interface between sealants and adjacent work.

B. Product Data:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;

C. Samples:

1. Submit color charts for each sealant type for initial selection.
2. Submit standard cured color samples for each sealant type illustrating selected colors.

D. Test Reports:

1. Submit results of field pre-construction testing.

2. Submit manufacturer's recommendations for joint preparation, priming, and joint accessory materials based on test results.
3. Submit manufacturer's recommended installation procedure modifications resulting from field adhesion tests.

E. Manufacturer's Installation Instructions:

1. Submit manufacturer’s published installation procedures.
2. Include instructions for completing sealant intersections when different materials are joined.

F. Manufacturer's Certificate:

1. Certify products are suitable for intended use and products meet or exceed specified requirements.
2. Certify applicator is approved by manufacturer.

G. Qualifications Data:

1. Submit applicator's qualifications, including reference projects of similar scope and complexity, with current phone numbers and contact names of architects and owners for verification.

H. Manufacturer's Field Reports:

1. Indicate time present at project site.
2. Include observations, indicate compliance with manufacturer's installation instructions, and supplemental instructions provided to installers.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Submit recommended inspection intervals.
2. Submit instructions for repairing and replacing failed sealant joints.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with the following:

1. Building Joints: ASTM C 1193.
2. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

B. Field Pre-Construction Testing:

1. Test each elastomeric sealant and joint substrate in accordance with the following, before beginning work of this section:
   a. Install sealants in field samples or mockups using joint preparation methods determined by laboratory pre-construction testing.
   b. Install field-test joints in inconspicuous location as approved by Architect.
   c. Test Method: Manufacturer's standard field adhesion test to verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
   d. When test indicates sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

B. Applicator Qualifications:

1. Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity, and approved by manufacturer.

2. Designate one individual as project foreman who shall be on site at all times during installation.

1.07 MOCKUP

A. Install sealants in mockups specified in other sections including sealant and joint accessories to illustrate installation quality and color.

B. Incorporate accepted mockup as part of Work.

1. Repair seal joint mockups used for field adhesion testing.

1.08 PRE-INSTALLATION MEETINGS

A. Notify Architect and Owner of meeting minimum one week prior to commencing work of this section.

1.09 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturers unopened original packaging. Inspect for damage.

B. Store primers and sealants in cool dry location with ambient temperature range of 60-80 F.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install primers or sealants when atmospheric temperatures or joint surface temperatures are less than 40°F.

B. Do not install primers or sealants when joint substrates are wet.

1.11 SCHEDULING

A. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.

B. Ensure sealants are cured before covering with other materials.

1.12 WARRANTY

A. Submit signed copies of the following warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of 3 years from date of Substantial Completion.

1. Manufacturer's standard warranty covering sealant materials.
2. Applicator's standard warranty covering workmanship.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Tremco Sealant/Weatherproofing Division of RPM International, Inc. (Basis of design)

B. Architect approved equal prior to bid.

2.02 URETHANE SEALANTS

A. Multi-Component Urethane: ASTM C 920, Type M, Grade NS, [Class 25] [Class 50]; Uses T, [NT], M, A, and O; two component, chemical curing, nonstaining, nonbleeding, color as selected. GREENGUARD Children and Schools Certified.
1. Dymeric 240FC

B. Single Component Urethane: ASTM C920, Type S, Grade NS, Class 50, Uses T, NT and I; Immersible, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant. GREENGUARD Children and Schools Certified.
   1. Dymonic 100

C. Single Component Urethane: ASTM C 920, Type S, Grade NS, [Class 100/50] [Class 25], Uses [T,] NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, color as selected. GREENGUARD Children and Schools Certified.
   1. Dymonic FC
   2. Dymonic
   3. Vulkem 116

D. Multi-Component Self-Leveling Urethane: ASTM C 920, Type M, Grade P, Class 25, Uses T; self leveling, multi-component, chemical curing, nonstaining, nonbleeding, color as selected.
   1. THC 900
   2. THC 901
   3. Vulkem 445SSL

E. Single Component Self-Leveling Urethane: ASTM C 920, Type S, Grade P, Class 35; self leveling, single component, moisture curing, nonstaining, nonbleeding, color as selected.
   1. Vulkem 45SSL

2.03 SILICONE SEALANTS

A. Multi Component Non-Staining Silicone: ASTM C 920, Type M, Grade NS, Class 50; Uses NT, M, G, A and O: multi-component, neutral curing, nonstaining, nonbleeding, color as selected. GREENGUARD Children and Schools Certified.
   1. Spectrem 4-TS.

B. Single Component Silicone: ASTM C 920, Type S, Grade NS, [Class 50] [Class 100/50]; Uses NT, M, G, A and O: single component, [moisture] [neutral] curing, nonstaining, nonbleeding, color as selected. GREENGUARD Children and Schools Certified.
   1. Spectrem 1
   2. Spectrem 2
   3. Spectrem 3

C. Single Component Silicone: ASTM C 920, Type S, Grade NS, Class 25; Uses NT, G, A and O: single component, [moisture] [neutral], nonstaining, nonbleeding, color as selected. GREENGUARD Children and Schools Certified.
   1. Proglaze
   2. Tremsil 200
   3. Tremsil 600

D. Single Component Traffic Silicone: Low modulus, high performance, single component, [gun grade] [self leveling] sealant.
   1. Spectrem 800

2.04 OTHER SEALANTS

A. Latex Sealant: ASTM C 834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected.
   1. Tremflex 834

B. Synthetic Rubber Sealant:
   1. Acoustical Sealant

C. Butyl Sealant: ASTM C 1311, butyl or polyisobutylene, single component, nondrying, non-skinning, non-curing.
   1. Butyl Sealant

2.05 ACCESSORIES

A. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

B. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

C. Joint Backing: Round foam rod compatible with sealant; oversized 25 to 50% larger than joint width; recommended by sealant manufacturer to suit application

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

E. Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work.
   1. Verify joint surfaces are clean and dry.
   2. Ensure concrete surfaces are fully cured.

B. Report unsatisfactory conditions in writing to the Architect;

C. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Prepare joints in accordance with ASTM C 1193 and manufacturer's instructions.

B. Clean joint surfaces to remove dirt, dust, oils, wax, paints, and other contamination capable of affecting primer and sealant bond.
   1. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.03 SEALANT INSTALLATION

A. Install primer and sealants in accordance with ASTM C 1193 and manufacturer's instructions.

B. Install joint backing to maintain the following joint ratios:
   1. Joints up to 1/2 inch (13 mm) Wide: 1:1 width to depth ratio.
   2. Joints Greater than 1/2 inch (13 mm) Wide: 2:1 width to depth ratio; maximum 1/2 inch joint depth.

C. Install bond breaker where joint backing is not used.

D. Apply primer where required for sealant adhesion.

E. Install sealants immediately after joint preparation.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Joining Silicone and Polyurethane Sealants:

1. Install polyurethane sealants first.
2. Join silicone sealant to polyurethane in accordance with manufacturer's instructions.

H. Tool exposed joint surface concave.

3.04 MANUFACTURER'S FIELD SERVICES

A. Require sealant manufacturer to be present at project site to:

1. Observe sealant mockup installation and to issue reports of observations.
2. Conduct field pre-construction testing.

3.05 CLEANING

A. Remove masking tape.

B. Clean adjacent surfaces soiled by sealant installation.

3.06 SCHEDULE – SEALANT JOINTS

A. Exterior Sealant Joint [Type A]:
   1. Applications:
      a. Control and expansion joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints between different materials listed above.
      d. Perimeter joints between materials listed above and frames of doors, windows, storefronts, louvers and similar openings.
      e. Control and expansion joints in soffits and overhead surfaces.
      f. Other exterior joints in vertical surfaces and non-traffic horizontal surfaces for which no other sealant is specified.
   2. Multi-Component Urethane Sealants:
      a. Dymeric 240FC
   3. Single Component Urethane Sealants:
      a. Dymonic 100
      b. Dymonic FC
      c. Dymonic
      d. Vulkem 116
   4. Multi-Component Silicone Sealants:
      a. Spectrem 4-TS
   5. Single Component Silicone Sealants:
      a. Spectrem 1
      b. Spectrem 2
      c. Spectrem 3

C. Interior Sealant Joint [Type C]:
   1. Applications:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints on exposed interior surfaces of exterior openings.
      c. Joints on precast beams and planks.
      d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, storefronts, louvers, elevator entrances and similar openings.

e. Other interior joints in vertical surfaces and non-traffic horizontal surfaces subject to movement for which no other sealant is specified.

2. Multi Component Urethane Sealants:
   a. Dymeric 240FC
3. Single Component Urethane Sealants:
   a. Dymonic FC
   b. Dymonic 100
4. Single Component Silicone Sealants:
   a. Spectrem 1
   b. Spectrem 2
   c. Spectrem 3
5. Other Sealants:
   a. Tremflex 834

D. Traffic Sealant Joint [Type D]:
1. Applications:
   a. Control, expansion and isolation joints in cast-in-place concrete.
   b. Other interior and exterior traffic bearing joints in horizontal and sloped traffic surfaces
2. Multi Component Urethane Sealants:
   a. THC-900/901, self leveling
   b. Vulkem 116 plus catalyst
   c. Vulkem 445SSL, self leveling
3. Single Component Urethane Sealants:
   a. Vulkem 45SSL, self leveling
4. Single Component Silicone Sealants:
   a. Spectrem 800
   b. Spectrem 900SL

E. Interior Food Contact Sealant Joint [Type F]:
1. Applications:
   a. Joints in kitchen counter tops and work surfaces.
   b. Joints between food service equipment and surrounding construction.
   c. Other interior joints, where incidental food contact may occur.
2. Single Component Urethane Sealants:
   a. Dymonic FC
   b. Dymonic
   c. Dymonic 100
3. Single Component Silicone Sealants:
   a. Proglaze
   b. Tremsil 200
   c. Tremsil 600
   d. Spectrem 1
   e. Spectrem 2
   f. Spectrem 3

F. Interior Sanitary Sealant Joint [Type G]:
1. Applications:
   a. Joints in Toilet rooms, Morgue, Decomp, Tissue Storage, Histology, Evidence, and Biohazard
   b. Joints between plumbing fixtures and adjacent materials.
   c. Joints between locker room lockers and adjacent materials.
   d. Joints between food service equipment and surrounding construction.
   e. Other interior joints in wet areas where needed to limit mold and mildew growth.
2. Single Component Silicone Sealants:
   a. Tremsil 200

G. Concealed Metal Lap Sealant Joint [Type J]:
1. Applications:

a. Concealed lap and hook joints in sheet metal flashing and trim.
2. Single Component Non-Curing Sealants:
a. Tremco Butyl Sealant
b. Tremco Acoustical Sealant

H. Concealed Bedding Sealant Joint [Type K]:
1. Applications:
a. Bedding joints under metal thresholds and saddles.
b. Bedding joints between sheet metal flashing and other materials.
2. Single Component Urethane Sealants:
a. Dymonic FC
b. Dymonic
c. Vulkem 116
d. Dymonic 100
3. Single Component Silicone Sealants:
a. Proglaze
b. Spectrem 2
c. Spectrem 3
4. Single Component Non-Curing Sealants:
a. Tremco Acoustical Sealant
5. Single Component Curing Sealants:
a. Tremco Butyl Sealant

END OF SECTION 07 92 00

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes custom steel doors and standard frames.

B. Steel sidelight, borrowed lite and transom frames.

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 4 Section "Brick Veneer"
2. Division 8 Section "Doors and Frames
3. Division 8 Section "Door Hardware"
4. Division 9 Section "Painting"

1.3 CODES AND STANDARDS

A. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
E. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
F. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
G. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
H. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

1.4 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. **Steel door and frame submittal to be completed only after pre-submittal meeting has taken place between owner, architect, hollow metal frame supplier, hardware supplier, wood door supplier, glazing supplier and contractor**.

C. 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.

D. Provide 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.

E. Door Schedule: Submit schedule of doors and frames using same reference numbers and format for details and openings as those on Contract Drawings.
   1. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.5 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.

C. Single-Source Responsibility: Provide doors and frames and related components from one manufacturer for each type of door and frame.

1.6 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 or pallets. 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.

1.7 PROJECTION CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within one (1) year warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Steel Doors and Frames:
      a. Curries Co. (Basis of Design)
      b. Habersham Metal Products
      c. Ceco Door Products
      d. or approved equal prior to bid

2.2 DOORS

A. Custom E6 Steel Doors: Provide 1-3/4-inch thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
   1. Interior Doors: Grade III, extra heavy-duty, Model 2, seamless design, minimum 18 gauge thick cold-rolled steel sheet faces.
   2. Exterior Doors: Grade III, extra heavy-duty, Model 2A, seamless design, minimum 18 gauge thick galvanized steel sheet faces.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level

2.3 FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
   1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
   2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M. 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. Conceal fastenings, unless otherwise indicated.
   1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
   2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
   4. **Frames shall be galvanized at all CMU wall locations and exterior locations.**

C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. 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.

E. 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.

F. Grout: When required in masonry construction, as specified in Division 4 Section "Unit Masonry."

2.4 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. Vertical steel stiffeners.
      b. Honeycomb
      c. Polystyrene
   2. Clearances: 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. Not more than 3/4 inch (19 mm) at bottom.
      a. Fire Doors: Provide clearances according to NFPA 80.

B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only cold-rolled steel sheet.

C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

F. 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.

G. Hardware Preparation: Prepare doors and frames to receive hardware indicated in Division 8 Section “HARDWARE” according to final door hardware schedule and templates provided by hardware supplier. 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.

1. Provide nonremovable 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.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

2.6 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. Pre-treatment: 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 pre-treatment.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
   1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
   3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
   4. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels.
   5. Install fire-rated frames according to NFPA 80.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3.7 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

D. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08 11 13

SECTION 08 14 23

MOLDED HARDBOARD DOORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Particleboard doors with molded wood fiber faces.
2. Factory finishing of doors.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 8 Section “Steel Doors and Frames”
2. Division 8 Section “Door Hardware”

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. D**oor submittal to be completed only after pre-submittal meeting has taken place between Owner, Architect, hollow metal frame supplier, hardware supplier, door supplier, glazing supplier, and Contractor**.

C. Product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.

D. 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 such as lite openings and security wire ways.

1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with the following standard:

1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.

B. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE, AND 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.

B. Each door shall be wrapped for protection during delivery and remain on the door once they are installed.

C. Store doors upright in a dry, well ventilated area when the building is dried-in and air conditioning and heating is operational. Store ten (10) feet from any heat source to prevent uneven drying.

D. Doors mush be sealed with an oil-based sealer or primer if stored for long periods of time.

E. 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 conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location:

1. AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content."

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 be in effect during the following period of time after date of Substantial Completion.
   a. Molded Doors: Limited five (5) year warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide doors by one of the following:
1. Doors:
   a. Jeld-wen – (basis of design).
   b. Masonite.
   c. or approved equal prior to bid.

2.2 FABRICATION

A. Fabricate doors to comply with following requirements:

1. In sizes indicated for job-site fitting.
   a. Comply with clearance requirements of referenced quality standard for fitting.
2. Coordinate and locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, hollow metal door frame shop drawings, DHI A115-W series standards, and hardware templates.
   a. Coordinate measurements of hardware in metal frames to verify dimensions and alignment before proceeding with factory machining.

B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required in the factory.

2.3 FACTORY PRIMING

A. General: Comply with referenced quality standard's requirements for factory priming.

B. Prime door facings, stiles and rails at the factory.

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 or damage.

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 doors to comply with manufacturer's instructions and referenced quality standard and as indicated.

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. Machine doors for hardware. Seal cut surfaces after fitting and machining to match door color and finish.

2. 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. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.

D. Remove protective packaging just prior to installation. Installer shall be experienced in performing work required and shall be specialized in the installation work similar to that required for this project.

E. Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions and product packaging instructions for installation.

3.3 ADJUSTING AND PROTECTION

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Installed Doors: Replace doors damaged during installation in excess of surface blemishes as required by the Architect.

C. Protect doors as recommended by door manufacturer to ensure that doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08 14 23

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 05 Section “Cold Formed Metal Framing”.
2. Division 05 Section “Light Gauge Metal Framing”.
3. Division 08 Section “Hollow Metal Doors and Frames”.
4. Division 08 Section “Molded Hardboard Doors”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C – Positive Pressure Fire Tests of Door Assemblies.
3. UL 305 – Panic Hardware.
4. ULC-S132, Emergency Exit and Emergency Fire Exit Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum five (5) years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum three (3) years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum five (5) years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within

specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Seven (7) years for heavy duty cylindrical (bored) locks and latches.
2. Five (5) years for exit hardware.

1.8 MAINTENANCE SERVICE

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 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
   a. Three Hinges: For doors with heights 61 to 90 inches.
   b. Four Hinges: For doors with heights 91 to 120 inches.
   c. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
   b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

   a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Acceptable Manufacturers:

   a. McKinney Products (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Acceptable Manufacturers:

   a. Pemko Products (PE).

2.3 DOOR OPERATING TRIM

A. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
5. Manufacturers:

   a. Rockwood Products (RO).
   b. Trimco (TC).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum ten (10) years of experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Manufacturer's Standard.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.

1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level. Geographical exclusivity to be provided for all security and high security cylinders and UL437 certification where specified.

    a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.

2. Acceptable Manufacturers:

    a. Sargent Manufacturing (SA) - Degree Series.
    b. Corbin Russwin (RU) – Access 3 Series.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 Certified Products Directory (CPD) listed cylindrical (bored) locksets furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application.

1. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

2. Locks are to be non-handed and fully field reversible.

3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 2 million cycles.

4. Acceptable Manufacturers:

a. Corbin Russwin Hardware (RU) – CL3300 Series.
b. Sargent Manufacturing (SA) – 10 Line.
c. Yale Locks and Hardware (YA) 5400LN Series.

B. Lock Trim Design: As specified in Hardware Sets.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Acceptable Manufacturers:

a. Strikes for Mortise Locks and Latches: BHMA A156.13.

b. Strikes for Bored Locks and Latches: BHMA A156.2.
c. Strikes for Auxiliary Deadlocks: BHMA A156.36.
d. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
6. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
   a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
   b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:
   a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt or security type fasteners as specified in the door Hardware Sets.

B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 certified surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

1. Acceptable Manufacturers:

a. Corbin Russwin Hardware (RU) - DC6000 Series.
b. Norton Door Controls (NO) - 7500 Series.
c. Sargent Manufacturing (SA) - 351 Series.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers

    a. Rockwood Products (RO)
    b. Trimco (TC)

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

    a. Rockwood Manufacturing (RO).
    b. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Acceptable Manufacturers:

    a. Rixson Door Controls (RF).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Acceptable Manufacturers:

1. National Guard Products (NG).
2. Pemko Manufacturing (PE).

2.13 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Refer to Door Hardware Schedule for hardware sets. Coordinate with the drawings for quantity location, door swing and operation. Notify the architect of discrepancies prior to bid.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. RO - Rockwood
3. SU - Securitron
4. SA - Sargent
5. RF - Rixson
6. PE - Pemko

Hardware Sets

Set: 1.0

Doors: 100

Description: EXTERIOR PAIR - LOBBY

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US4	MK	087100
1	Surface Vert Rod Exit	DG164 43 8710 306 x Less Pull	US4	SA	087100
1	Surface Vert Rod Exit, Exit Only	43 8710 EO	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
2	Decorative Door Pull	RM3310-24 Mtg-Type 12XHD	US4	RO	087100
2	Door Closer	351 CPS - Heavy Duty Parallel Arm w/ Compression Stop	EAB	SA	087100
1	Threshold	2009APK x Length Required x MSES25SS		PE	087100
1	Gasketing (Head)	2891GPK		PE	087100
1	Gasketing (Jamb)	290GPK		PE	087100
2	Sweep	3452GNB		PE	087100
2	Astragal	305GN		PE	087100

Set: 2.0

Doors: 118

Description: EXTERIOR SINGLE - CARRIER CENTER

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP	US4	MK	087100
1	Rim Exit Device, Storeroom	DG164 43 8804 x Less Pull	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Decorative Door Pull	RM3310-24 Mtg-Type 12XHD	US4	RO	087100
1	Door Closer	351 CPS - Heavy Duty Parallel Arm w/ Compression Stop	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Threshold	2009APK x Length Required x MSES25SS		PE	087100
1	Gasketing (Head)	2891GPK		PE	087100
2	Gasketing (Jamb)	290GPK		PE	087100
1	Rain Guard	346G x (Width of Frame Head)		PE	087100
1	Sweep	3452GNB		PE	087100

Set: 3.0

Doors: 119

Description: INTERIOR SINGLE - WARMING PANTRY

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Classroom Lock	DG164 28 10G37 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Door Closer	351 CPSH - Heavy Duty Hold Open Arm with Compression Stop	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100

Set: 4.0

Doors: 103

Description: INTERIOR SINGLE - RESTROOM

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Privacy Lock	28 10U65 LL	US4	SA	087100
1	Door Closer	351 O - Heavy Duty Regular Arm	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100
1	Coat Hook	RM811	US4	RO	087100

Set: 5.0

Doors: 106, 108, 120, 121

Description: INTERIOR SINGLE - MECHANICAL / ELECTRICAL / STORAGE

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Storeroom/Closet Lock	DG164 28 10G04 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Door Closer	351 O - Heavy Duty Regular Arm	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL / 608 (Gasketing at Fire Rated Openings / Silencers at Non Fire Rated)		PE	087100

Set: 6.0

Doors: 104, 115

Description: INTERIOR SINGLE - IT CLOSET / JANITORIAL

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Storeroom/Closet Lock	DG164 28 10G04 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Door Closer	351 CPSH - Heavy Duty Hold Open Arm with Compression Stop	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Gasketing	S88BL / 608 (Gasketing at Fire Rated Openings / Silencers at Non Fire Rated)		PE	087100

Set: 7.0

Doors: 101A, 101B

Description: INTERIOR SINGLE - BOARD ROOM

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Classroom Lock	DG164 28 10G37 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Door Closer	351 O - Heavy Duty Regular Arm	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100
1	Door Bottom	411APKL 36"		PE	087100

Set: 8.0

Doors: 112

Description: INTERIOR SINGLE - FIRE RATED - CORRIDOR

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Classroom Lock	DG164 28 10G37 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Door Closer	351 P10 - Heavy Duty Parallel Arm	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100

Set: 9.0

Doors: 107, 116

Description: INTERIOR SINGLE - CORRIDOR

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US4	MK	087100
1	Passage Latch	28 10U15 LL	US4	SA	087100
1	Door Closer	351 CPSH - Heavy Duty Hold Open Arm with Compression Stop	EAB	SA	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100

Set: 10.0

Doors: 111

Description: INTERIOR SINGLE - COPY ROOM

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Passage Latch	28 10U15 LL	US4	SA	087100
1	Concealed Overhead Holder/Stop	2-X46	606	RF	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
3	Silencer	608		RO	087100

Set: 11.0

Doors: 105, 113

Description: INTERIOR SINGLE - OFFICES

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Entry/Office Lock	DG164 28 10G05 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100

Set: 12.0
Doors: 102, 117
Description: INTERIOR SINGLE - OFFICES

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Entry/Office Lock	DG164 28 10G05 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Conc Overhead Stop	2-X36	606	RF	087100
1	Gasketing	S88BL		PE	087100

Set: 13.0
Doors: 114
Description: INTERIOR SINGLE - CLOSET

3	Hinge, Full Mortise	TA2714	US4	MK	087100
1	Classroom Lock	DG164 28 10G37 LL	US4	SA	087100
1	Large Format Final Core	DG1 6300 MK	US4	SA	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
3	Silencer	608		RO	087100

Set: 14.0
Doors: 109, 110
Description: INTERIOR SINGLE - MULTI-STALL RESTROOMS

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US4	MK	087100
1	Pull Plate	BF 110x70C	US4	RO	087100
1	Push Plate	70C-RKW	US4	RO	087100
1	Door Closer	351 O - Heavy Duty Regular Arm	EAB	SA	087100
1	Mop Plate	K1050 4" x 1" LDW 4BE CSK	US4	RO	087100
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US4	RO	087100
1	Wall Stop	400 / 441 (Type as Required)	US4	RO	087100
1	Gasketing	S88BL		PE	087100

END OF SECTION 08 71 00

SECTION 08 80 00

GLAZING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Vision lites

B. Related Sections: The following sections contain requirements that relate to this Section.

1. Division 8 Section “Hollow Metal Doors and Frames”

1.03 DEFINITIONS

A. Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.

B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's directions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's directions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
   a. Specified Design Wind Loads: 300 psf.

b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
   1) Load Duration: 60 seconds or less.
c. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
   1) For monolithic-glass lites heat treated to resist wind loads.
   2) For insulating glass.
d. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 120 F deg, ambient; 180 F deg, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2 inch wide interspace.
3. Center-of-Glass U-Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
4. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
5. Solar Optical Properties: NFRC 300.

1.05 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Glazing submittal to be completed only after pre-submittal meeting has taken place between Contractor, Owner, Architect, hollow metal frame supplier, hardware supplier, wood door supplier, and glazing supplier.

C. Product data for each glass product and glazing material indicated and required accessories.

D. Shop Drawings: Include elevations, edge details, hardware and attachments to other work for:

1. Window glazing, door glazing and fire rated glazing.

E. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.

1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

F. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.

G. Warranties: Special warranties specified in this Section.

1.06 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. FGMA Publications: "FGMA Glazing Manual"
2. LSGA Publications: "LSGA Design Guide"
3. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines".

B. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a 5 year minimum record of successful in-service performance.

C. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1. Primary glass of each (ASTM C 1036) type and class indicated.
2. Heat-treated glass of each (ASTM C 1048) condition indicated.
3. Laminated glass of each (ASTM C 1172) kind indicated.
4. Insulating glass of each construction indicated.

D. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer’s written instructions for shipping, storing and handling mirrors as needed to prevent deterioration of silvering, damage to edges and abrasion of glass surfaces and applied coatings.

1.08 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 degrees F.

1.09 WARRANTY

A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Manufacturer's Warranty on Coated Glass Products: Submit written warranty signed by coated glass manufacturer agreeing to furnish replacements for those coated glass units that deteriorate as defined in "Definitions" article, f.o.b. the nearest shipping point to Project site.

PART 2 – PRODUCTS

2.01 PRODUCTS AND MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated in schedules at the end of PART 3.

2.02 TEMPERED GLASS PRODUCTS

A. Tempered Glass: ASTM C 1048, Type I (transparent flat glass); Quality-Q3, of class, kind and condition indicated. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat strengthened) float glass as indicated.

1. Class 1 (clear) unless otherwise indicated.

2.03 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.04 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine glass framing, with glazier present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
2. Minimum required face or edge clearances.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.03 GLAZING, GENERAL

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass from edge damage during handling and installation as follows:

1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
2. Remove damaged glass from Project site and legally dispose of off-site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

E. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

F. Square cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 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. 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.

C. Do not remove release paper from tape until just before each lite is installed.

D. Apply heel bead of elastomeric sealant as recommended by sealant manufacturer.

E. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

F. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Install gaskets so they protrude past face of glazing stops.

3.06 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's printed recommendations. Provide supplementary wet seal and weep system unless otherwise indicated.

3.07 PROTECTION AND CLEANING

A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

F. Do not permit edges of mirrors to be exposed to standing water.

3.08 GLAZING SCHEDULE

A. Refer to Drawings for glazing types.

END OF SECTION 08 80 00

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Description of Work: Work of this section includes, but is not limited to, the following:

1. Gypsum board and accessories
2. Metal suspension systems
3. Gypsum board finishing
4. Projection Screen – Level 5 Finish
5. Trim and accessories

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. See Division 9 Section “Painting”.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions with project conditions and materials clearly identified or detailed for each required system.

B. Identify on the drawings recommended control joint placement in walls and ceilings based upno manufactuer’s recommendations.

1.4 SYSTEM REQUIREMENTS

A. Performance Requirements: Fabricate and install systems as indicated but not less than that required to comply with ASTM C754 under the following conditions:

1. Gypsum board partitions:
   a. Standard systems: Maximum deflection of l/240 of partition height.
   b. Systems to receive water resistant gypsum board or backer board: Maximum deflection of l/360 of partition height.
2. Interior suspended ceilings and soffits: Maximum deflection of l/360 of distance between supports.

B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.

C. Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

1.5 QUALITY ASSURANCE

A. Reference Standards:

1. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are required, specify gypsum board assemblies that comply with requirements as follows in C, D and E.
2. Fire-Resistance Ratings shall comply with GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
3. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, specify materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
4. Gypsum Wallboard shall comply with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
5. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board" except for more stringent requirements of manufacturer.
5. Apply acoustical sealant in accordance with applicable requirements of ASTM C919.
6. **Gypsum board manufactured outside the Continental United States is not permitted.**

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver material to site promptly without undue exposure to weather.
2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.

B. Storage:

1. Store above ground in dry, ventilated space.
2. Protect materials from soiling, rusting and damage.
3. Store board to be directly applied to masonry walls at 70°F for 24 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not install gypsum board when ambient temperature is below 40°F.
2. For adhesive attachment of gypsum board, and for finishing of gypsum board, maintain ambient temperature above 55°F from one week prior to attachment or joint treatment, and until joint treatment is complete and dry.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All gypsum board and finishing materials shall be provided by a single manufacturer.

B. Gypsum Board and Accessories: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL. (Basis of Design).

C. Grid Suspension Assemblies: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL. (Basis of Design).

D. Alternate Manufacturers:

1. Georgia Pacific Building Products (GP)
2. National Gypsum Corporation (NG)
3. Or Architect approved equal prior to Bid.

2.2 PRODUCTS

A. Typical Partitions and Ceilings Gypsum Board:

1. ASTM C1396 (Section 5), regular type.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated
4. Acceptable products:
   a. SHEETROCK® brand SW by USG (Basis of Design).
   b. Or ToughRock® Fireguard X™ by GP.
   c. Or Gold Bond® Fire-Shield® Type X by NG.
   d. Or Architect approved equal prior to Bid.

B. Fire Rated Partitions and Ceilings Gypsum Board:

1. ASTM C1396 (Section 7), Type X.
2. Edges: Tapered.
3. Thickness: 5/8 inch, unless otherwise indicated
4. Acceptable products:
   a. Sheetrock® brand Firecode® C Core by USG (Basis of Design).
   b. Or ToughRock® Fireguard X™ C Core by GP.
   c. Or Gold Bond® Fire-Shield C™ C Core by NG.
   d. Or Architect approved equal prior to Bid.

C. Moisture/Mold Resistant Partitions and Ceilings Gypsum Board:

1. ASTM C1396 (Section 7), Type X.
2. Edges: Tapered
3. Thickness: 5/8 inch, unless otherwise indicated
4. Acceptable products:
   a. Sheetrock® brand Mold Tough™ Firecode by USG (Basis of Design).
   b. Or ToughRock® Fireguard X™ Mold-Guard™ by GP.
   c. Or Gold Bond® XP® Fire-Shield Type X by NG.
   d. Or Architect approved equal prior to Bid.

D. Tile Backerboard and Underlayment:

1. ASTM C1278 (Gypsum Based Tile Backer).
2. Edges: Square
3. Thickness: 5/8 inch, unless otherwise indicated
4. Acceptable products:
   a. Fiberock Tile Backerboard and Underlayment by USG (Basis of Design).
   b. Or DensShield Tile Backer by GP.
   c. Or Gold Bond® EXP® Tile Backer by NG.
   d. Or Architect approved equal prior to Bid.

E. Exterior Sheathing:

1. Noncombustible, moisture and mold resistant treated gypsum core with fiberglass face and backing complying with ASTM C1177.
2. Thickness: 5/8 inch.
3. Acceptable product and manufacturer:
   a. Securock Brand® Glass-Mat Sheathing by USG (Basis of Design).
   b. Or DensGlass Gold® Sheathing by GP.
   c. Or Gold Bond® EXP® Sheathing by NG.
   d. Or Architect approved equal prior to Bid.

2.4 CEILING SUPPORT MATERIALS

A. Hanger Anchorage Devices: Screws, clips, bolts or other devices compatible with indicated structural anchorage for ceiling hangers and whose suitability has been proven through standard construction practices or by certified test data.

B. Hangers:

1. Steel wire or rods, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
2. Wire: ASTM A 641, soft, Class 1 galvanized.
3. Rods and Flats:
   a. Mild steel components.
   b. Finish: Galvanized or painted with rust-inhibitive paint for interior work; galvanized for exterior work.

C. Framing System:

1. Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635, with exposed surfaces finished in manufacturer's standard enamel paint finish.
2. Fire rating: Where required by drawings provide 1 hour rating in accordance with UL assembly indicated.
3. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
4. Accessories:
   a. U-shaped channel molding.
   b. Galvanized carbon steel (12 ga.) hanger wire.
5. Acceptable product:
   a. Drywall Suspension System by USG. (Basis of Design)
   b. Or Drywall Flat Ceiling Suspension System by Armstrong.
   c. Or Drywall Ceiling Suspension System by Chicago Metallic
   d. Or Architect approved equal prior to Bid.

2.5 ACCESSORIES

A. Metal Trim for Gypsum Board:

1. All Gypsum wall board shall be finished with metal edges where abutting other materials.
2. Conform to profile and dimensions indicated.
3. Material for interior work: Galvanized steel, 26 gauge minimum.
4. Corner beads: Equivalent to Dur-A-Bead No. 103 by USG.
5. Casing beads (edge beads): Equivalent to 200A by USG.
6. Control joints:
   a. Roll-formed zinc with perforated flanges.

b. Size: 1-3/4 inch wide, with ¼ inch wide center channel.
c. Provide with removable tape strip over channel.
d. Acceptable product: Equivalent to No. 093 by USG.

B. Paper-Faced Metal Trim for Gypsum Board:

1. Conform to profile and dimensions indicated.
2. Material for interior work: Comply with ASTM C1047.
3. Outside corners: Paper Faced Metal Bead and Trim B1W series by USG.
4. Inside corners: Paper Faced Metal Bead and Trim B2 by USG.
5. Trims: L shape – B4 SERIES by USG; J shape: B9 SERIES by USG.

C. Hanger Wire Sound Isolators: Provide where indicated for sound-rated suspended ceilings.

D. Adhesives and Joint Treatment Materials:

1. Conform to requirements of ASTM C475.
2. Joint compounds:
   a. Drying-type (ready-mixed): Equivalent to SHEETROCK® brand taping joint compound and topping joint compound, or SHEETROCK® all purpose joint compound [or ready-mixed lightweight all purpose joint compound by USG.
   b. Setting (chemically-hardening) type: Equivalent to SHEETROCK® brand setting-type joint compound by USG. Note: this is default for veneer plaster and FIBEROCK® brand panels.
   c. Laminating adhesive for multiple layers: Special adhesive or joint compound specifically recommended for laminating gypsum boards.
   d. Laminating adhesive for direct application: Special adhesive or joint compound specifically recommended for laminating gypsum boards and for adhering gypsum boards to solid substrates.
   e. Reinforcing joint tape:
      1. ASTM C475, 2 inch nominal width.
      2. For backer board, provide fiberglass tape as recommended by board manufacturer.

E. Gypsum Board Screws: Self-drilling, self-tapping steel screws.

1. Fasteners for gypsum wallboard to supporting members shall be of the screw type recommended by manufacturer, except where other types of fasteners are specifically required.
2. Nail fasteners are not permitted.

F. Backer Board Accessories: Provide accessories and corrosion-resistant-coated steel screws as recommended by backer board manufacturer and required for complete installation.

G. Acoustical Sealant: Equivalent to to SHEETROCK® acoustical sealant by USG.

H. Z-Furring Insulation: See Section 07 21 00 THERMAL INSULATION.

I. Miscellaneous Accessories: Provide as required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and adjoining construction and conditions under which work is to be installed. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install in accordance with reference standards and manufacturer's instructions and as required to comply with seismic requirements.

B. Tolerances:

1. Do not exceed 1/8 inch in 8'-0" variation from plumb or level in exposed lines of surface, except at joints between gypsum board units.
2. Do not exceed 1/16 inch variation between planes of abutting edges or ends.
3. Shim as required to comply with specified tolerances.

C. Install framing to comply with ASTM C754 and with ASTM C840 requirements that apply to framing installation.

D. Install supplementary framing, blocking and bracing at terminations in gypsum board assemblies to support fixtures, equipment, heavy trim, grab bars, toilet accessories, furnishings or similar construction.

3.3 METAL SUPPORT INSTALLATION

A. Metal Runners:

1. Align and secure runner tracks accurately to partition layout at both floor and ceiling.
2. Provide fasteners appropriate to substrate construction as recommended by manufacturer.

B. Hat Channel Furring:

1. Attach hat-shaped furring channels either vertically or horizontally with fasteners through alternate wing flanges (staggered).
2. Space furring channels at 16 inches on center, unless otherwise indicated. Where furring is indicated to receive backer board, water resistant gypsum board with ceramic tile, or veneer plaster, space at 16 inches on center.
3. Install furring channels within 4 inches of floor line and ceiling line.

C. Ceiling and Soffit Support Systems:

1. Secure hangers or rods to structural support by connecting directly to structure where possible; otherwise connect to inserts, clips or other anchorage devices or fasteners indicated.
2. Space main runners, hangers and furring according to requirements of ASTM C754, except as otherwise indicated.
3. Where spacing of structural members, or width of ducts or other equipment, prevents regular spacing of hangers, provide supplemental hangers and suspension members and reinforce nearest affected hangers to span extra distance.
5. Install compression posts, splay wires and other accessories as required to comply with seismic requirements.
6. Extend runners to within 6 inches of walls.
7. Wire-tie or clip furring members to main runners and to other structural supports indicated. In fire resistance rated assemblies, wire-tie furring members; do not clip.
8. Provide 1 inch clearance between furring or runners and abutting walls and partitions.
9. For proprietary framing system, comply with manufacturer's instructions.

3.4 BOARD INSTALLATION

A. Single Layer Gypsum Board on Metal Studs:

1. Loosely butt gypsum board joints together and neatly fit.
2. Do not place butt ends against tapered edges.
3. Maximum allowable gap at end joints: 1/8 inch.
4. Stagger joints on opposite sides of partitions.
5. Apply ceiling boards first where gypsum board ceilings and wall occur.
6. Cut openings in gypsum board to fit electrical outlets, plumbing, light fixtures and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
7. Screw board in place securely with screws spaced according to manufacturer's recommendations.

B. Single Layer Gypsum Board on Furring:

1. Apply gypsum board with long dimension at right angles to studs.
2. Center end joints over channel web; stagger end joints from those in adjacent rows of board.
3. Fasten boards to studs with screws spaced according to manufacturer's recommendations.

C. Double Layer Gypsum Board:

1. Fasten base layer to studs or furring with screws, and attach face layer using laminating adhesive and screws, applied according to manufacturer's instructions.
2. Offset face-layer joints at least 10 inches from parallel base-layer joints.
3. Screw both layers to metal supports at double layer ceiling applications and where required for fire-rated construction.

3.6 SOUND-RATED CONSTRUCTION

A. Insulation:

1. Install sound attenuation blankets in sound-rated partitions and ceilings where indicated.
2. Completely fill space between studs and framing to full height of partition wall or full area of ceiling.
3. Fit carefully behind electrical outlets and other work penetrating sound-rated construction.

B. Gypsum Board:

1. Install gypsum board same as for interior partitions and ceilings.
2. Coordinate with installation of perimeter sealants.

C. Acoustical Sealant:

1. At partition walls, provide continuous beads of acoustic sealant at juncture of both faces of runners with floor and ceiling construction, and wherever gypsum board abuts dissimilar materials, prior to installation of gypsum board.
2. At ceilings, provide continuous beads of sealant wherever gypsum board abuts dissimilar materials.
3. Provide continuous bead of sealant behind faces of control joints prior to installation of control joint accessories.
4. After installation of gypsum board base layers, cut face layer sheets ½ inch less than floor-to-ceiling height and position with 1/4 inch open space between gypsum board and floor, ceiling and dissimilar vertical construction. Fill 1/4 inch open space with continuous sealant beads after installation of face layer.
5. At openings and cutouts, fill open spaces between gypsum board and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of sealant.
6. Seal sides and backs of electrical boxes to completely close off openings and joints.

D. Sound Flanking Paths:

1. Where sound-rated partition walls intersect non-rated gypsum board partition walls, extend sound-rated construction to completely close sound flanking paths through non-rated construction.
2. Seal joints between face layers at vertical interior angles of intersecting partitions.

3.7 ACCESSORY INSTALLATION

A. Trim:

1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
2. Install metal corner beads at external corners.
3. Install metal casing bead trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.

B. Control Joints:

1. Install control joints at junction of gypsum board partitions with walls or partitions of other finish material.
2. Install control joints within long runs of partitions, ceilings or soffits at approximately 25'-0" on center or as indicated.

C. Access Panels: Access panels shall be provided in the base bid for all assemblies for any equipment or item requiring maintenance or periodic replacement.

3.8 FINISHING

A. Provide levels of gypsum board finish for locations as follows, in accordance with Gypsum Association GA 214, "Recommended Specification: Levels of Gypsum Board Finish".

1. Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
2. Level 2: Gypsum board substrate at tile, except remove tool marks and ridges.
3. Level 3: Gypsum board surfaces, where textured finishes or heavy vinyl wall papering will be used or USG First Coat primer.
4. Level 4: Gypsum board surfaces, except where another finish level is indicated USG First Coat primer.
5. Level 5: Gypsum board surfaces requiring extra smooth surface for critical light.
6. Ceiling soffits shall have a level 5 finish and have expansion joints at intersecting corners.

B. Interior Gypsum Board:

1. All Gypsum finishing shall be accomplished by vacuum sanding.
2. Prefill:
    a. Use setting-type joint compound. Mix joint compound according to manufacturer's directions.
    b. Fill joints between boards flush to top of eased or beveled edge.
    c. Fill joints of gypsum board above suspended ceilings in fire-rated partitions.
    d. Wipe off excess compound and allow compound to harden.
3. Taping (Level 1):
    a. Use taping or all purpose conventional weight compound.
    b. Butter taping compound into inside corners and joints.
    c. Center tape over joints and press down into fresh compound.
    d. Remove excess compound.

e. Tape joints of gypsum board above suspended ceilings.

4. First coat (Level 2):
   a. Use taping or all-purpose conventional weight drying-type compound, or setting-type joint compound.
   b. Immediately after bedding tape, apply skim coat of compound over body of tape and allow to dry completely in accordance with manufacturer's instructions.
   c. Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.
5. Second coat (Level 3): Use all purpose or topping conventional weight drying type joint compound. After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 2 inches beyond edge of first coat.
6. Third coat (Level 4):
   a. Use all purpose or topping conventional weight drying type joint compound.
   b. After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 2 inches beyond edge of second coat.
   c. Allow third coat to dry. Apply additional compound, and touch-up and sand, to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.
7. Skim coat (Level 5):
   a. Apply skim coat of all-purpose conventional weight drying-type compound over exposed surfaces of gypsum board.
   b. After skim coat has dried, touch-up and sand to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.

C. Water-Resistant Gypsum Board: Treat fastener heads and joints with setting-type joint compound.

1. For joints to be covered with tile, apply tape and joint compound bedding coat and skim coat only; do not apply finish coats.
   a. Do not crown joints or leave excess compound on panels.
   b. Remove tool marks and ridges.
   c. For fastener heads to be covered with tile, apply one coat of joint compound.

D. Joint Compound:

1. After skim coat sets, apply finish coat of compound feathering 3 to 4 inches beyond tape edges.
2. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
3. Allow joint compound to completely set before applying veneer plaster finish.

E. Trim:

1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
2. Install metal corner beads at external corners.
3. Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi-exposed, and where gypsum base terminates against dissimilar material.

F. Control Joints: Install where indicated on the provided shop drawings and based upon manufacturer’s recommendations.

G. Special Trim and Reveal Joints: Install as indicated on drawings and in accordance with manufacturer's instructions.

3.10 ADJUSTING

A. Correct damage and defects which may telegraph through finish work.

B. Leave work smooth and uniform.

END OF SECTION 09 21 16

SECTION 09 65 00

RESILIENT TILE FLOORING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Premium vinyl composition floor tile.

B. Resilient wall base, rubber tread with integrated risers and other accessories installed with resilient floor tiles are specified in Division 9 Section "Resilient Wall Base and Accessories."

1.2 RELATED DOCUMENTS

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

1.3 RELATED SECTIONS

A. Division 3 Section “Cast-In-Place Concrete”

B. Division 9 Section “Resilient Wall Base and Accessories”

1.4 REFERENCES

A. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

B. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes”

C. ASTM F 2982 Standard Specification for Polyester Composition Floor Tile

1.5 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature for each type of material to be provided for Project.

B. Product samples for each type of tile and edge strip required for the project.

C. Manufacturer’s Standard Colors: provide a selection kit for color selection.

C. Maintenance data for resilient floor tile, to include in Operating and Maintenance Manual specified in Division 1.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Floor Tile: Obtain each type, color, and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Pre-installation Testing: Conduct pre-installation testing for relative humidity (rh) and ph of newly placed slab.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).

C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

D. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test

1.8 PROJECT CONDITIONS

A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive tiles for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).

B. Do not install tiles until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during tile installation.

D. Flooring installer shall test the moisture content of concrete slab value prior to installation to meet manufacturer’s requirements.

1.9 SEQUENCING AND SCHEDULING

A. Install tiles and accessories after other finishing operations, including painting, have been completed.

B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive.

1.10 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

1. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.

1.11 WARRANTY

A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.

B. Limited Warranty Period: 5 years

C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide the following vinyl composition floor tiles as indicated on architectural drawings:

1. Armstrong Flooring (Basis of Design)
2. Azrock by Tarkett Commercial
3. Johnsonite
2. Or Architect approved equal prior to bid.

2.2 VINYL COMPOSITION TILE FLOORING MATERIAL REQUIREMENTS

A. Vinyl Composition Tile: Meet or exceed requirements of ASTM F 1066 Class 2, non-asbestos formulated, through pattern.

B. Size: 12”x24”

C. Gauge: 1/8”.

D. Flammability: Provide materials with 1.0 CRF (critical radiant flux) or higher when tested in accordance with ASTM E 648, Flooring Radiant Panel Test.

E. Smoke Density: Provide materials with smoke density of less than 450 when tested in accordance with ASTM E 662.

F. Static Load: Provide materials with static load limit of 150 psi or higher.

G. Slip Resistance: Provide materials with minimum rating for floor of >60.

H. Color and Pattern: Premium Striations BBT.

1. Premium Pattern as shown on the drawings.
2. Colors to be selected from manufacturer’s premium color selections.

2.3 INSTALLATION ACCESSORIES

A. Moisture Mitigation of Concrete slab shall be included in the bid. Provide Armstrong S-452 Seal Strong for concrete slab RH up to 100%.

B. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.

C. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.

D. Adhesives (Cements): Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.

E. Subfloor Filler: If quality of flooring slab finish does not meet the flatness and finish criteria. The contractor shall include filler of type recommended by and compatable will the flooring material manufacturer.

PART 3 – EXECUTION

3.1 EXAMINATION

A. General: Examine areas where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 Section "Cast-In-Place Concrete" for slabs receiving resilient flooring.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits of any kind.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile.

B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

D. Subfloor Preparation Moisture Mitigation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring S-184 Fast-Setting Cement-Based Patch and Underlayment and S-452 Seal Strong™ two part moisture mitigation system as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems manual, F-5061 and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

E. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

F. Apply concrete slab primer, as recommended by flooring manufacturer for bonding, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.

C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.

E. Extend tiles into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.

G. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.

H. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.

I. Hand roll tiles where required by tile manufacturer.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing tile installation:

3. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
4. Sweep or vacuum floor thoroughly.
5. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
6. Damp-mop tile to remove black marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.

1. Apply protective floor polish to tile surfaces that are free from soil, visible adhesive, and surface blemishes.
   a. Use commercially available, metal, cross-linked acrylic product acceptable to tile manufacturer.

b. Coordinate selection of floor polish with Owner.

2. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Clean tiles not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean tiles using method recommended by manufacturer.

1. Strip protective floor polish that was applied after completing installation prior to cleaning.
2. Reapply floor polish after cleaning per manufacturer's recommendation.

END OF SECTION 09 65 00

SECTION 09 65 13

RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wall base.
2. Floor transition strips.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 6 inches long, of each resilient product color, texture, and pattern required.

1.3 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 COLORS AND PATTERNS

A. Acceptable Manufacturers:

1. Resilient Wall Base (ASTM F1861):
   a. Basis of Design:
      1) Roppe Corporation, USA
   b. Optional
      1) Armstrong World Industries, Inc.
      2) Johnsonite.
   c. Or approved equal prior to bid.

B. Colors and Patterns: Color selected from manufacturer's premium color selection.

C. Type: TS (rubber, vulcanized thermoset).

D. Group (Manufacturing Method): I (solid).

E. Style: Cove (with top-set toe) at all hard surface flooring and level loop carpet and Straight (toeless) at cut pile carpet locations.

F. Minimum Thickness: 0.125 inch (3.2 mm).

G. Height: 4 inches or 6 inches in restrooms and janitors closets.

H. Lengths: **Coils** in manufacturer's standard length. **(48" pre-cut lengths will not be acceptable)**

I. Outside Corners: Premolded.

J. Inside Corners: Job formed or pre-molded.
1. If job-formed, provide a tight corner and prepare a field mock-up to be approved for all corners to conform to.

K. Surface: Smooth.

2.3 RESILIENT MOLDING ACCESSORY

A. Description: Reducer strip for resilient floor covering; Joiner for tile and carpet.

1. Basis of Design:
   1) Roppe Corporation, USA
2. Optional:
   1) Armstrong World Industries, Inc.
   2) Johnsonite.
3. Other manufacturers desiring approval comply with front-end document on alternate approval process.

B. Material: Rubber.

C. Shapes and Sizes: selected from the manufacturer's standard shapes to accommodate floor transitions.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturers for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Rubber Floor Adhesives: 60 g/L.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates for Stair Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:
   a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
   b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are the same temperature as the space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 RESILIENT WALL BASE INSTALLATION

A. Apply wall base to walls, stair stringers to cover wall intersections, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch wall base during installation.

E. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.

F. Pre-molded Corners: Install pre-molded corners before installing straight pieces.

G. Job-Formed Corners:

1. Outside Corners (acceptable only with approved mock-up to maintain standard): Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.3 RESILIENT ACCESSORY INSTALLATION

A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.
   a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09 65 13

SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes modular, tufted carpet tile.

B. Related Sections include the following:

1. Division 9 Section “Resilient Tile Flooring” and “Resilient Wall Base and Accessories” for resilient wall base and accessories installed with carpet and carpet tile.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Pattern of installation.
4. Pattern type, location, and direction.
5. Pile direction.
6. Type, color, and location of edge, transition, and other accessory strips.
7. Transition details to other flooring material.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and other Accessory Stripping: 6-inch- (300-mm-) long Samples.

D. Product Schedule: For carpet tile. Use same room designations indicated on Drawings.

E. Qualification Data: For Installer.

F. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

B. Mockups: Before installing carpet tile, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects of pattern lay-out and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.

C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

D. All carpet tiles, products and accessories are to be from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet before installing these items.

1.7 WARRANTY

A. Commercial Lifetime Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Warranty shall cover the following under normal useful life of the carpet:

a. Wear: Carpet tiles will not wear more than 10% of their surface pile weight from abrasive wear. “Abrasive wear” means fiber loss from the carpet tiles through normal abrasion, not crushing or flattening of the carpet pile in any area, nor staining, soiling, fading, or change in carpet appearance, nor fiber loss due to abnormal usage of the carpet tiles.
b. Static: Carpet tiles will not give static discharges in excess of 3.5 KV when tested under AATCC Test Method 134 (Step).
c. Edge Ravel/Zippering: Carpet tiles will not edge ravel or zipper.
d. Delamination: Carpet tiles will not delaminate (chair pads are recommended for maximum appearance retention and to deter delamination).
e. Dimensional Stability: Carpet tiles will not lose their dimensional stability per the AACHEN test ISO 2551.

B. Limited Stain Warranty:

1. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Basis of design manufacturer shall be Mohawk Group

B. Or Architect approved equal prior to Bid.

2.2 CARPET TILE

A. Product line and color selections made by the Owner.

B. Refer to Finish schedule 09 00 00.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. GLasBac Tac-Tiles: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and sub-floor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

C. Contractor shall provide InterfaceFLOR Moisturegard 2.0 moisture vapor barrier at all locations where subfloor moisture and pH testing does not meet manufacturer requirements. This shall be included in base bid.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
2. Subfloor finishes comply with requirements specified in Division 3 Section "Cast-in-Place Concrete" for slabs receiving carpet or carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Contractor shall install InterfaceFLOR Moisturegard 2.0 moisture vapor barrier at all locations where subfloor moisture and pH testing does not meet manufacturer requirements.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet or carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet and carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet/tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

E. Extend carpet/ tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.

G. Install pattern parallel to walls and borders and per Floor Finish Plan

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet/ tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations."

C. Protect carpet/ tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09 68 13

SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field painting of exposed interior items and surfaces.

B. This section includes the painting of defined areas for projection purposes. Coordination with other trades is required.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: For each type of finish-coat material indicated.

1.3 QUALITY ASSURANCE

A. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5.

1. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m).
2. Final approval of colors will be from benchmark samples which upon approval can be incorporated into final project finish.

1.4 PROJECT CONDITIONS

A. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.

B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).

C. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).

D. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.5 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: 5 percent, but not less than 1 gal. (3.8 L) or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Acceptable Manufacturers:
   a. Basis of Design:
      1) Sherwin-Williams Co. (Sherwin-Williams).
   b. Optional:
      1) PPG Industries, Inc. (Pittsburgh Paints).
      2) Porter Paint Co.
      3) Duron
      4) Or Architect approved equal prior to Bid.

B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names may be listed other Part 2 articles:

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

C. Colors: As indicated in the Finish Schedule.

2.3 PREPARATORY COATS

A. Concrete Unit Masonry Block Filler: High-performance latex block filler of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

B. Exterior Primer: Exterior latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

1. Ferrous-Metal, Galvanized-Metal and Aluminum Substrates: Rust-inhibitive metal primer.
2. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

C. Interior Primer: Interior latex-based of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

1. Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer.
2. Zinc-Coated Metal Substrates: Galvanized metal primer.
3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.4 INTERIOR FINISH COATS

A. Interior Flat Acrylic Paint:

1. Sherwin-Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series.

B. Interior Low-Luster Acrylic Enamel:

1. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20W2200 Series.

C. Interior Semigloss Acrylic Enamel:

1. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series.

D. Epoxy- Polyamide:

1. Sherwin-Williams; Tile Clad High Solids B62Z Series.

E. Projection Screen Acrylic Enamel:

1. Sherwin Williams; ProClassic Smooth Enamel Satin Extra White, #B20 W51.
2. Apply over Level 5, primed Gypsum Board with ¼" nap roller.

PART 3 - EXECUTION

3.1 APPLICATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

C. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
   a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
c. If transparent finish is required, backprime with spar varnish.
d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

4. Ferrous Metals: Clean non-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
   a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

E. Material Preparation:

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

F. Exposed Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convector covers, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.

1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
2. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.
3. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

G. Sand lightly between each succeeding enamel.

H. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Omit primer over metal surfaces that have been shop primed and touchup painted.
2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.

I. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

J. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

L. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

M. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

N. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

3.2 CLEANING AND PROTECTING

A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.3 EXTERIOR PAINT SCHEDULE

A. Ferrous Metal:

1. Acrylic Finish: Two (2) finish coats over a rust-inhibitive primer.
   Semi-Gloss Finish:
   1st Coat: S-W Pro Industrial™ Pro-Cryl Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry)
   2nd Coat: S-W DTM Acrylic Semi-gloss coating, B66-200
   3rd Coat: S-W DTM Acrylic Semi-gloss coating, B66-200 (4 mils wet, 1.5 mils dry per coat)

3.4 INTERIOR PAINT SCHEDULE

A. Concrete Floors-Sealed Concrete:

1. Solvent-Borne Acrylic System: Clear
   1st Coat: S-W H&C® High Performance Industrial Clear Sealer
   2nd Coat: S-W H&C® High Performance Industrial Clear Sealer (75-250 sq/ft. per gallon)

B. Concrete Floors-Epoxy floor finish:

1. Epoxy Primer / Self-Leveling Epoxy System:

1st Coat:	ArmorSeal® 33 Epoxy Primer/Sealer, B58AQ33 Series (7.0 - 8.0 mils dry)
2nd Coat:	ArmorSeal® 650 SL/RC Self-Leveling Epoxy, B58Q650 Series (10.0 - 30.0 mils dry per coat)

C. Concrete and Masonry (Other Than Concrete Unit Masonry):

1. Egg-Shel / Satin Finish:

1st Coat:	S-W PrepRite® Masonry Primer, B28W300 (7 mils wet, 3 mils dry)
2nd Coat:	S-W ProMar® 200 Latex Eg-Shel, B20W2200 Series
3rd Coat:	S-W ProMar® 200 Latex Eg-Shel, B20W2200 Series (4 mils wet, 1.6 mils dry per coat)

D. Gypsum Board:

Finish Coats: Interior flat acrylic paint at gypsum board ceilings and eggshell or satin acrylic enamel at all other gypsum board surfaces.

1. Eggshell-Low Odor - Low VOC:

1st Coat:	S-W ProGreen™ 200 Interior Latex Primer, B28W600 Series (4 mils wet, 1.5 mils dry)
2nd Coat:	S-W ProGreen™ 200 Interior Latex Eg-shel, B20W651
3rd Coat:	S-W ProGreen™ 200 Interior Latex Eg-shel, B20W651 4 mils wet, 1.6 mils dry per coat)

E. Ferrous Metal:

Finish Coats: Interior semi-gloss acrylic enamel for metal doors and frames and general metals throughout and full-gloss acrylic enamel for metal guardrails, handrails, stringers and underside of steel.

1. Semi-Gloss Finish:

1st Coat:	S-W Pro Industrial Pro-Cryl® Primer, B66-310 Series (2-4 mils dry)
2nd Coat:	S-W ProMar® 200 Latex Semi-Gloss, B31W2200 Series
3rd Coat:	S-W ProMar® 200 Latex Semi-Gloss, B31W2200 Series (4 mils wet, 1.3 mils dry per coat)

2. Flat Finish:

1st Coat:	S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series (5.0 mils wet, 2.0 mils dry)
2nd Coat:	S-W Pro Industrial Waterborne Acrylic Dryfall Flat, B42 Series
3rd Coat:	S-W Pro Industrial Waterborne Acrylic Dryfall Flat, B42 Series (6.0 mils wet, 1.7 mils dry per coat)

F. Wood and Hardboard Trim-Painted:

1. Gloss Finish:

1st Coat:	S-W PrepRite® ProBlock Latex. B51 Series (4 mils wet, 1.4 mils dry)
2nd Coat:	S-W ProMar® 200 Latex Gloss, B21W200 Series
3rd Coat:	S-W ProMar® 200 Latex Gloss, B21W200 Series

END OF SECTION 09 91 00

SECTION 10 14 13

SIGNAGE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Interior integrated modular signage system for directional, control, and informational signage.

B. Cast Aluminum Building Dedication Plaques.

C. Applied Vinyl Lettering.

D. Architectural Dimensional Lettering.

1.2 RELATED SECTIONS

A. Division 4 Section “Brick Veneer”.

B. Division 9, Section “Gypsum Board Assemblies”.

C. Division 9, Section “Painting”.

1.3 REFERENCES

A. ANSI A117.1: Providing Accessibility and Usability for Physically Handicap People, 1986 edition.

B. Department of Justice, Office of the Attorney General, "Americans with Disabilities Act", Public Law 101-336, (ADA).

C. 2010 Standards for Accessible Design (SAD): The updated ADAAG (ADA Accessibility Guidelines), effective on March 15, 2011 and made mandatory on March 16, 2012.

1.4 SYSTEM DESCRIPTION

A. Signage under this section is intended to include items for identification, direction, control, and information of building where installed as complete integrated system from a single manufacturer.

B. ADA Design Requirements:

1. Provide signage that conforms to the requirements of all regulatory agencies holding jurisdiction.

2. Comply with all applicable provisions of the 2010 Standards for Accessible Design (the updated ADA Accessibility Guidelines, ADAAG) Requirements include, but are not limited to the following:

a. Tactile copy must be all upper case and raised at least 1/32”. Tactile characters must be sans serif, not italic, not oblique, script or highly decorative.

b. The stroke width of the upper case “I” has to be 15% of the letter height or less. The character width of the uppercase “O” must be between 55% and 100% of the height of the corresponding uppercase “I”.

c. The copy height for tactile information must be between 5/8” and 2”. If separate visual characters are provided, raised characters can be ½” and need not contrast with the background.

d. The distance between characters on tactile copy must be a minimum of 1/8” and a

maximum of 4 times the character stroke width. These distances are measured between the closest points of adjacent characters.

e. Spacing between lines of tactile copy needs to be a minimum of 135% and a maximum of 170% of the corresponding upper case "I" height (measured from baseline to baseline).

f. Braille must be Grade II and positioned directly below the corresponding raised characters. If text is multi-lined, Braille is placed below the entire body of text and separated 3/8" from any other tactile characters and 3/8" minimum from raised borders and decorative elements.

g. Visual characters and symbols, and their background, are to have a non-glare finish. The color of raised characters must contrast as much as possible with their background to make sure signs are more legible for persons with low vision.

h. Pictograms, selected from International Standards, are to be located within a 6" vertical void and accompanying text descriptions are to be located directly below the pictogram.

1.5 SUBMITTALS

A. Final Art:

1. Included in this bid, Signage Contractor is to provide the creation of ALL final art files necessary for the production of the graphics. Signage Contractor will be provided graphics layouts indicating design intent in low resolution Adobe PDF format. These PDF's will serve as the design basis to be replicated by the signage contractor in the development of the final art files. Signage Contractor is to create all necessary files needed for production including modifications of all text, sizes and layouts. Signage Contractor must provide all graphics to the Architect for approval prior to manufacturing. It will be the responsibility of the signage contractor to make all necessary modifications of all files in order to receive approval from the Architect for production.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Manufacturer's product literature indicating units and designs selected.

2. Evidence of manufacturer's computerized data retrieval program for tracking of project for sign typography, message strip requirements and other pertinent data from schedule input to final computerized typography on finished product.

3. Preparation instructions and recommendations.

4. Storage and handling requirements and recommendations.

5. Installation methods.

C. Samples: One full size sign sample illustrating the design, construction, colors, typestyles, mounting method and other details as specified. Provide sample in small size sign.

1. Samples will not be returned for use in Project.

D. Shop Drawings:

1. Indicate materials, sizes, configurations, and applicable substrate mountings.

2. Typography sample for message strips and headers copy.

3. Artwork for special graphics.

4. Artwork for special headers.

E. Signage Schedule: Complete with location of each sign and the required copy/text.

F. Sign Program Maintenance Plan:

1. Manufacturer shall provide details of software and system of pre-perforated and color coated paper sign inserts allowing client to update and maintain signage graphics in-house.

2. Manufacturer shall provide details of an Online Reordering & Maintenance Application whereby the client can submit sign reorders online and store relevant project information such as sign type drawings, message schedules and product instructions.

G. Contract Close Out:

1. Furnish appropriate checklist for aiding in reordering after Date of Substantial Completion. Maintain computer schedule program for five years for ordering new signage required by Owner.

2. Maintenance data and cleaning requirements for exterior surfaces.

3. Furnish one complete SignWord Pro software package Windows 3.0 or Windows 95 or later, Windows NT 4.0 or later in Owner selected format for PC type computer.

4. Provide on Ream of paper for printing sign inserts.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Work required under this section from manufacturer regularly engaged in work of this type and scope for a minimum of 5 years.

B. Installer Qualifications: Trained and authorized by manufacturer for installations of required scope and product.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Package signs to prevent damage during shipment, handling, storage and installation. Products are to remain in their original packaging (unless otherwise specified) until removal is necessary for installation.

B. If installation site is not ready for signage upon delivery, store signs in a dry, air-conditioned environment.

C. Handle signage in accordance with manufacturer’s instructions.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 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 absolute limits.

1.9 SEQUENCING AND SCHEDULING

A. Schedule system installation after room finishes and fixtures have been completed.

1.10 WARRANTY

A. Product Warranty: Provide manufacturer's warranty against defects in materials and workmanship for a period of one year after final completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer: APCO Signs

B. Other Approved Manufacturers:

1. IMG, Image Manufacturing Group

2. Bartlett Pair

3. Or approved equal prior to bid.

2.2 ACCEPTABLE PRODUCT

A. Basis of Design Product: Arcadia Curved Face Sign System as manufactured by APCO Signs.

2.3 SYSTEM REQUIREMENTS

A. General:

1. Sign system shall feature solutions for all required sign types, including but not limited to wall mounted personnel signs, work station personnel signs, primary room identification, directories, overhead signs, projection wall signs, restroom signs, regulatory and information signs.

2. Signs within the system shall feature the same family of components and convey a uniform look throughout.

B. Features:

1. Updatability: Signs shall allow for easy updating of message inserts without the need to replace the entire sign assembly. System shall offer a solution for easy in-house updating of laser printed sign inserts for all sign types, including personnel signs, directories and directional signs.

2. Mounting: Signs shall accommodate installation via fully concealed mechanical fasteners.

C. Graphics and Typography: As selected from manufacturer's standards. Reference sign drawings.

D. Colors and Finishes: As selected from manufacturer's standards. Reference sign drawings.

E. ADA Compliance: Sign system shall comply with all applicable provisions of the 2010 Standards for Accessible Design (the updated ADA Accessibility Guidelines, ADAAG)

F. Materials and Construction:

1. Frames/Holders: Curved face sign frames shall be constructed of extruded aluminum, alloy 6063-T6, with minimum 3/4 inch (19 mm) wide contour edge detail. Top/bottom caps shall be aluminum. Plastic caps will not be acceptable. Aluminum extrusions shall contain a minimum of 50% post-consumer recycled content Modular sign holders shall accommodate any type of flexible insert material up to .095 inch (2.4 mm) thick.

2. Braille / Tactile Components: PETG-backed photopolymer with raised characters and Braille of minimum 1/32 inch (0.8 mm) depth/thickness. Braille/tactile plaques shall contain a minimum of 40% recycled content.

3. Substrate for Optional Decorative Laminate Backers: Any decorative laminate backers such as Formica or Wilsonart shall be pressure adhered to SiennaCORE, a natural fiber thermoset composite backer with a minimum 50% recycled content and comprised of materials from FSC certified sources. Non-thermoset composite substrates such as PVC or acrylic will not be accepted.

4. Fasteners: Signs shall be able to accommodate fully concealed mechanical fasteners.

5. Vinyl: All vinyl to be 3M Scotchcal series opaque or reflective vinyl mounted first surface per drawing specification.

G. Aluminum: Aluminum used for exposed exterior elements shall be T-5 mill aluminum with acrylic polyurethane two-part catalyzed coating system. All coating applications shall be prepared and spray applied in the factory by skilled mechanics. All surfaces shall be mechanically sanded removing all grain lines, striations, and surface blemishes, cleaned with non-abrasive scouring pads, rinsed, and air dried prior to receiving coatings.

1. Coating shall be prepared as designated by manufactures latest literature for surface preparation and application but in no case less than one (1) applicable primer coat and two (2) final full coats. All finished surfaces shall be uniform.

2. Colors shall match color designations as indicated on the drawings.

H. Miscellaneous Products:

1. Coatings:

   All surfaces shall be prepared to receive coatings or surface finishes according to manufactures' latest for surface preparation and application but in no case less than one (1) applicable primer coat and two (2) final full coats. All finished surfaces shall beuniform.

2. Foam Tape:

   1/32" (0.88 mm) thick, doubled faced, white pressure sensitive urethane foam adhesive tape, one (1) of the following:

   a. 3M Company: No. 4032 or AL4432YEAom9576

   b. Spectape of Texas: No. ST1132

3. Silicone:

   FS TT-S-001543, Class A, one (1) of the following:

   a. General Electric: Silicone Sealant #1200

   b. Dow Corning: Building Sealant #781

4. Epoxy:

Two (1) component thermosetting epoxy adhesive with 100% solids content, one (1) of the following:

a. Miracle Adhesive: No. NP-428

b. Hughson Chemicals Chemlok #304

2.4 SIGN SYSTEM COMPONENTS

A. Product: Curved Arcadia Signs by APCO: (Basis of Design) Reference drawings at the end of this section.

1. Curved aluminum Arcadia Series 1000 sign holders with a wide range of graphics inserts and displays. Reference drawings for colors, finishes, typestyles and other details. Reference sign schedule for exact messages.

2. Curved Aluminum Frame Finish:

a. Satin anodized aluminum finish.

3. Decorative Divider Bar:

a. Polished Acrylic Divider Bar with 1st surface applied color.

4. Core Sign Types: Other sign types, including flag mount are included within the Project. See Signage Schedule and drawings at the end of this section.

5. Elements: Decorative Backer Shape/Style: No Backer

B. Graphics:

1. Type Sizes: Selected from manufacturer's standard sizes indicated in SCHEDULE for particular units; meet ADA requirements for letter proportions and sizes.

2. Typography: Reference signage schedule and drawings for details. Font(s) selected from manufacturer’s standards unless otherwise specified. All text and graphics shall be a true representation of the typeface(s) and/or graphics specified. Letter spacing and interline spacing shall be set by the manufacturer.

a. Gothem Bold (GB) approved font or HelveticaNeue-Roman (HR)

3. Type Code(s): Initial caps.

4. Imprint Colors: Selected by Architect from manufacturer's standard 40 non-glare screening ink colors per unit and indicated in SCHEDULE; color contrast background colors in accord with ADA requirements.

5. Copy/Message List: Indicated in SCHEDULE.

6. Reference drawings and Signage SCHEDULE for details.

7. All text and graphics shall be a true representation of typeface(s) and/or graphics specified.

C. Curved-Face Arcadia Sign System as custom specified/designed. Reference drawings for location of colors, finishes, sizes and details. Reference signage schedule for sign text.

1. Arcadia Series 1000 (Contour Profiles at Left/Right of Sign).

a. Frame Finish

1) Indicated on the attached SCHEDULE.

b. Frame Sizes (widths) selected from Manufacturer's Standards. Heights selected from Manufacturer's standards and determined by insert/display components within each frame.

1) 4 inches (102 mm) width, (ARH100)

2) 6 inches (152 mm) width, (ARH150)

3) 8-1/2 inches (216 mm) width, (ARH215)

4) 11 inches (279 mm) width, (ARH280)

5) 17 inches (432 mm) width, (ARH430)

c. Insert/Display components to include:

1) Non-Glare Lens with subsurface laser printed paper insert

d. Decorative dividers to include:

1) 1/4" x 1/4" acrylic divider with surface painted color

e. Mounting/installation types to include:

1) Surface Wall Mount with Concealed Mechanical Fasteners

2.5 FABRICATION

A. Shop assembly:

1. Fabricate units to configurations indicated on reviewed shop drawings.

2. Provide copy on inserts, and covers required on reviewed shop drawings and in accord with ADA requirements.

3. Provide additional blank paper as specified.

4. Include instruction sheets for removal and replacement inserts and installation.

2.6 INTERIOR APPLIED SIGNAGE APPLIED TO GLAZING AT MAIN ENTRY DOORS

A. Graphic Applied to Glazing at Entry

1. Graphics material: 2 mil cast vinyl film applied to conditioned side of glazing system.

a. Internationally recognized “No Smoking” graphic in radius.
   1) Height: 4”.
   2) Finish: white and red opaque.
   3) Mounting method: Pressure sensitive adhesive.
b. Include 60 characters to be applied to conditioned side of glazing system.
   1) Height: 2”.
   2) Verbiage to be determined.
   3) Finish: opaque- color to be determined.
   4) Mounting method: Pressure sensitive adhesive.

2.7 CAST BUILDING DEDICATION PLAQUE

A. Provide two (2) 16” x 24” bronze plaque with pebble textured background and graphics

B. Raised lettering/Owner logo graphics and single line raised border.

C. Wall mounted with concealed mounting, stud mounted with silicone adhesive.

D. Owner to provide information concerning text and graphics prior to fabrication.

2.7 ARCHITECTURAL DIMENSIONAL LETTERS

A. Refer to drawing elevations for 6” letters and placement of lettering.

B. Provide individual prismatic cast aluminum letters with protective coating.

C. Individual characters to receive threaded studs for mounting. Studs to be set in holes drilled in exterior wall and secured in epoxy grout.

D. Fabricator to field verify all conditions and dimensions prior to submitting detailed shop drawings.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install products in accordance with manufacturer’s instructions, in locations and with mounting methods as specified in sign and location drawings.

B. Square, plumb and level all installed products.

C. Install all signage in accordance with the 2010 Standard for Accessible Design and any applicable local regulations and/or codes.

D. Upon completion of the work, sign installer shall remove any unused products, materials, packaging and debris from the installation site.

3.4 CLEANING

A. Clean all exposed surface not more than 48 hours prior to Date of Substantial Completion in accordance with manufacturer's written cleaning instructions.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 SIGN SCHEDULE

A. Refer to Signage Schedule and Drawings for sizes, locations, sign types, layouts, typestyle specifications, sign text/copy, and sign graphics.

SIGN SCHEDULE

Room No.	Room Name on Drawing	Wording on Sign	Sign Type	Quantity	Notes
100	LOBBY	-	-	none	
101	BOARD ROOM	Board Room	A	2	
102	OFFICE	Office	A	1	Insert of owner provided name
103	TOILET	Toilet	B	1	
104	IT / DATA	IT Closet	B	1	
105	OFFICE	Office	A	1	Insert of owner provided name
106	MECH / ELECT	Mechanical	A	1	
107	CORRIDOR	-	-	none	
108	STORAGE	Storage	B	1	
109	MEN	Men	C	1	Universal accessibiltiy symbol
110	WOMEN	Women	C	1	Universal accessibiltiy symbol
111	COPY	Copy Room	B	1	
112	CORRIDOR	-	-	none	
113	OFFICE	Office	A	1	Insert of owner provided name
114	CLOSET	Closet	B	1	
115	JANITOR	Janitor	B	1	
116	CORRIDOR	-	-	none	
117	OFFICE	Office	A	1	Insert of owner provided name
118	CAREER CENTER	Career Center	A	1	Insert with text to be provided
119	WARMING PANTRY	Warming Pantry	B	1	
120	MECH	Mechanical	B	1	
121	STORAGE	Storage	B	1	

SECTION 10 21 13

SOLID PLASTIC TOILET COMPARTMENTS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Floor Mounted/Overhead-Braced Solid Plastic Toilet compartments

1.02 RELATED SECTIONS

A. Division 6 Section “Rough Carpentry” for wood blocking.

B. Division 10 Section "Toilet Accessories" for toilet tissue dispensers, grab bars, and similar accessories.

1.03 REFERENCES (including but not limited to)

A. ANSI A117 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People

B. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations

C. Fair Housing Amendments Act of 1988, Accessibility Guidelines. Federal Register Volume 56, Number 44

D. International Building Code

1.04 SUBMITTALS

A. Comply with requirements in Section 01 30 00 Submittals.

B. Manufacturer's Data:
   1. Provide required number of copies of:
      a. Product Data Sheets
      b. Installation instructions
      c. Replacement parts information
      d. Manufacturer’s standard range of colors

C. Shop Drawings:
   1. Provide required number of copies of all shop drawings.
   2. Take complete and accurate measurements of complete toilet compartment locations in the field to confirm space requirements.
   3. Provide scaled layout of all toilet partitions.
   4. Show fabrication and erection of compartment assemblies, to extent not fully described by manufacturer's data sheets.
   5. Show anchorage, accessory items and finishes.
   6. Provide location drawings for bolt hole locations in supporting members for attachment of compartments.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent physical damage, or wetting.

C. Handle so as to prevent damage to finished surfaces.

1.06 WARRANTY

A. Furnish one (1) year guarantee against defects in material and workmanship for all items included within this section.

B. Solid plastic units: Provide Manufacturer’s standard 25 year warranty against breakage, corrosion, and delamination for all solid plastic units included within this section.

C. All warranties shall commence upon the date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Solid plastic units:
      a. Bradley Bradmar Solid Plastic
      b. Scranton Products (Basis of Design).
   2. Architect approved equal prior to bid.

2.02 SOLID PLASTIC TOILET COMPARTMENTS (Refer to Plans for Locations and Configuration)

A. Scranton Products Hiny Hiders, Classic Collection with Premium Texture (to be selected).

B. Construction:
   1. Toilet Compartments shall be Floor-Mounted Overhead-Braced.
   2. Doors, panels, and pilasters shall be 1” thick with all edges rounded to a radius.
   3. Doors and dividing panels shall be 66” high and mounted at 9” above the finished floor.
   4. Pilasters shall be 82” high and fastened into a 3” high pilaster shoe with a stainless steel, torx head bolts.

C. Materials:
   1. Doors, panels and pilasters shall be 1” thick constructed from High-Density Polyethylene (HDPE) resins. Partitions shall be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.
   2. Color shall be selected by Architect from Manufacturer’s premium colors.

D. Hardware:
   1. Hinges shall be 8” and fabricated from heavy-duty extruded aluminum (6463-T5 alloy) with bright dipped anodized finish with wrap-around flanges, through bolted to doors and pilasters with stainless steel, torx head sex bolts. Hinges operate with field adjustable nylon cams. Cams can be field set in 30-degree increments OR, hinges shall be integral, fabricated from the door and pilaster with no exposed metal parts.
   2. Door strike/keeper shall be 6” long and made of heavy-duty extruded aluminum (6436-T5 alloy) with bright dipped anodized finish, with wrap around flanges and secured to the pilasters with stainless steel, torx head sex bolts. Bumper shall be made of extruded black vinyl.

3. Latch and housing shall be made of heavy-duty extruded aluminum (6463-T5 alloy). The latch housing shall have a bright dipped anodized finish, and the slide bolt and button shall have a black anodized finish.
4. Each door shall be supplied with one coat bumper/hook and 2 door pulls made of chrome plated zamak. Outswing doors shall be supplied with a door stop made of chrome plated zamak.
5. Pilaster shoes shall be 3" high (type 304, 20 gauge) stainless steel. Pilaster shoes shall be secured to the pilaster with a stainless steel, torx head bolt.
6. Wall brackets shall be 1" stirrup type made of heavy-duty aluminum (6463-T5 alloy) with a bright dipped anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel, torx head bolts.
7. Headrail shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design. The headrail shall have a clear anodized finish and shall be fastened to the headrail bracket by a stainless steel, torx head sex bolt, and fastened to the top of the pilasters with stainless steel, tamper resistant torx screws. Headrail brackets shall be 20-gauge stainless steel with a satin finish, and secured to the wall with #14 stainless steel screws.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Examine areas scheduled to receive compartments for correct height and spacing of anchorage/blocking, dimensions, plumbness of walls and soundness of surfaces that would affect installation of mounting brackets.

B. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.

C. Do not begin installation of compartments until conditions are satisfactory.

D. Take complete and accurate measurements of complete toilet compartment locations.

3.03 INSTALLATION

A. General:
1. Install compartments rigidly, straight, plumb, and level and in accordance with manufacturer's installation instructions.
2. Installation methods shall conform to manufacturers recommendations for backing and proper support.
3. Conceal evidence of drilling, cutting, and fitting, to room finish.
4. All doors and panels to be mounted at 14" above finished floor.
5. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8".

3.04 ADJUSTMENT AND CLEANING

A. Adjust hardware for proper operation after installation.

B. Set hinges on inward swing doors to hold doors open approximately 15 degrees from closed position when unlatched.

C. Set hinges on outward swing doors to hold unlatched doors in closed position.

D. Clean exposed surfaces of partitions, hardware, fittings.

END OF SECTION 10 21 13

SECTION 10 28 16

TOILET ACCESSORIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Toilet, bath, washroom, and custodial accessories

B. Attachment hardware

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Installation of concealed anchor devices

B. Installation of backing plate reinforcement

1.03 RELATED SECTION

A. Division 6 Section “Rough Carpentry” for in-wall framing and plates.

B. Division 6 Section “Interior Finish Carpentry” for finished trim and coordination with cabinets.

C. Division 10 Section “Solid Plastic Toilet Compartments” for attachment of accessories to solid plastic toilet compartments.

1.04 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People

B. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips

C. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality

D. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products

E. ANSI/ASTM B456 - Electro-deposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium

F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip

G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service

H. NEMA LD-3 - High Pressure Decorative Laminates

1.05 SUBMITTALS

A. Submittals shall provide product data on accessories describing size, finish, details of function, attachment methods.

B. Submit manufacturer's installation instructions.

1.06 KEYING

A. All accessories shall be keyed alike.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for installing work in conformance with ANSI A117.1.

B. Operation of accessories shall comply with guidelines set forth by the American Disabilities Act, Title III. Documentation and samples to be provided to architect upon request.

1.08 SEQUENCING AND SCHEDULING

A. Coordinate the work of this Section with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Model numbers for toilet room accessories manufactured by Bradley Corporation are listed to establish a standard of quality for design, function, materials, workmanship and appearance. Others approved include A & J, Bobrick, Palmer Fixture Company. Manufacturers may be submitted for evaluation by the architect by following the conditions of the substitutions clause. Unless approval is obtained 10 days prior to the bid date, all bids shall be based on the standard of quality. The architect shall be the sole judge as to the acceptability of all products submitted for substitution.

B. Refer to drawings for toilet room accessory locations.

2.02 SOURCE

A. Accessories shall be the products of a single manufacturer. Accessories with tumbler locks shall be keyed alike with the exception of coin boxes in vending equipment.

2.03 MATERIALS

A. Stainless Steel: ANSI Type 302/304, with polished No. 4 finish, 22-gauge minimum, unless otherwise indicated.

B. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 20-gauge minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

C. Fasteners: Screws, bolts, and other devices of same materials as accessory unit or of galvanized steel where concealed.

2.04 PRODUCTS

A. Mirror
   1. Basis-of-Design Product: Bradley Model #747F-024360-S.
   2. Frame: Stainless steel channel.
   3. Size: 24” x 36”.
   4. Mounting centered on the sink: As indicated by manufacturer.

B. 36” Grab Bar
   1. Basis-of-Design Product: Bradley Model #812-001-36-2.
   2. Mounting: Flanges with concealed fasteners.

C. 42” Grab Bar
   1. Basis-of-Design Product: Bradley Model #812-001-42-2.
   2. Mounting: Flanges with concealed fasteners.

D. Toilet Tissue Dispenser
   1. Basis-of-Design Product: Bradley Model #5234.
   2. Mounting: Surface mounted.

E. Not used

F. Not used

G. Coat Hook
   1. Basis of Design Product: Bradley Model #9114
   2. Mounting: Surface mounted.

H. Sanitary Disposal:
   1. Bradley Model #4A10-11
   2. Mounting: Surface mounted.

J. Not used

K. Not used

2.05 FABRICATION

A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project.

B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Provide concealed anchorage wherever possible.

C. Recessed Toilet Accessories, General: Fabricate units of all welded construction with mitered corners. Hinge doors or access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Verify exact location of accessories for installation.

3.03 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturers' instructions, and as per ANSI 117.1.

B. Install plumb and level, securely and rigidly anchored to substrate.

3.04 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces after removing labels and protective coating.

END OF SECTION 10 28 16

SECTION 10 44 16

FIRE EXTINGUISHERS AND CABINETS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Fire extinguishers.
2. Fire extinguisher cabinets.

1.3 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for cabinets include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

C. Samples for verification purposes in full-size units of each type of cabinet finish indicated, and in sets for each color, texture, and pattern specified, showing the full range of variations.

D. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

E. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

F. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from a single manufacturer.

C. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.

D. Conform to NFPA 10 requirements for portable fire extinguishers.

E. Conform to Americans with Disabilities Act 1990 on maximum cabinet projection of 4” in corridors where necessary and 48” high from finish floor to lever.

1.5 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   i. Failure of hydrostatic test according to NFPA 10.
   ii. Faulty operation of valves or release levers.
2. Warranty Period: 6 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. J. L. Industries, Inc., a division of Activar Construction Products Group.
2. Larsen's Manufacturing Company – (basis of design).
3. Architect approved equal prior to bid.

2.2 FIRE EXTINGUISHERS

A. General: Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard, that comply with authorities having jurisdiction.

B. Multipurpose Dry Chemical Type: UL-rated 2A -10BC, 5-lb nominal capacity, in enameled steel container.

2.3 CABINETS

A. Fire-Rated Cabinets: Provide UL listed cabinets with UL listing mark for all fire-rated wall.

B. Cabinet Type: Suitable for containing the following:

1. Fire extinguisher.

C. Cabinet Mounting: Suitable for the following mounting conditions:

1. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall

return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.

D. Trim Style: Fabricate trim in one piece with corners mitered, welded, and ground smooth.

1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
   a. Rounded-edge trim with 5/16-inch backbend depth.
   b. Trim Metal: Stainless Steel.

E. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

1. Stainless Steel: Manufacturer's standard door construction.

F. Identify fire extinguisher in cabinet with FIRE EXTINGUISHER lettering applied to door. Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location.

1. Application Process: Silk screen.

G. Door Style: Manufacturer's standard design.

1. Silk-screen lettering or design.
2. Full Clear Acrylic door.

H. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 deg.

I. Finishes for Cabinet:

1. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
2. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine rough-in for hose vales, hose racks, and cabinets to verify locations of piping connections prior to cabinet installation.

B. Examine walls and partitions for thickness and framing for cabinets to verify cabinet depth and mounting prior to cabinet installation.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Follow manufacturer's printed instructions for installation.

B. Install 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 cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
2. Fasten mounting brackets and cabinets to structure, square and plumb.

END OF SECTION 10 44 16

SECTION 11 30 13

RESIDENTIAL APPLIANCES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers equipment.

1. Provide all labor, materials, and equipment necessary to install complete all equipment as shown on the Drawings and specified herein.
2. Provide all anchors, chairs, fastenings, cutouts, and bases necessary for the proper installation and anchoring of this equipment.
3. Provide all devices, controls, switches, etc., which are an integral part of the equipment. Provide UL approved plugs and cords for items powered by plugging into receptacle. Provide all line switches, safety cutouts, control panels, fittings, etc., and their connections between equipment and rough-ins at walls and floors.

B. Related Work Specified Elsewhere:

1. Refer to all Sections in Division 0, Contract Requirements, and Division 1, General Requirements.
2. Casework are covered in Division 6, Interior Architectural Millwork.
3. Plumbing rough-ins are covered in Division 22, Plumbing.
4. Mechanical rough-ins are covered in Division 23, Mechanical.
5. Electrical rough-ins are covered in Division 26, Electrical.

1.02 SUBMITTALS

A. Provide product data for all equipment specified below and as indicated on the drawings **prior to millwork shop drawings for coordination of sizes**.

B. Any substitutions shall be submitted along with the basis of design product data to show dimension and hook-up variances for coordination for casework and utility hook-up.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Coordinate Delivery according to manufacturer’s instructions.

1.04 JOB CONDITIONS

A. Protection:

1. Protect all Work until substantial completion of the Project. Keep all items covered and otherwise protected from damage by other trades. Replace or repair all damaged items.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. The Contractor shall review the schedule of equipment, product data sheets and manufacturer's installation requirements and shall provide materials and labor to for complete installation.

B. Or approved equal prior to bid. All substitutions shall not increase requirements for power, space for unit or any plumbing connection coordination.

PART 3 – EXECUTION

3.01 PREPARATION

A. Field Measurements:

1. Verify all pertinent dimensions of the building and conditions at job site before start of fabrication. Check all walls and corners for squareness and clearances. Evaluate access to the various areas and provide the equipment in increments which will pass freely through provided openings.

3.02 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Installation:

1. Set in place and install all equipment according to the manufacturer's instructions.
2. Do all Work at times when construction and all other trades have advanced to the point that will permit equipment installation.

3.03 ADJUSTMENT AND CLEANING

A. Make all adjustments necessary prior to turning building over to Owner.

B. Wipe equipment down after tests and adjustments to bring to clean sanitary condition at the time the building is turned over to the Owner.

REFER TO SCHEDULE ON FOLLOWING PAGE

3.04 SCHEDULES

Qty.	Equipment Type	Room No.	Manuf.	Model No.	Width	Depth	Height	Comments
1	Reach-In Refrigerator	119	Avantco	178A19RHC	29”	25.5”	82.5”	Parts and labor 1 yr, compressor warranty 5 yr
1	U/C Refrigerator	101	KitchenAid	KUR104E	24”	24”	35” max	Stainless Steel, 5 yr, extended warranty, no water hookup (door swing direction determined at shop drawing submittal)
1	U/C ‘Chewable’ Ice Maker	101	Ice-O-Matic	GEMU090	14.88”	23.63”	33.38”	22 lb. storage capacity
1	Microwave	119	LG	LCS1112ST	20.06”	15.94”	11.44”	Stainless Steel, 5 yr. extended warranty
1	Ice Cube Maker	119	Ice-O-Matic	CIM0530A	30.25”	24.25”	21.25”	Parts and labor 3 yr, evaporator/compressor parts warranty 5 yr, include water filter
1	Ice Maker Bin (for use with Ice Cube Maker)	119	Ice-O-Matic	B-110	30.25”	31”	50”	Stores up to 510 lbs

END OF SECTION 11 30 13

SECTION 22 00 00

PLUMBING SYSTEMS AND EQUIPMENT

PART 1 – GENERAL

1.01 REFERENCE TO OVERALL PROJECT:

A. The General Conditions, Supplementary Conditions, and all applicable requirements of the overall project, except as otherwise amended shall apply to all work herein.

1.02 SCOPE:

A. The work under this Section shall be to provide a complete plumbing system. All items of work, of cost and expense of any nature whatsoever belonging with or necessary to the completion of work called for in this Specification or in the Contract Documents are hereby specified to be included in this Contract.

B. Work covered by this Section of the specifications and accompanying drawings consists in furnishing all labor, equipment, appliances and materials and in performing all operations in connection with installation of a complete plumbing system for the new building as indicated and specified. This Section shall also include all incidental items not ordinarily specified, but necessary for the complete installation.

C. All equipment and materials mentioned in these specifications and/or shown on the Drawings shall be furnished, except where otherwise specifically noted, completely installed, adjusted, and left in a safe and satisfactory operating condition. All accessories, appliances and connections necessary for the operation of the equipment shall be furnished and installed.

D. The plumbing systems consist of the following principal items:

1. Underground sanitary sewer system to points indicated on the drawings.
2. Aboveground sanitary waste and vent systems.
3. Underground domestic water system to points indicated on the drawings.
4. Aboveground domestic hot water and cold water systems.
5. Domestic hot water heating system.
6. Plumbing fixtures and equipment.
7. Insulation of plumbing systems.

1.03 DRAWINGS AND SPECIFICATIONS:

A. The commencement of work under this Section indicates that the Contractor has examined and has knowledge of the architectural, structural, electrical, mechanical, and site work Drawings and Specifications. The failure of the Contractor to acquaint himself with all available information shall not relieve him of any responsibility for performing his work properly.

B. No additional compensation shall be allowed because of conditions that occur due to the Contractor's failure to become thoroughly familiar with all of the contract documents for this project, as described above, and with the job site.

C. Unless expressly stipulated, no additional allowance will be made in the Contractor's and/or manufacturer's favor by virtue of errors, ambiguities and/or omissions which were known to or which should have been known or discovered during the preparation of the bid estimates or during the course of the work and directed to the Architect's attention in a timely manner.

D. The Drawings and Specifications are intended to supplement one another. Any materials or labor called for in one but not the other shall be furnished as if both were mentioned in the specifications and shown on the

drawings. Labor and/or materials neither shown nor specified but necessary for the completion and proper functioning of the systems, shall be furnished and installed by the Contractor.

E. The Drawings are diagrammatic and are intended to depict the approximate locations of equipment, piping, and apparatus. All dimensions, whether in figures or scales, shall be verified in the field.

F. Contractor shall keep a record of the locations of all concealed work and upon completion of the job, shall supply as-built drawings showing any deviations from the original drawings. These drawings shall indicate dimensions of buried utility lines from building walls.

1.04 ORDINANCES, PERMITS AND CODES:

A. It shall be the Contractor's duty to perform the work and provide the materials covered by these specifications in conformance with all ordinances and regulations of all authorities having jurisdiction.

B. The Contractor shall obtain and pay for all permits, connection, and inspection fees as required for the complete installation of the plumbing systems.

C. All work herein shall conform to all applicable laws, ordinances and regulations of the local utility companies.

D. The work shall be in accordance with, but not limited to, the requirements of:

1. National Fire Protection Association
2. National Safety Code
3. Georgia State Energy Code for Buildings
4. International Plumbing Code

E. Codes and regulations referred to are minimum standards. Where the requirements of these specifications or drawings exceed those of the codes and regulations, the drawings and specifications govern.

1.05 COORDINATION AND CONFLICTS:

A. The Contractor shall coordinate his work so that it does not interfere with the work of other trades. It shall be the Contractor's duty to see that his work is installed in a timely manner.

B. Where minor deviations from plans are required in order to conform to space limitations, such changes shall be made by the Contractor at no additional cost to the Owner and shall be subject to the approval of the Architect.

1.06 WARRANTY:

A. All equipment shall be started, tested, adjusted, and placed in satisfactory operating condition by the Contractor. All equipment shall be covered for the duration of the manufacturer's guarantee or warranty and the Subcontractor shall furnish the Owner with all manufacturer's guarantees or warranties.

B. Equipment furnished shall be guaranteed for a minimum period of one (1) year from date of acceptance.

1.07 RECORD DOCUMENTS:

A. Contractor shall furnish at the time of request for final payment, copies of a brochure containing the following information as called for in these specifications.

1. Letter of guarantee.
2. Operating instructions.

3. Manufacturer's parts data and service instructions on all items of equipment.
4. Manufacturer's guarantees and warranties.

1.08 MOTORS:

A. Motors shall be wound for the currents specified under the Electrical Plans and Specifications. Motor running currents shall not exceed the manufacturer's name plate full load amperes. Motors other than hermetic type shall be manufactured in accordance with NEMA Standards. All motors installed outdoors shall be enclosed, weatherproof type, unless installed within weatherproof type equipment housing.

1.09 ELECTRICAL WORK:

A. Motors, controls, relays, contactors and switches required for proper operation of equipment covered under this Section, except items specified to the furnished under the Electrical Section, shall be furnished by the Subcontractor under this Section of the Specifications. Devices which are a part of the power wiring circuit and which are not an integral part of the equipment shall be installed under the Electrical Section.

B. All control wiring shall be furnished and installed under this Section.

C. Power wiring, unless otherwise indicated hereinbefore, shall be furnished and installed under the Electrical Section of the Specifications.

D. Devices, materials and installation shall conform to requirements of the Electrical section, except as specified herein.

E. All motors, and motor switches shall be for the voltage and phase shown on the Electrical Plans and Specifications.

1.10 PRODUCTS AND EXECUTION:

A. All materials, equipment, fixtures and apparatus shall be new and shall bear the label of the Underwriters' Laboratories, Inc., where UL standards have been established for such material.

1.11 SUBMITTALS:

A. All materials and equipment which the Contractor proposes to furnish shall be submitted for review. Data shall be complete in all respects and shall reference, where applicable, to the unit symbol utilized on the Drawings and Specifications.

B. Submittal review is considered as general acceptance of the basic applicability of the substituted equipment. Contractor is responsible for the installation of the substituted equipment and/or alternate arrangement of the equipment within a given space. When the Contractor desires to use substituted equipment, he shall be responsible for producing his own coordinated work drawings which depict the substituted equipment accommodated in the space. Where the substituted equipment creates the need for alterations in any portion of the work depicted in the contract documents, it shall be the Contractor's responsibility to notify all of the affected parties and coordinate these items with all other trades. Further, it shall be the Contractor's responsibility to assume any additional cost to the contract created by the substituted equipment.

C. Substituted equipment is considered to be any equipment other than the first named item in the Specifications or on the Drawings.

D. Contractor further agrees that if deviations, discrepancies or conflicts between Shop Drawings and Specifications are discovered either prior to or after Shop Drawing Submittals are processed by the Engineer, the design drawings and Specifications shall control and shall be followed. Review of submittal

data shall in no way relieve the Contractor of his duty to perform all work and provide all equipment in strict compliance with the requirements set forth in the contract documents.

E. Each individual submittal item for materials and equipment shall be marked to show specification section and paragraph number which pertains to the item. Failure to mark submittals in accordance with the above format shall be considered due cause for rejection of shop drawings.

F. Submittals shall not be made in conjunction with any other systems other than plumbing.

G. Submit for review complete data and Drawings on the following items:

1. Fixtures, faucets, traps, drains, tailpieces, etc.
2. Valves
3. Water heaters
4. Drains
5. Pipe supports and attachments
6. Piping
7. Hydrants and hose bibbs
8. Recirculation pumps
9. Cleanouts
10. Backflow Preventer
11. Pressure reducing valves
12. Thermometers
13. Pressure gages
14. Vacuum breakers
15. T&P relief valves
16. Insulation

1.12 RECORD DRAWINGS:

A. Upon completion of the Project, the Contractor shall submit three sets of prints indicating as-built conditions of all piping and equipment, and incorporating changes made during construction. Prints may be made from corrected tracings or sepias of shop drawings.

B. A record of as-built conditions shall be kept throughout the Project and shall be used in the preparation of the final record drawings.

PART 2 – PRODUCTS

2.01 PVC SOIL PIPE AND FITTINGS:

A. Piping:

1. Schedule 40 PVC DWV pipe and fittings ASTM D2665-78.

B. Fittings:

1. Socket type solvent weld PVC plastic pipe fittings ASTM D2466-78.

C. Solvent:

1. Solvent cement certified compatible by piping manufacturer ASTM D2564-80.

D. Systems:

1. Soil, waste, and vent piping throughout the building.

2.02 COPPER TUBING AND FITTINGS – TYPE K:

A. Piping:

1. Type "K" soft annealed copper tubing ASTM B88.

B. Fittings:

1. Wrought copper sweat type ANSI B16.22.

C. Joints:

1. Joints in copper piping shall utilize 95-5 tin-antimony solder or Sil-Fos.

D. Systems:

1. Domestic water piping below grade and below slab-on-grade.

2.03 COPPER TUBING AND FITTINGS – TYPE L:

A. Piping:

1. Type "L" hard drawn copper tubing ASTM B88.

B. Fittings:

1. Wrought copper sweat type ANSI B16.22.

C. Joints:

1. Joints in copper piping shall utilize 95-5 tin-antimony solder or Sil-Fos.

D. Systems:

1. Domestic water piping inside the building.

2.04 COPPER TUBING AND FITTINGS – TYPE DWV:

A. Piping:

1. Type DWV copper drainage tubing ANSI B.306.

B. Fittings:

1. Cast bronze solder joint drainage fittings ANSI B16.23a.

C. Joints:

1. Joints in copper piping shall utilize 95-5 tin-antimony solder or Sil-Fos.

D. Systems:

1. Waste arm piping from lavatories, water coolers, kitchen equipment, etc.

2.05 BRASS PIPE AND FITTINGS:

A. Piping:

1. Seamless red brass pipe ASTM B-43.

B. Fittings:

1. Malleable iron pattern cast brass fittings.

C. Systems:

1. Waste arm connections from urinals.

2.06 FLASHING:

A. Openings in the roof for vent pipes shall be flashed watertight. Coordinate flashing procedures with roofing contractor so that roof warranty is not affected.

2.07 VALVES:

A. General:

1. Valves of the same type on the project shall be of one manufacturer.
2. Valves shall have the name or trademark of the manufacturers and the working pressure stamped or cast on the valve body.
3. Valve handwheels shall be oriented, when installed, to provide maximum accessibility for operation.

B. Valves for Domestic Water System:

1. Gate valves 2-1/2" and larger shall have iron body, bronze trim, OS&Y, solid wedge, bolted bonnet, and flanged ends for 125# SWP. Valves shall be:
   a. Nibco F617-0
   b. Milwaukee F-2885
   c. Crane 465-1/2
   d. Stockham G-623
   e. Jenkins 651A

2. Gate valves 2" and smaller shall have bronze body, rising stem, solid wedge, threaded bonnet, and solder ends for 125# SWP. Valves shall be:
   a. Nibco S111
   b. Milwaukee 1149
   c. Crane 1334
   d. Stockham B-109
   e. Jenkins 991

3. Check valves 2-1/2" and larger shall be horizontal switch type with iron body, bronze trim, and flanged ends for 125# SWP. Valves shall be:
   a. Nibco F918-B
   b. Milwaukee F-2974
   c. Crane 373
   d. Stockham G-931
   e. Jenkins 624

4. Check valves 2" and smaller shall be horizontal swing type with bronze body, bronze disc, and solder ends for 125# SWP. Valves shall be:
   a. Nibco S413-B
   b. Milwaukee 1509
   c. Crane 1342
   d. Stockham B-309
   e. Jenkins 1222

5. "Butterball" valves: Where gate 2" and smaller are specified, Milwaukee "Butterball" valve No. BB1-350 (solder) may be substituted.

2.08 WALL HYDRANTS:

A. Hydrants shall be standard type, vandal resistant, non-freeze, nickel bronze face, all brass body with brass casing, compression type with key handle, integral vacuum breaker. Hydrant barrel shall be of sufficient length to extend completely through the exterior wall of the building. Install hydrants maximum 18" above finished grade. Hydrants shall be JR Smith, Josam, Zurn or Wade.

2.09 HOSE BIBBS:

A. Interior hose bibbs shall be polished chromium plated, box type with locking cover, 3/4" threaded compression type with removable tee handle and vacuum breaker 1/2" inlet. Hose bibbs shall be Chicago, T&S Brass, or approved equal.

2.10 CLEANOUTS:

A. Provide cleanouts in soil and waste lines as shown, as required by the governing code as follows:
   1. At the bottom of each exposed fixture trap which is not integral with the fixture.
   2. At the end of each branch drainage line.
   3. At each change of horizontal direction greater than 45□.
   4. At the foot of each soil and rainwater stack.
   5. In horizontal drain lines at intervals of not more than 75' for inside piping and 100' for outside piping.

B. For Walls: Cleanouts shall be extra heavy cleanout tee with countersunk bronze plug trapped for machine screw, shallow stainless steel face-of-wall access cover, securing screw. Cleanouts shall be:
   1. J.R. Smith 4531
   2. Josam 58790-25
   3. Zurn Z-1445-1
   4. Wade W-8460-R

C. For Piping Concealed in Pipe Chase or Shaft: Cleanout shall have cast iron ferrule, bronze plug trapped for machine screw, shallow stainless steel face-of-wall access cover, and securing screw. Cleanouts shall be:
   1. J.R. Smith 4402
   2. Josam 58710
   3. Zurn ZN-1440-1
   4. Wade W-8550-R

D. For Concrete Floors: Cleanouts shall have cast iron body, adjustable round scoriated nickel bronze cover and rim, securing screw, and countersunk plug. Cleanouts shall be:
   1. J.R. Smith 4245
   2. Josam 56040
   3. Zurn Z-1415-2
   4. Wade W-6010-Z

E. For Tile Floors: Cleanouts shall have cast iron body, adjustable square scoriated nickel bronze cover and rim, securing screw, and countersunk plug. Cleanouts shall be:

1.	J.R. Smith	4045
2.	Josam	56020
3.	Zurn	Z-1405-3
4.	Wade	W-6010-S

F. For Carpeted Floors: Cleanouts shall have cast iron body, adjustable square nickel bronze cover and rim, carpet marker, and countersunk plug. Cleanouts shall be:

1.	J.R. Smith	4045-Y
2.	Josam	56020-14
3.	Zurn	Z-1405-15
4.	Wade	W-6010-S-NH

G. For Cleanouts to Grade: Cleanouts shall have cast iron ferrule and countersunk bronze plug. Cleanouts shall be set in a 12" x 12" x 6" deep poured concrete pad set flush with grade. Cleanouts shall be:

1.	J.R. Smith	4400
2.	Josam	58500-25
3.	Zurn	Z-1440
4.	Wade	W-8550-S

2.11 FLOOR DRAINS:

A. Slotted strainers, outlets same size as waste pipe. Set top flush with finished floor.

B. Drains in water-proofing membranes shall have a flashing clamping device.

C. All floor drains, except shower drains, shall have a trap guard.

D. All floor drains in areas accessible to inmates shall be secured with tamper proof hardware.

E. Drains shall all be of the same manufacturer, unless otherwise specified.

F. Floor drains shall be:

1.	J.R. Smith	2010-a
2.	Josam	30000-A
3.	Zurn	ZN-415
4.	Wade	W-1100-STD

2.12 TRAPS:

A. Provide traps for all fixtures, floor, area and shower drains, except as noted otherwise. Set traps true and level. Provide exposed traps with brass cleaning screws.

B. Full "S" traps, bell traps, or crown vented traps shall not be used.

2.13 TRAP PRIMERS:

A. Provide an automatic trap primer for each floor drain.

2.14 UNIONS:

A. Provide a union in each connection to each piece of equipment so it may be readily removed.

B. Unions in drainage pipes on fixture side of traps may be slip or flange type with soft rubber or leather gaskets.

C. Unions in steel pipe 2" or smaller shall be ground joint with brass to iron seat.

D. Unions in copper pipe 2" or smaller shall be cast brass or bronze with copper soldered connections.

E. Unions in pipes larger than 2" shall be flange and gasket type. Flanges in steel and wrought iron pipe shall be cast iron.

2.15 SHOCK ABSORBERS:

A. Shock absorbers shall have a stainless steel casing, flexible mechanical bellows, pressurized inert gas chamber and certification and certification stamp as conforming to standard PDI WH-201 of the Plumbing and Drainage Institute shock absorbers shall be:

1.	Josam	"Absorbotron" Series
2.	J.R. Smith	"Hydrotrol" Series
3.	Zurn	"Shocktrol" Series
4.	Amtrol	"Diatrol" Series
5.	Wade	"Shok-stop" Series

B. Shock absorbers shall be provided within the chase at each flush valve, as indicated on the drawings. All shock absorbers not accessible within a chase shall have a wall access panel adjacent to the shock absorber for repair purposes, or shall be located above an accessible ceiling.

2.16 AIR CHAMBERS:

A. Air chambers shall be 12" in length and one pipe size larger than the pipe on which it is installed. All air chambers shall be installed in the vertical position. Air chambers shall not be used for shock absorbing purposes unless specifically called for on the drawings.

B. Air chambers shall be installed on the hot and cold water branch lines to all fixtures. Individual fixtures in a battery of fixtures if an air chamber is installed on the supply line after or at last fixture will not require individual air chamber.

2.17 HANGERS AND SUPPORTS:

A. Plumbing piping underground shall be firmly bedded on solid ground on the body of the pipe. Block cast iron water pipe with concrete to undisturbed earth to prevent blowing out joints. Provide the rods for all outside joints.

B. Where several pipes 2-1/2" and smaller run parallel and in the same plane, they may be supported on gang or multiple hangers; larger piping shall be independently hung, parallel and equally spaced.

C. Supports for steel pipe and for copper tubing 1-1/4" or larger, shall not be more than 10' apart. Supports for copper tubing 1" and smaller shall be not more than 8' apart. Pipes shall be supported within 1' of each elbow.

D. Support soil and vent stacks and inside downspouts with iron riser clamps at each floor. Support each horizontal length of cast iron pipe, excluding fittings. Maximum distance between hangers shall be 5'-0".

E. Vertical pipe subject to movement shall be supported from wall by means of pipe clamp.

F. Support domestic hot and cold water piping in spaces behind plumbing fixtures by brackets and U-bolts secured to cast iron stacks. Size U-bolts to bear on the piping.

G. Hangers for copper piping shall be copper plated.

H. Hangers shall be complete with rods and supports proportioned to the size of pipe to be supported, in accordance with manufacturer's recommendations.

I. Support piping 2-1/2" and larger in new concrete construction, from adjustable type inserts. Where weight to be supported by an insert is 300 lb. or more, install two #3 reinforcing rods, 3' long through yoke of insert.

J. Inserts installed in existing concrete construction and for piping 2-1/2" and smaller shall be Rawl "SABER-TOOTH", or Phillips "RED HEAD", self-drilling shells.

K. Do not pierce waterproofing with support bolts.

L. Size hangers for insulated piping to bear on outside of insulation except for copper tubing shall be installed bearing on the pipe.

M. Provide insulation protectors at hangers bearing on outside of insulation. Provide rigid insert or rigid section of insulation at each insulation protector.

N. After hanger rods are installed in inserts in finished concrete ceiling, fill the remaining opening with cement so that no hole shows at the ceiling.

O. Pipe hangers and supports shall be installed and furnished in accordance with recommendations set forth in Manufacturers Standardization Society Standard Practices No. SP-69 and SP-58.

P. Hangers and supports shall be manufactured by:

1. Grinnell
2. Michigan
3. F&S

2.18 SLEEVES:

A. Provide where pipes pass through walls, floors and roofs, except cast iron pipe through masonry walls may be built into the walls.

B. Sleeves shall be standard weight steel pipe except sleeves for concealed piping through floors, not in structural members, and through interior drywall construction may be 26 gauge galvanized sheet metal.

C. Sleeves are not required at individual plumbing fixtures.

D. Floor sleeves for exposed piping shall extend from the bottom of the slab to 2" above the finished floor.

E. Omit pipe sleeves in concrete floor slabs on grade.

F. Wall sleeves shall be full thickness of walls.

G. Make sleeves through outside walls watertight. Caulk between plumbing pipe and sleeve with oakum and lead. Pack with fiberglass and caulk, 1" deep at each face, with non-hardening sealant between pipe and sleeve.

H. Size sleeves for insulated pipes to allow full thickness insulation.

I. Sleeves penetrating fire rated walls and floor shall be provided with fire proofing caulking equal to 3M Fire Barrier No. CP-25 in annular space between sleeve and piping.

2.19 FLOORS, WALLS AND CEILING PLATES:

A. Where exposed piping, bare and insulated, passes through floors, walls and ceilings, except in mechanical rooms, escutcheons shall be provided. Escutcheons shall be chrome-plated steel plates, hinged type with setscrew. Escutcheons shall be as manufactured by Michigan, F&S or Grinnell. Escutcheons for chrome-plated connections at plumbing fixtures shall be as specified under the plumbing fixtures.

2.20 WATER PRESSURE REDUCING VALVES:

A. Provide in the cold water service to the building. Each valve shall have capacities and characteristics as shown on drawings.

B. Each PRV Station shall be provided with a strainer in the inlet of each valve and unions on both sides.

C. Provide a 3-1/2" 0-200 psig dial pressure gauge at the inlet and outlet of each valve.

D. Pressure reducing valves shall be:

1.	Watts	2235
2.	Mueller Co.	Series H-9300
3.	Clayton Series	90-01

2.21 INSULATION:

A. All pipe insulation material shall have a permanent composite insulation, jacket and adhesive with a fire and smoke hazard rating as tested by procedure ASTM E-84, NFPA 255 and UL 723, not exceeding:

1. flame spread – 25
2. smoke developed – 50

B. The use of staples for securing insulation will <u>not</u> be permitted.

C. Insulation shall be applied on clean, dry surfaces. All insulation shall be continuous through wall and ceiling openings and sleeves.

D. Unions shall not be insulated.

E. Except as specified below, all aboveground cold, hot and hot water circulating piping shall be insulated.

F. Do not insulate the following lines:

1. Chrome-plated piping at plumbing fixtures

G. Insulation shall be one-piece fibrous glass sectional pipe insulation with factory applied glass reinforced aluminum foil and white kraft paper flame retardant vapor barrier jacket. Longitudinal jacket laps and butt strips shall be self-sealing. Insulation shall have an average thermal conductivity not to exceed 0 23 BTU-in per square foot, per °F, per hour, at a mean temperature of 75°F. Insulation shall be:

1. Johns-Manville Flame Safe AP-T

2. Owens-Corning Fiberglass 25 ASJ/SSL
3. CertainTeed Fiberglass 500° Snap-On ASJ/SSL

H. Insulate piping with 3/4" thick insulation for all domestic hot water and hot water recirculation piping.

I. Butt all joints of pipe insulation together and secure all jacket laps with lap adhesive. Seal all butt joints with joint strips furnished with insulation.

J. Insulate fittings, flanges, unions and valves (including packing nut) with preformed or mitered fiberglass fittings of equal thickness and composition to adjacent pipe insulation. Wire fittings in place and cover with a smoothing coat of finishing cement. Finish with glass fabric embedded into a coat of white breather coating. Glass fabric shall overlap adjoining insulation at least 2". White fabric and mastic shall be used on exposed fittings.

2.22 ELECTRIC WATER HEATER:

A. Heater shall be high efficiency electric storage type, with capacities as scheduled on the drawings. Tank shall be factory fired with glass lining with 150 psi working pressure and shall be equipped with extruded high density anode.

B. Heater controls shall include a thermostat with high temperature cutoff.

C. Heater shall have ASME rated temperature and pressure relief valve and drain valve.

D. Heater shall have a 3 year limited warranty for commercial installation.

E. Heater shall be:

1. A.O. Smith
2. Lochinvar
3. State

2.23 HOT WATER CIRCULATING PUMP:

A. The domestic hot water circulation pump shall be the in-line centrifugal type designed for 125 psi working pressure with bronze body and impeller shaft. The pump motor shall be the open drip-proof design with sleeve bearings, built-in thermal overload protectors, and shall operate at 1,750 RPM. The pump shall have the capacities as shown on the drawings and shall be:

1.	Bell & Gossett	Booster Series
2.	Taco	Circulation Series
3.	Grundfos	Circulation Series

2.24 PLUMBING FIXTURES:

A. Fixtures shall have smooth impervious surfaces, free from defects and concealed fouling surfaces and be Grade "A" with name or trademark of the manufacturer printed on or pressed into closets and lavatories. A label which cannot be removed without destroying it, containing the manufacturer's name or trademark and the quality or class of the fixture shall be affixed to all fixtures and not removed until after the work is accepted.

B. Reinforce the wall back of wall hung fixtures with a steel plate 6"x24"x1/8" thick, securely bolted into the wall.

C. Set fixtures level and in alignment with walls.

D. Caulk between fixtures and mounting surfaces with tile cement.

E. All fixtures, except for special types, shall be the product of the same manufacturer.

F. All vitreous china fixtures shall be white.

G. The nipple connecting the cold water supply to the exposed flush valves shall be chrome-plated I.P.S. brass pipe.

H. All exposed waste and supply piping shall be chrome-plated.

I. All faucets and fittings shall be chrome plated brass construction. Pot metal faucets will not be acceptable.

J. Plumbing fixtures shall be as scheduled on the drawings.

2.25 FIXTURE SUPPLY STOPS:

A. Supply stops for lavatories and sinks, except pot and pan sinks in kitchen, shall be Brass Craft CS-500-A with 1/2" sweat inlets, bell escutcheons, angle stop valve, flexible tube risers with faucet sink adaptors as required for faucets with female thread connections. All exposed piping and parts shall be chromium-plated.

B. Supply stop for electric water coolers shall be Brass Craft R-14 straight stop or R-19 angle stop with 1/2" sweat inlet with 3/8" O.D. compression riser outlet. Valve shall be contained within fountain cabinet.

C. Equal products - Eastman Central, Sterling Faucet (Rockwell) McGuire.

2.26 FIXTURE P-TRAPS:

A. Unless otherwise indicated or specified, P-traps for lavatories, drinking fountains and sinks shall be 17 gauge tubular chrome plated brass with tubing drain to wall, wall flange, cast brass slip nuts and cleanout plug.

B. Lavatory & Drinking Fountain P-traps - 1-1/4" size.

C. Sink P-traps - 1-1/2" size.

D. Floor mounted service sink basins shall have cast iron P-traps.

E. 2-Part waste for double compartment sinks shall be 17 gage chrome-plated with left- or right- hand outlet.

PART 3 - EXECUTION

3.01 GENERAL FOR PIPING INSTALLATION:

A. Install horizontal waste pipes with a fall of 1/4" per foot, for pipe sizes 2" and smaller and 1/8" per foot for pipe sizes 3" and larger, unless otherwise required by code or noted on the plans.

B. Use reducing fittings between different size pipe. Ream steel, alloy steel, brass and copper pipe after cutting, turn on end and knock loose dirt and scale out.

C. Install water service pipes in trenches separate from sewers.

D. Install water piping outside the building with not less than 36" cover.

E. Slope water piping to drain back to the mains.

F. Make changes in horizontal direction in soil and waste piping with long radius fittings or with Y-branches and 1/8 or 1/16 bends.

G. Group exposed pipe together neatly and arrange control valves at fixture for ease of operation.

H. Piping installed below the level of footings shall be installed one foot horizontally from the footing for each foot of depth below the footing.

I. Pitch air and gas piping down to the main or low point 1/2" in 10'. Take branch piping off the top of mains. Install a water leg or trap with drain valve at low points and bottoms of risers.

J. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

K. Install piping to conserve building space and not interfere with use of space.

L. Group piping whenever practical at common elevations.

M. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

N. Provide clearance for installation of insulation and access to valves and fittings.

O. Provide access where valves and fittings are not exposed.

P. No piping shall be concealed by building construction before the systems have been tested.

Q. During construction, all pipe openings not being worked on shall be plugged or capped to prevent foreign objects from entering systems.

R. Install bell and spigot pipe with bell end upstream.

S. Valves shall be installed where indicated on the drawings and where required by these specifications. Where valves are not shown but are required by code/standard, they shall be provided and shall meet the product specification above.

T. Valves shall be installed where readily accessible.

U. Install valves with stems upright or horizontal, not inverted.

V. Install unions at all piping connections to equipment unless flanges are provided or used on equipment.

W. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

X. Butterfly valves may be used instead of gate valves if approved by local authorities.

Y. All valves in each system, except for special types shall be the product of a single manufacturer.

Z. All valves requiring packing shall be designed and constructed such that they can be repacked under pressure.

3.02 EXCAVATING, TRENCHING AND BACKFILLING:

A. Perform all excavating to install piping herein specified. All excavated materials not to be used for backfilling shall be removed and disposed of. All excavating shall be made by open cut. No tunneling shall be done.

B. The bottom of the trenches shall be graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections excavated for sealing of pipe joints. Depressions for joints shall be dug after the trench bottom has been graded. Over-depths shall be backfilled with loose, granular, moist earth, tamped.

C. The trenches shall not be backfilled until all specified pressure tests are performed. Trenches shall be backfilled with the excavated materials. Free from large clods of earth and stones, deposited layers and tamped until the pipe has a cover of not less than the adjacent existing ground. The compaction of the filled trench shall be at least equal to that of the surrounding undisturbed material. Settling the backfill with water will not be permitted. Reopen any trenches not meeting compaction requirements or where settlement occurs, refill, compact, and restore the surface to the grade and compaction specified above.

3.03 TESTS:

A. Test drainage, vent and rainwater piping before fixtures are installed by capping or plugging and filling the system with water, allowing it to stand filled for 1 hour. If tested in sections, each section shall be subjected to not less than a 10' head.

B. Test water supply piping before fixtures and faucets are connected by applying a hydrostatic pressure of 125 psi test pressure for 1 hour.

C. Test each fixture for soundness, stability of support and operation.

D. Test piping under floor slabs and in floor fill before slabs are poured. Test pressure shall be held for 1 hour.

E. Screwed and soldered piping which is not tight under tests shall be taken down and reassembled. Joints in cast iron pipe not tight under test shall be dug out, re-poured and caulked.

F. Tests of the piping system shall be made in the presence of the Architect or his representative.

G. The final test shall be made while pipe is exposed to view where possible.

3.04 PAINTING:

A. Factory painted equipment that has been scratched or marred shall be repainted to match original color.

3.05 CLEANING AND ADJUSTING:

A. All equipment, fixtures, pipe, valves and fittings shall be cleaned of grease, oil, paint spots, metal cuttings, sludge, and construction debris before final inspection.

3.06 STERILIZATION:

A. Upon completion of installation and test of potable water supply piping, all such piping shall be disinfected in accordance with the following procedures:

1. All potable water piping shall be disinfected by a mixture containing not less than 0.6 pounds of

high-test calcium hypochlorite, or 2 pounds of chlorinated lime to each 1,000 gallons of water to provide not less than 50 ppm of available chlorine. The mixture shall be injected into the system and retained for not less than twenty-four (24) hours at which time the chlorine level shall be at 10 ppm or greater. The system shall then be drained, flushed with potable water until only a normal chlorine residual remains (2 ppm) and placed in service or,

2. If local Health Authority requires additional procedures, these requirements shall be met, and a certificate, or letter certifying acceptance by the Health Authority shall be submitted.

3.07 WELDING QUALIFICATIONS:

A. Welding shall be in accordance with procedures of the National Certified Pipe Welding Bureau, and shall conform to requirements of the ASME Boiler and Pressure Vessel Code or the ASA Code for Pressure Piping. Welders shall be qualified under the above procedures and certified by the National Certified Pipe Welding Bureau or other recognized testing authority.

3.08 PIPE JOINTS:

A. Joints in steel, brass and alloy steel pipe, except as otherwise specified, shall be screwed. Apply Rectorseal #5 joint compound to the male threads only, or make joint with teflon tape.

B. No threads shall show in exposed chromium plated piping.

C. Slip joints of coupling joints in brass drainage pipe are permitted of fixture's side of traps only.

D. Nipples having less than one inch between threads shall be extra strong.

END OF SECTION 22 00 00

SECTION 23 00 00

HVAC GENERAL

PART 1 –GENERAL

1.01 DESCRIPTION:

A. These mechanical general provisions specified herein apply to all HVAC sections of Division 23.

1.02 CODES AND REGULATIONS:

A. Work in this Division shall be governed by and installed in compliance with the International Mechanical Code, the Georgia Energy Code, NFPA 90A, 90B, 91, 101, and 214, along with any applicable local codes and ordinances.

1.	NFPA 90A	Air conditioning and ventilating systems.
2.	NFPA 90B	Warm air heating and air conditioning systems.
3.	NFPA 91	Blower and exhaust systems.
4.	NFPA 101	Life Safety Code.

1.03 SPACE CONDITIONS:

A. Drawings indicate locations of fixtures, apparatus, ductwork and piping; while these are to be followed as closely as possible, if it is necessary to change the location of some to accommodate building conditions, make changes without additional cost to the Owner and as approved by the Architect.

B. Provide adequate access to equipment and apparatus requiring operation, service or maintenance within the life of the system.

C. Do not run piping or duct work, or locate equipment, (with respect to switchboards, panel boards, power panels, motor control centers or dry type transformers) within 42 inches in front of equipment, over equipment, or within 36 inches horizontally of same space.

1.04 EXISTING CONDITIONS:

A. Contractor shall visit the site and familiarize himself with job conditions before submitting his proposal. It shall be the Contractor's responsibility to verify locations and sizes of all existing utility services prior to submitting his proposal. No consideration will be given to claims for extra cost arising from Contractor's failure to be fully cognizant of job or site conditions existing at time of acceptance of bid.

B. Active Services: When encountered in work, protect, brace, support existing active sewers, gas and other services required for proper execution of work. If existing active services are encountered that require relocation, relocate as approved. Do not prevent or disturb operation of active services that are to remain.

C. Inactive Services: When encountered in work, remove, cap or plug inactive services, as indicated.

D. Interruption of Services: Where work makes temporary shut-downs of services unavoidable, shut down at times as approved by Owner. Arrange work to assure that services will be shut down only during time actually required to make necessary connection to existing work.

1. Where existing walls, ceilings, floors, etc., are cut or otherwise damaged during construction, repair all surfaces to their original condition.

1.05 COORDINATION:

A. Coordinate all work under this Division with work under other Divisions, providing adjustment as necessary. Every effort has been made to insure that the work of all trades will fit in the available space. Equipment, apparatus, ductwork, piping, etc., installed without regard for the space requirements of other trades will be reworked at the expense of the installing sub-contractor if it creates an unnecessary hindrance to the installation of another trade's work.

B. The products of particular manufacturers have been used as the basis of design in preparation of these documents. Any modifications to the mechanical systems and their components, the electrical systems, the building structure and architecture, or any other portion of the building that results from the use of any other than the basis of design equipment, shall be coordinated with all trades. Such coordination shall occur prior to delivery of products from the manufacturer (typically before shop drawing submittals). Any related modification shall be performed without additions to the contract.

C. All items mounted at or below the ceiling and any item penetrating the ceiling shall be coordinated with the architectural reflected ceiling plans. If any items are not shown on these plans, or any items need to be relocated for coordination purposes, prepare a reflected ceiling plan and submit to the Architect for approval.

1.06 PROTECTION OF WORK DURING CONSTRUCTION:

A. Provide protective covers, skids, plugs or caps to protect equipment and materials from damage and deterioration during construction. Protect exposed coils with plywood or other suitable rigid covers to avoid damage to fins.

1.07 RELATED WORK DESCRIBED IN OTHER DIVISIONS:

A. Installation of access panels in wall and ceiling construction.

B. Painting, except as specified herein.

C. Electrical power, interlock and control wiring, except as specified herein.

D. Installation of starters, contactors, thermal overload switches and remote push buttons, except as specified herein.

E. Curbs, flashing and pitch pockets for equipment on roof, except as specified herein.

1.08 MAINTENANCE DATA:

A. Three weeks prior to final job observation, submit three (3) manuals covering details of operation and maintenance for all apparatus requiring service including:

1. Service telephone number of the installing contractor.
2. Manufacturer's operating and maintenance manuals, including parts lists for each piece of equipment and accessory requiring service or maintenance; the guarantee period and the name, address and phone number of the nearest sales and service organization for each item.
3. Step-by-step procedure for starting and stopping each system.
4. Temperature control diagrams.
5. Copies of inspection certificates provided by the City, County, State and insurance companies.

B. Manuals shall be bound in 3-ring binders with index and tabs. All material shall be original copies as printed by the manufacturers.

1.09 RECORD DRAWINGS:

A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work or equipment, including concealed or embedded piping and valves, and all changes and deviations in the Mechanical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect. The "Record Drawings" shall consist of a set of mylar sepias to be used to provide a set of "As-Built" documents to the Owner upon completion of the project.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.

C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

1. "RECORD DRAWINGS (3/8 inch high letters)
2. To be used for recording Field Deviations and Dimensional Data Only". (5/16 inch high letters)

1.10 SUBMITTALS:

A. Submit shop drawings for review in accordance with the requirements of Division 01. Shop drawings shall be bound into volumes, with each volume containing one copy of all shop drawings. All shop drawings shall be submitted simultaneously; no shop drawings will be checked until all have been submitted with the following exceptions:

1. Fabrication drawings such as those for Ductwork, Piping and Controls may be submitted separately.
2. Any separate submittals shall have a tab in the binder for insertion as provided. Provide in the original submittal a sheet marked "Drawings to be submitted by (date)."

B. Submittals shall be supported by descriptive material, such as catalog cuts, diagrams, performance curves and charts published by the manufacturer, to show conformance to specification and drawing requirements; model numbers alone will not be acceptable. All literature shall clearly indicate the specified model number, dimensions, arrangement, rating and characteristics of the proposed equipment. Capacities and ratings shall be based on conditions indicated or specified herein. Any deviations from specified equipment (particularly those which require coordination with other trades) shall be clearly noted in a concise list on a separate sheet.

C. Shop drawings shall be submitted for each of the following items:

1. Split System Heat Pump Equipment
2. Sheet Metal Ductwork and Accessories
3. Fans
4. Insulation
5. Air Distribution Devices
6. Thermostats
7. Flexible Ductwork

1.11 TESTING:

A. Ductwork:

1. All new ductwork shall be tested in operation with the system for which it is designed. This applies to systems subjected to 1.0 inch S.P. or less.

B. Piping for Heating and Air Conditioning Systems:

1. Refrigerant piping shall be tested with a halide leak detector. All leaks shall be repaired by rewelding joints or by replacing pipe and fittings.
2. All leaks shall be repaired by tightening, re-welding or replacing pipe and fittings.

1.12 CLEANING AND ADJUSTING:

A. The exterior surfaces of all mechanical equipment, piping, ducts, etc., shall be cleaned of all grease, oil, paint and other construction debris.

B. Ducts, plenums and casings shall be cleaned of all debris and blown free of all particles of rubbish and dust before installing outlet faces.

C. Bearings that require lubrication shall be lubricated in accordance with the manufacturer's recommendations.

D. All control equipment shall be adjusted to the settings indicated or required for performance as specified.

E. Flush water piping systems until water runs clean.

F. Remove all stickers, rust, stains, labels and temporary covers before final acceptance.

G. Remove foreign matter from equipment, piping and duct work systems and appurtenances.

H. Clean and polish identification plates.

1.13 PAINTING:

A. Factory painted equipment that has been scratched or marred shall be repainted to match original factory color.

B. The interior of all ductwork visible through the face of any grille, register or diffuser; or any ductwork, conduit or piping visible through any open return air grille, shall be painted flat black.

C. All uninsulated black ferrous metal items exposed to sight inside the building, such as steel piping, equipment hangers and supports, not provided with factory finish shall be cleaned and painted with one (1) coat of rust inhibiting primer. In addition, such items in finished spaces shall also be painted with two (2) coats of finish paint in a color to match adjacent surfaces or as otherwise selected by the Architect.

D. Black ferrous metal items exposed outside the building, such as cooling tower support beams, uninsulated pipe and pipe supports, not provided with factory finish shall be cleaned and painted with one (1) coat of rust-inhibiting primer and two (2) coats of an asphaltic base aluminum paint. Insulated pipes outside the building shall be cleaned and painted with one (1) coat of rust-inhibiting primer before installing insulation.

1.14 GUARANTEE:

A. That each piece of apparatus shall be of the customary standard and quality furnished by the designed manufacturer for that catalog number.

B. That the air systems shall operate without aerodynamic noise generated from the faulty installation of duct work or any component of the air distribution system.

C. All systems and components shall be provided with a one (1) year warranty from the time of final acceptance or beneficial occupancy. The warranty shall cover all materials and workmanship. During this warranty period, all defects in materials and workmanship shall be corrected by repair or replacement without incurring additions to the contract.

D. All air conditioning compressors shall be warranted for an additional four years. This additional warranty shall include parts only.

1.15 INSTRUCTION OF OPERATING PERSONNEL:

A. Arrange formal instruction sessions for the Owner's operating personnel covering:

B. General familiarization and operating procedure for the entire mechanical installation.

C. Routine maintenance procedures for all mechanical equipment.

D. Specific operating and maintenance procedures for the automatic control systems.

E. Obtain receipt from the Owner's representative acknowledging completion of each item of instruction.

1.16 CONSTRUCTION OBSERVATIONS:

A. Review of the work in progress may be made at any time by the Architect and/or Engineer.

B. Final construction observation will be performed upon written request by the Contractor. Prior to requesting a "final" construction observation, the Contractor shall provide the following documentation to the Architect/ Engineer.

C. Written certification by the temperature controls installer that all controls have been installed, tested and adjusted. Certification shall include the date this work was completed.

D. Completed test and balance reports.

E. Receipt from the Owner's representative verifying instruction of operating personnel.

F. Operation and maintenance manuals for all equipment.

G. Written certification of the date that all systems were placed in final operating status. (Systems shall be operated with all components functioning properly for not less than one week prior to final observation.)

H. Refer to other paragraphs/sections of Division 23 for specific requirements of documentation.

I. The cost of additional site visits by the Architect/ Engineer, required after the "final" observation because of a failure by the Contractor to provide the above documentation, or failure to complete the work required for this documentation, shall be borne by the Contractor.

1.17 SLEEVES:

A. Provide where pipes pass through walls, floors above grade and roofs, except iron pipe through masonry walls, may be built into the walls.

B. Sleeves shall be standard weight steel pipe, except sleeves for concealed piping through floors not in structural members. They may be 25 gauge galvanized sheet metal.

C. Floor sleeves for piping shall extend from the bottom of the slab to two (2) inches above the finished floor.

D. Wall sleeves shall be full thickness of walls.

E. Seal between piping and sleeve with fire-rated caulk at all penetrations of fire rated walls, partitions or floors.

F. Make sleeves through outside walls watertight. Caulk between uninsulated pipe and sleeve.

G. Size sleeves for insulated pipes to allow full thickness insulation.

H. Omit pipe sleeves in concrete floor slabs on grade.

1.18 ELECTRICAL WORK:

A. All electrical equipment and installation provided under this Division shall comply with the 2014 National Electrical Code.

B. All power wiring and final power connections to the system shall be provided as part of the Division 23 mechanical work. Installation of electrical systems shall be by a licensed electrician.

C. Control wiring shall be provided under Division 23. All wiring for voltages higher than 30 volts shall be done by a licensed electrician.

D. All electrical characteristics shall be coordinated before equipment is ordered or submitted.

1.19 MOTORS AND STARTERS:

A. Provide motors, starters, push buttons, thermal overload switches and contactors for equipment covered herein, unless otherwise specified. Installation of starters, push buttons, thermal overload switches and contactors (not factory installed) is specified under another Division.

B. Motors shall be wound for the electrical characteristics described on the electrical drawings. Nameplates shall show the above voltages.

C. Select motors for operation within their nameplate amperage.

D. Motors shall be of the induction type, unless otherwise specified.

E. Starters shall have overload protection for all hot lines. This will require three overload relays for three-phase motors and one overload relay for single-phase line-voltage motors.

F. Unless otherwise specified, provide each motor 1/2 hp and larger with a magnetic starter providing overload and low voltage protection. Provide a control voltage transformer in each starter.

G. Equipment furnished with factory-installed motor starter units shall also be equipped with individual motor branch circuit protective devices interconnected on their line sides to lugs sized to receive a feeder with minimum ampacity of 125% of total connected load.

H. A hand-off-auto switch shall be mounted on the face of each starter.

I. Unless otherwise specified, provide for each motor smaller than 1/2 hp a manual starting switch with thermal overload protection with pilot light and stainless steel coverplate. Switches installed on finished walls shall be flush type.

J. Starters and contactors not furnished with equipment shall be Allen-Bradley, Arrow-Hart, Cutler-Hammer, General Electric, Joslyn-Clark, Siemens, Square D, Wagner or Westinghouse.

K. Coordinate all mechanical equipment requirements, including any control and interlock requirements, with work in Division 26 and with existing conditions.

1.20 FILTERS:

A. Each split system heat pump fan-coil unit shall be equipped with a 1" slide-in filter rack designed to accept filters as described below. Filter rack shall be provided by the FCU manufacturer.

B. Filters shall consist of a 1" thick pleated, MERV8 filter media.

C. Filters shall be sized for a maximum inlet velocity of 300 feet per minute.

D. Contractor shall install one complete set of filter media prior to start-up of the air conditioning equipment. A second clean set of filter media shall be installed prior to system testing and balancing. A third clean set of filter media shall be installed at substantial completion and a fourth set of filters shall be turned over to the owner at substantial completion, for future installation by owner's personnel.

E. The contractor shall provide the owner with a complete list of filter sizes required for each piece of air conditioning equipment.

1.21 EQUIPMENT INSTALLATION AND START UP:

A. All equipment shall be installed in strict conformance with manufacturer's recommendations, as specified herein and as shown. If any conflict arises between these instructions, notify the Engineer immediately for guidance.

B. Start-up and testing of the following equipment shall be performed under the direct supervision of a representative of the manufacturer. The installing contractor may not act as the manufacturer's representative for this purpose.

1. Split System Heat Pumps

C. Upon completion of the start-up and testing procedures, the manufacturer shall provide written certification to the Architect that the equipment is installed and operating properly.

1.22 EQUIPMENT, MATERIALS AND BID BASIS:

A. Specified manufacturer's names and model numbers are for the purpose of describing type, capacity, function and quality of equipment and materials to be used. Unless "or equal" is specifically stated, bids shall be based on equipment named.

B. Capacities indicated take precedence over model numbers.

END OF SECTION 23 00 00

SECTION 23 05 90

TEST AND BALANCE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. This section describes the requirements for test and balance of air distribution systems, and water systems.

1.02 TEST AND BALANCE AGENCY:

A. The contractor shall retain the services of an independent test and balance agency that is independent of any Contractor, sub-contractor, or manufacturer to perform the testing and balancing and prepare reports to the General Contractor. The independent test and balance agency shall be a certified member of the Associated Air Balance Council or the National Environmental Balancing Bureau.

B. The Test and Balance work shall be performed by an approved agency in accordance with these specifications. Qualifications shall be submitted for approval and shall include firm general information, including ownership and length of time in business, listing of qualified technicians and engineers and listing of similar projects completed.

1.03 OPERATION OF EQUIPMENT:

A. The contractor shall put all heating, ventilating and air conditioning systems into full operation and shall operate the systems at all times that test and balance work is in progress. The contractor's start-up, adjustment and placing in operation of the mechanical systems shall include but is not limited to assembly of all parts, alignment of drives, tightening sheaves on shafts, checking motors for correct rotation and reconnecting where necessary, providing correct starter overload heaters, removing dirt and blockage, and placing the systems in good operating condition.

B. Openings in ducts for pitot tube insertions shall be provided by the contractor at locations indicated by the balancing agency, and shall be sealed by the balancing agency with snap-in plugs when the air balance has been complete. Patching of the duct insulation if required will be the responsibility of the contractor.

C. The contractor shall provide clean filters at the beginning of the air balance, and shall replace them if necessary during the course of the balance procedure.

1.04 STANDARDS:

A. Testing and balancing shall be performed in accordance with these specifications and in accordance with the latest Associated Air Balance Council National Standards for Total System Balance, Fourth Edition.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ADJUSTABLE SPEED DRIVES:

A. Belt drives are to be adjusted by the test and balance agency. In cases where the specified capacities cannot be obtained with the original adjustable sheave or original fixed drive sheave, the Agency is to report to the Contractor the sheave size required to obtain the specified capacity. Where larger or smaller sheave sizes are required, the Contractor shall provide new sheaves and, if required, new belts.

B. Where variable speed controllers are provided for balancing purposes, controllers shall be adjusted by the test and balance agency.

3.02 CONTROL PERFORMANCE CHECK:

A. The results produced by the operation of automatic controls shall be checked by the testing agency; controls requiring adjustment shall be listed and reported to the Contractor. This does not reduce the responsibility of the Contractor for the checking and adjustment specified under the Temperature Control Section.

3.03 ROOM TEMPERATURE TESTS:

A. After system balance has been complete, the balancing agency shall perform an operational test over a period of eight hours. The test shall be performed only after each piece of equipment has been individually tested and adjusted to correct operating conditions. The test shall be performed at a time when the outdoor dry bulb temperature is above 85°F. (if during the cooling season), or below 50°F. (if during the heating season). The doors to all spaces shall be closed and all the lights shall be turned on if the test is performed during the cooling season. All space thermostats shall be set at 75° F. during the cooling season test and 70°F during heating season test. The following information shall be recorded and submitted:

1. Temperature of each conditioned space with setting of controlling thermostat.
2. Date and outdoor DB and WB temperature range at the time indoor temperatures were recorded.

3.04 EQUIPMENT NAMEPLATES DATA AS INSTALLED:

A. Manufacturer, size, model, serial number, motor hp, rpm, voltage, full load amps. Vee belt sheave sizes, grooves, belts, sizes, length. Starter heater size, rating and fuse size.

3.05 TESTING PROCEDURES - AIR DEVICES:

A. Test and adjust all blower and fan speeds to deliver specified CFM.

B. Test and record motor full load amperes of all motors.

C. Total air quantities for all air handling units shall be determined by pitot tube traverse of main ducts, traverse of filter banks or coils, and by totaling the readings of individual air outlets. All three methods should be employed where possible so that comparisons can be made.

D. Total air quantities shall be obtained by adjustment of fan speeds. Branch duct quantities shall be adjusted by volume or splitter dampers. Dampers shall be permanently marked after air balance is complete so that they can be restored to correct positions if disturbed at any time. Final air quantities shall be within 10 percent of those called for on the drawings.

E. Minimum outside air quantities shall be established from measurements of return air, outside air, and mixed air temperatures, using a 12 inch long glass thermometer with 0.5°F divisions. Minimum outside air quantity shall be set after complete adjustment of total supply air quantity. The following formula shall be utilized to calculate percentage of outside air:

$$\% OA = \frac{Ts-Tr}{To-Tr}$$

Where: Ts = Mixed air temperature
Tr = Return air temperature
To = Outside air temperature

3.06 WARRANTY:

A. The Test and Balance Agency shall furnish a warranty to complete any of the test and balance of the cooling or heating that could not be done prior to final inspection due to lack of seasonable weather, and to make corrections of the test and balance work during one year after the date of Substantial Completion, without extra cost to the Owner.

B. The warranty shall be in letter form addressed to the Owner but transmitted through the General Contractor to the Architects and Engineers.

3.07 REPORT:

A. Prepare a typewritten, bound report including the following information:

1. Name and address of testing agency and name of individual responsible for the work.
2. Make, model and latest calibration date of testing equipment.
3. Sketch or written description sufficient to identify individual devices tested.
4. All amperages, pressures, temperatures, CFM, GPM, and other information required by this section.

3.08 EQUIPMENT MARKING:

A. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers and similar controls and devices, to show final settings at completion of T & B work. Provide markings with paint or other suitable permanent identification materials.

END OF SECTION 23 05 90

SECTION 23 07 20

HVAC INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. The extent of the HVAC insulation work is hereby defined as furnishing, fabricating, assembling and installing complete, permanently installed commercial and industrial insulation systems as shown on the drawings and/or as included in this specification. Applicable portions of Section 23 00 00, "HVAC General Provisions", shall also be a part of this section of the specifications.

B. The scope of work covered in this section includes patching of any existing insulation that is damaged during construction, insulation of new piping and ductwork that is installed as part of this project, and re-insulation of any components that require removal of existing insulation during the construction process.

1.02 QUALITY ASSURANCE:

A. Materials furnished under this specification shall be standard, cataloged products, new and commercially available, suitable for service requiring high performance and reliability with low maintenance, and free from all defects.

B. Specified components of this insulation system, including facings, mastics, and adhesives, shall have a fire hazard rating not to exceed 25 for flame spread and 50 for smoke developed, as per tests conducted in accordance with ASTM E84 (NFPA 255) methods.

C. Provide materials by firms engaged in the manufacture of insulation products of the types and characteristics specified herein, whose products have been in use for not less than five years.

PART 2 - PRODUCTS

2.01 PIPE INSULATION:

A. TYPE P1 ASTM C534

1. Flexible, closed cell elastomeric, nominal 6 PCF density, K factor 0.27 maximum at 75° F mean.
2. Approved products:
   a. Armstrong AP Armaflex
   b. Manville Aerotube II
   c. Nomaco Therma-Cel
   d. Rubatex R-180-F5

2.02 DUCT INSULATION:

A. TYPE D1 ASTM C553 TYPE 1 CLASS B3

1. Fiberglass, nominal 1 PCF density blanket, K factor 0.31 maximum at 75° F mean, with factory applied FSK (Foil-Scrim-Kraft) vapor barrier jacket, for temperatures to 250° F.
2. Approved products:
   a. CertainTeed "Standard Duct Wrap"
   b. Manville "Microlite"
   c. Owens/Corning Fiberglass RFK-75

d. Knauf "Ductwrap"

B. TYPE D2 ASTMC - 1071 TYPE 1

1. Fiberglass, nominal 2.0 PCF density liner, K factor 0.26 maximum at 75° F mean, black coating, for temperatures to 250° F.
2. Approved products:
   a. CertainTeed Ultralite Duct Liner 200
   b. Manville Linacoustic
   c. Knauf Duct Liner M

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPE INSULATION:

A. Install insulation products in accordance with the manufacturer's written instructions, and in accordance with recognized industry practices.

B. Install insulation on pipe systems subsequent to testing and acceptance of test.

C. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete the run. Do no use cut pieces of scraps abutting each other.

D. Clean and dry pipe surfaces prior to insulation. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.

E. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage. Seal open ends of insulation with mastic. Sectionally seal all butt ends of chilled water and condensate drain piping insulation at fittings with white vapor barrier coating.

F. Cover valves, flanges, fittings, and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at Installer's option). Finish cold pipe fittings with white vapor barrier coating and hot piping with white vinyl acrylic mastic, both reinforced with glass cloth.

G. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.

H. Coat closed-cell elastomeric insulation exposed to weather with white vinyl lacquer-type coating.

3.02 INSTALLATION OF DUCTWORK INSULATION:

A. General: Install insulation products in accordance with the manufacturer's written instructions, and in accordance with recognized industry practices.

B. Install insulation materials with smooth and even surfaces.

C. Clean and dry ductwork prior to insulation. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

D. Maintain integrity of vapor-barrier on ductwork insulation, and protect it to prevent puncture and other damage. Tape all punctures. Seal all longitudinal and circumferential joints with FSK tape.

E. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated.

F. Except as otherwise indicated, omit insulation on ductwork where internal insulation or sound absorbing linings have been installed.

G. All internal insulation shall be adhered to the duct with 100% coverage of approved fire retardant mastic. All edges shall be sealed. Any abrasions or tears repaired with mastic. Increase indicated duct sizes to compensate for liner thickness.

3.03 INSULATION REQUIREMENTS:

A. Interior Condensate Drain Piping:

a. TYPE P1 ELASTOMERIC - 1/2 INCH THICKNESS

B. Refrigeration Gas Piping:

a. TYPE P1 ELASTOMERIC - 3/4 INCH THICKNESS

C. Ductwork, Supply, Return and Outside Air:

a. TYPE D1 - 2 INCH THICKNESS

D. Ductwork, Rectangular Supply and Return Air within 6 feet of air handling equipment:

a. TYPE D2 - 1 INCH THICKNESS

END OF SECTION 23 07 20

SECTION 23 31 00

DUCTWORK AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. The extent of ductwork is indicated on the drawings and in the schedules, and by the requirements of this section and section 23 00 00.

1.02 QUALITY ASSURANCE:

A. Industry Standards: Comply with SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) HVAC Duct Construction Standards, recommendations for fabrication, gauges, construction and details, and installation procedures, except as otherwise indicated.

1.03 SUBMITTALS:

A. Submittals shall be in accordance with requirements of Section 230000, "HVAC General Provisions".

B. Shop Drawings: Low-Pressure Metal Ductwork: Submit dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Show modifications of indicated requirements, made to conform to local shop practice, and how those modifications ensure that the free area, materials and weights are not reduced.

PART 2 - PRODUCTS

2.01 LOW PRESSURE DUCTWORK & ACCESSORIES:

A. All ductwork for this project will be considered low pressure ductwork, (less than 2.00”WC working pressure).

B. Ductwork Metal and Gauges: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A527, Lockforming Quality, with ASTM A525 G90 zinc coating, mill phosphatized. Gauges to comply with SMACNA standards.

C. Duct Sealant: Non-hardening, non-migrating mastic or liquid elastic sealant (type applicable for the fabrication/installation detail) as compounded and recommended by the manufacturer specifically for sealing joints and seams in ductwork.

D. Ductwork Support Materials: Except as otherwise indicated, provide upper attachment, hangers of galvanized steel straps, or steel rods and lower attachment for support of ductwork. Hanging/support systems shall be in accordance with SMACNA requirements.

E. Turning Vanes: Provide double thickness turning vanes in the size and type indicated in SMACNA Standards.

F. Duct Access Doors: Provide removable duct access doors as indicated, 12 inches x 12 inches minimum or in sizes indicated, with gaskets and insulation where ductwork is indicated to be insulated. Secure with easy access window lock type latches.

G. Flexible Ductwork Low-Pressure: Unless otherwise specified, provide factory-fabricated, UL 181

Class 1 round flexible air ductwork, where shown, in size indicated. Provide with metal or nylon duct clamps. Constructed of steel helix core bonded to liner. Insulate with 1 inch fiberglass covered with seamless vapor barrier. Flexible ductwork may not be used in an inaccessible location.

H. Flexible Ductwork Fittings: Provide spin-in type fitting for connecting low-pressure flexible duct to sheet metal. Fitting to be same diameter as round duct, with fixed extractor, and damper with operator and lock nut. Fitting to be galvanized steel, gauge as recommended by manufacturer.

PART 3 - EXECUTION

3.01 LOW PRESSURE DUCTWORK:

A. All ductwork shall be low pressure construction.

B. Fabricate rectangular ductwork with joints, seams and reinforcements as indicated, complying with recognized industry standards and SMACNA Standards.

C. Reinforce rectangular ductwork with angle frames to SMACNA Standards.

D. Crossbreaking: In addition to required reinforcement of rectangular work, stiffen flat duct surfaces over 12 inches wide by crossbreaking.

E. Co-ordinate duct liner requirements with HVAC insulation specifications.

F. Fabricate round ductwork with girth joints and girth reinforcements complying with recognized industry standards and SMACNA Standards.

G. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight and noiseless systems, capable to performing each indicated service. Install each run with a minimum of joints. Align ductwork accurately at connections, within 1/8 inch misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of the type which will hold ducts true-to-shape and to prevent buckling.

H. Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in the shortest route which does not obstruct usable space or block access for servicing the building and its equipment. Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of the building. Limit clearance to 0.5 inch where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any.

I. Where possible, locate insulated ductwork for 1.0 inch clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate the layout with suspended ceiling and lighting layouts and similar finished work.

J. Electrical Equipment Spaces: Do not run ductwork through transformer vaults and other electrical equipment spaces and enclosures.

K. Coordinate duct installations with installation of accessories, dampers, coil frames, equipment, controls and other associated work of the ductwork system.

L. Support ductwork from building structure in accordance with SMACNA standards and anchor with

bolts, concrete inserts, steel expansion anchors, welded studs, C-clamps or special beam clamps.

M. Connect low pressure duct branches with extractors or splitter dampers indicated.

N. Seal ductwork as follows:

Low Pressure	Seal Class C

O. Maximum length of low pressure flexible duct shall be 6 feet. Install flexible ductwork as straight and taut as possible. Secure with duct clamps, sealant, and tape as recommended by SMACNA and flex duct manufacturer. Flexible duct may not be used in inaccessible locations.

3.02 CLEANING AND PROTECTION:

A. Clean ductwork internally, unit-by-unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of the metal; or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.

B. Strip protective paper from stainless ductwork surfaces, and repair finish wherever it has been damaged.

C. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at the time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent the entrance of dust and debris until the time connections are to be completed.

END OF SECTION 23 31 00

SECTION 23 33 00

LOUVERS AND DAMPERS

PART 1 –GENERAL

1.01 DESCRIPTION OF WORK:

A. The extent of damper requirements is indicated by the drawings (including schedules) and by this section of the specifications and section 23 00 00.

1.02 QUALITY ASSURANCE:

A. Provide dampers with performance data certified by AMCA (Air Movement and Control Association).

PART 2 – PRODUCTS

2.01 DAMPERS:

A. Furnish and install, at locations shown on plans or in accordance with schedules or specifications, dampers of characteristics described herein.

B. UL labeled fire and smoke dampers shall be classified "For use in dynamic systems".

C. Manual Balancing Damper, Rectangular:

1. Dampers shall be opposed-blade (or single-blade) type fabricated from galvanized steel. Pivot rods (axles) shall be 1/2 inch square or hexagonal with non-stick and non-corrosive bearings. Control shaft shall be 3/8 inch square plated steel with locking hand quadrant.

a. Ruskin MD35
b. Arrow 1770
c. AW&V VC-21
d. Vent Products 5201
e. United Air DO-3

D. Manual Balancing Damper, Round:

1. Dampers shall be butterfly type consisting of a circular blade mounted to a shaft. Damper blade and frame shall be fabricated of galvanized steel. Control shaft shall be 3/8 inch square plated steel with locking hand quadrant. Bearings shall be non-stick and non-corrosive.

a. Ruskin MDRS25
b. Arrow Type 70
c. AW&V VC-22
d. Vent Products 5300
e. United Air BR-4

E. Backdraft Dampers, Rectangular:

1. Dampers shall be of aluminum construction, of parallel-blade type. Blades shall have extruded vinyl edge seals. Linkage shall be concealed in frame. Bearings shall be non-

stick, non-corrosive type with no metal-to-metal contact. Leakage shall be less than 26CFM per square foot at 1/2 inch WG static pressure.

a. Ruskin BD2
b. Arrow 500-B
c. AW&V BD-40-EPT
d. Vent Products 3100
e. United Air BOA

F. Fire Dampers, 1-1/2 hour Rated:

1. Furnish and install, at locations shown on plans or as required by governing codes, DYNAMIC RATED fire dampers constructed and tested in accordance with UL Safety Standard 555. Each fire damper shall have a 1-1/2 hour fire protection rating, 165°F fusible link, and shall include UL Label. Fire dampers shall be equipped for vertical or horizontal installation as required by the location indicated. Dampers shall be gravity operated for vertical installations, by closure springs and latches for horizontal installations. Dampers in return air openings or behind grilles or registers shall be type A. Dampers in low pressure ductwork shall be type B. Dampers in medium or high pressure ductwork shall be type C.

a. Ruskin DIBD2 or equal

G. Control Dampers, Rectangular:

1. Dampers shall be low-leakage type with maximum AMCA certified leakage rate of 5 CFM/SF at 1.0 inch WG static pressure. Dampers shall be opposed-blade type with vinyl edge seals. Pivot rods (axles) shall be ½ inch diameter, factory assembled to connecting linkage. Rod bearings shall be heavy-duty non-corrosive type with no metal-to-metal contact. Actuators shall be fast-acting electric type, with a maximum travel time of 15 seconds from fully closed to fully open and from fully open to fully closed.

a. Ruskin CD36
b. Arrow Series 395
c. American Warning & Ventilating VC-21-EPT
d. Vent Products 5810
e. United Air DO-3

2.02 LOUVERS:

A. Louvers shall be extruded aluminum, drainable blade type, 6” deep, complete with rear mounted ½” mesh aluminum screen. Louvers shall be Ruskin ELF6375DX, or equal. Water penetration shall not exceed 0.01 oz/sf of free area at an intake velocity of 1000 fpm. Finish on louvers shall match adjacent hollow metal doors and frames.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Installer must examine areas and conditions under which louvers and dampers will be installed and notify Contractor in writing of conditions detrimental to proper installation.

3.02 FIELD QUALITY CONTROL:

A. Touch up paint on damaged exposed parts of devices or replace if necessary.

3.03 INSTALLATION - FIRE DAMPERS:

A. Fire dampers shall be installed utilizing steel sleeves, angles, other materials, and practices required to provide an installation equivalent to that utilized by the manufacturer when dampers were tested at UL. Installation shall be in accordance with the damper manufacturer's instructions.

B. Prove damper location and access adequacy after damper installation.

C. Provide duct access door that will allow resetting of damper and replacement of the link. Access shall be 12 x 12-in. (31 x 31-cm) minimum, except for smaller ducts, where access shall be as large as practical.

END OF SECTION 23 33 00

SECTION 23 34 20

FANS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. The extent of fan work is shown on drawings and in schedules and by requirements of this section and section 23 00 00.

B. Refer to ductwork sections for materials and sheet metal work required in conjunction with fans; not work of this section.

C. Refer to electrical specifications for electrical connection work required in conjunction with fans; not work of this section.

D. Manufacturer: Provide products produced by one of the following:

1. Acme
2. Ammerman
3. Carnes
4. Greenheck
5. Loren Cook Co.
6. Penn
7. Strobic Air Corp.
8. Quiet Air

E. Electrical Standards: Provide electric motors and products which have been listed and labeled by Underwriters Laboratories and comply with NEMA Standards.

F. NFPA Compliance: Comply with National Electrical Code (NFPA No. 70) as applicable to installation of fan motors and associated electric wiring and equipment.

G. AMCA Compliance: Comply with Air Movement and Control Association standards pertaining to testing, performance and sound ratings of fans. Fans shall bear AMCA seal.

H. Certifications, Fan Performance: Provide fans whose performance, under specified conditions, is certified by manufacturer.

PART 2 - PRODUCTS

2.01 FANS AND BLOWERS:

A. General: Except as otherwise indicated, provide fan manufacturer's standard materials and components as indicated by published product information, design and construction as recommended by manufacturer, and as required for a complete installation. Belt drives shall be adjustable, size for 150% of motor h.p.

B. Fan motor enclosure shall be the drip-proof type unless specifically indicated otherwise.

C. Roof-mounted fans shall be waterproof design so that water cannot enter the building through the fan

housing, whether or not the fan is operating.

D. Centrifugal Roof Exhaust Fans: Fans shall be of spun aluminum construction complete with centrifugal fan wheel, motor and drive, backdraft damper, factory wired disconnect switch, birdscreen, and factory roof curb for sloped roof. Motor and fan wheel shall be isolated from cabinet.

PART 3 - EXECUTION

3.01 INSPECTION:

A. Installer must examine areas and conditions which fans and components are to be installed and notify Contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.02 INSTALLATION OF FANS:

A. Install fans where shown, in accordance with manufacturer's written instructions, requirements of NEC, and recognized industry practices, to ensure that fans comply with requirements and serve intended purposes.

B. Coordinate with other work, including ductwork and electrical connection work as necessary for interfacing installation of fans properly with other work.

C. Comply with AMCA's installation safety practices as applicable to fans.

D. Check alignment and, where necessary, realign shafts of coupled motors and fans within tolerances recommended by manufacturer.

E. Install units as shown. Comply with manufacturer's indicated installation method, if any, and with vibration isolation sections of these specifications.

F. Cap openings not connected to equipment or ductwork. Upon completion of fan installation, provide covering for fan to prevent entrance of dirt and construction debris until connections are completed.

3.03 ELECTRICAL CONNECTIONS:

A. Ensure fan units are wired properly, with rotation in direction indicated and intended for proper fan performance.

B. Provide positive electrical fan and motor grounding.

3.04 FIELD QUALITY CONTROL:

A. Upon completion of installation of fan, and after motor has been energized with normal power source, test fan to demonstrate compliance with requirements. Where possible, field correct malfunctioning units, then reset to demonstrate compliance. Replace units which cannot be satisfactorily corrected.

END OF SECTION 23 34 20

SECTION 23 37 00

AIR DISTRIBUTION DEVICES

PART 1 –GENERAL

1.01 DESCRIPTION OF WORK:

A. The extent of air distribution devices requirement is indicated by drawings, schedules, and the requirements of this section and Section 23 00 00.

PART 2 – PRODUCTS

2.01 GRILLES, REGISTERS AND DIFFUSERS:

A. Grilles, registers, and diffusers as indicated on the drawings have been selected from the catalog of the manufacturer scheduled. Sizes and performance of the manufacturer being furnished shall be coordinated to insure conformity with design basis.

B. Sidewall supply grilles and registers shall have vertical front blades; sidewall return grilles shall have horizontal blades.

C. Grilles and registers with borders shall have felt or rubber gaskets cemented to the back face and holding screws not over 18 inches on centers around the perimeter. Holding screws shall be counter-sunk to fit flush with face of grille or register.

D. Grilles passing air through partitions shall be as described for wall return grilles, one for each side of partition.

E. Register dampers shall be of the gang-operated, opposed blade type, operated through the face of the register. Operating mechanism shall not project through the register face.

F. Mounting frame shall be coordinated with architectural reflected ceiling plans unless noted otherwise.

G. Finish of grilles, registers, and diffusers shall be as indicated on plans unless noted otherwise.

H. Acceptable manufacturer shall be Price, Titus, Krueger, Carnes, Anemostat, or Metal-Aire.

2.02 EXTRACTORS:

A. Extractors shall be provided at low pressure branch duct take-offs. Extractors shall be equipped with devices for locking in desired position; where located more than 18 inches from air outlet, provide an adjusting rod extending to within 12 inches of outlet.

B. Extractors shall be Price “AE1”, Titus "AG45", Krueger "EX8", Carnes "RXVA", Metal-Aire "101-1", or approved equal.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Installer must examine areas and conditions under which air distribution devices will be installed and notify Contractor in writing of conditions detrimental to proper installation.

3.02 FIELD QUALITY CONTROL:

A. Touch up paint on damaged exposed parts of devices or replace if necessary.

3.03 INSTALLATION - GRILLES AND REGISTERS

A. Install wall grilles and registers with horizontal edges parallel to ceiling.

END OF SECTION 23 37 00

SECTION 23 81 20

SPLIT SYSTEM DX HEAT PUMPS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Furnish and install factory assembled, piped and wired air conditioning components of the type operational characteristics, and capacity as shown and scheduled. The manufacturer shall have available factory trained service engineers and an inventory of replacement parts within a one hundred mile radius of the job site.

B. Acceptable manufacturers are Mitsubishi, Carrier, Lennox, Daikin or Trane.

C. Compressors shall be warranted against parts failure for five (5) years.

D. Submit catalog cuts, certified performance data and dimensional data.

PART 2 - PRODUCTS

2.01 FAN COIL UNIT:

A. Fan-coil unit shall be wall mounted type, complete with direct driven blower assembly, evaporator coil with drain pan, finished housing with return inlet and adjustable discharge louvers and filter rack.

B. Blower and Blower Motor: Blower shall be centrifugal type, statically and dynamically balanced. Motor shall have factory-lubricated bearings, multiple-speed, direct drive.

D. Filters: Refer to section 23 00 00 – HVAC General, for filter requirements.

E. Cooling coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coils shall have a factory-installed tubing with all joints brazed. Coils shall have a factory-installed refrigerant metering device and be equipped with refrigerant line fittings which permit mechanical or sweat connections.

F. Each wall mounted fan-coil unit shall be provided with an integral condensate lift device capable of lifting the condensate to a point above the ceiling where it can drain, by gravity to the nearest floor drain.

2.02 OUTDOOR HEAT PUMP UNIT:

A. Factory assembled and tested, complete with prewired control center, hermetic motor, compressor, coil, fan, motors, reversing valve and refrigerant piping, all housed in a factory finished, waterproof heavy gauge, zinc coated or bonderized steel enclosure, designed for vertical discharge.

B. Compressor: Inverter driven, hermetic with positive pressure lubrication system and reversible oil pump, vibration isolators, suction and discharge valves, oil filter and oil level sight glass, crankcase heater, discharge muffler, suction line strainer and relief valve.

C. Condenser Coil: Copper tubes and aluminum fins with coil guards. Fans shall be protected with fan guards.

D. Control Center: Motor starting equipment, suction and discharge pressure gauges, 60 second oil pressure switch, ON-OFF switch, motor thermostat and time delays between compressors of multiple compressor units.

2.03 ACCESSORIES:

A. Provide for each new split system heat pump, a commercial, seven-day programmable wall thermostat with automatic changeover from heating to cooling and fan on/auto control. When the heat pump is in the occupied mode, the blower shall run continuously. In the unoccupied mode, the blower shall cycle with the heating and cooling.

B. For fan coil units FCU-1 through FCU-5, provide a two-position motorized outside air damper interlocked to open ONLY when the system is in “OCCUPIED” mode. NOTE that this does NOT mean whenever the fan is running! (Fan may be running intermittently during unoccupied times. In these instances, the outside air damper should remain closed.)

2.04 REFRIGERANT PIPE AND FITTINGS:

A. Type "k" hard drawn copper tubing with wrought copper sweat type fittings.

B. Refrigerant stop valves shall be designed for refrigerant service. Install valves to isolate each condenser, compressor, and receiver. Valves shall be packless up to and including 1-1/8". Larger valves may be seal cap type.

C. Clean inside of refrigerant lines with methyl alcohol before assembly and take care thereafter to prevent flux and other foreign matter from being sealed in. Cut pipe ends square and deburr. Clean pipe and fittings with #00 steel wool. Make joints without burning, using 45% silver alloy solder and flux as made by Handy & Harriman, J.W. Harris Company or United Wire Company.

D. Test refrigerant piping, equipment, valves and fittings at a pressure of 245 psi on low side and 300 psi on the high side by introducing refrigerant and dry carbon dioxide (CO_2) throughout the freon circuit. Bubble test joints with soap lather, clean joints of soap and leak-test with a halide torch. The system shall be pumped out and the entire circuit placed under 27" of vacuum and allowed to stand sealed off for a period of eight hours, without noticeable loss of vacuum.

END OF SECTION 23 81 20

SECTION 26 00 00

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE

A This section applies to all Sections of Division 26 00 00 – Electrical General Provisions.

B The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section and in all sections of this division.

1.02 WORK INCLUDED

A Provide all labor, tools, and materials required for a complete and fully operational installation, as described on the Drawings or in the Specifications.

B The work shall be installed in a neat and workmanlike manner.

1.03 WORK NOT INCLUDED UNDER DIVISION 26 00 00

A The following items of work are specified under other divisions of the specifications:

1. Temporary service for construction.
2. Electric motors.
3. Electric heaters unless otherwise noted on the Drawings.
4. Control and interlock wiring for work furnished under other divisions, except where specifically required under this division.
5. Access panels in walls or ceilings.
6. Field finish painting, except for field painting of electrical material with paint supplied by the manufacturer of the material.
7. Starters for certain items of equipment are furnished under other divisions for installation under this division.

B Refer to other sections of this division for work required in connection with the above items.

1.04 DEFINITIONS

A “Provide”: furnish and install, complete and ready for operation.

B “Install”: receive, mount, and connect, complete and ready for operation.

C “Wiring”: wires and cables installed with all required raceways, connectors, and fittings.

D “Concealed”: not exposed to view; embedded in masonry or other construction; in furred spaces or above suspended ceilings; below grade.

E “Exposed”: not concealed; not embedded or installed underground; under raised floors; inside trenches, tunnels, basements, inside built-up HVAC equipment, crawl spaces, and accessible attics.

F “The Drawings”: that portion of the Contract Drawings annotated as electrical.

G “Furnish”: Supply, deliver to job site, protect and store.

1.05 ABBREVIATIONS

A The abbreviations used on the Drawings and in the Specification are defined as follows:

1. "AC": Alternating Current
2. "AFF": Height above Finished Floor
3. "AIC": Ampere Interrupting Capacity
4. "AICR": Ampere Interrupting Current Rating
5. "AHJ": Authority Having Jurisdiction
6. "NEC": National Electrical Code
7. "NIC": Not in the Contract
8. "NF": or "N/F": Non-fused
9. "30A/2P": Example of a circuit designation for a 30 Amp 2-Pole fused switch or a 30 Amp 2-Pole circuit breaker or device.
10. "FBO": Furnished by Others
11. "EC": Electrical Contractor
12. "EX": Existing to Remain
13. "EXR": Existing Relocated – new location indicated on the Drawings.
14. "HP": Horsepower
15. "kVA": Kilovolt Ampere
16. "kW": Kilowatt
17. "MCC": Motor Control Center
18. "MLO": Main Lugs Only
19. "NTS": Not to Scale
20. "WP": Weatherproof

1.06 CODES, RULES, AND REGULATIONS

A Comply with the following:

1. IECC - 2015.
2. Local codes enforced by the local inspection authority.
3. The edition of the National Electrical Code being enforced for this Project by the local inspection authority.
4. All applicable laws and ordinances.
5. The rules and regulations of electric utility company serving the Project applicable to the installation of service and metering equipment.
6. The rules and regulations of the telephone company serving the Project applicable to the work required for routing telephone service into the facility.

B Give all necessary notices, obtain all required permits, and pay all inspection and other fees imposed by Authorities Having Jurisdiction over the work.

1.07 STANDARDS

A The standards of the following organizations shall be applicable to the work:

1. The National Fire Protection Association (NFPA)
2. Underwriters Laboratories (U/L)
3. National Electrical Manufacturers Association (NEMA)
4. American National Standards Institute (ANSI)
5. Institute of Electrical and Electronic Engineers (IEEE)
6. Insulated Power Cable Engineers Association (IPECA)
7. Illuminating Engineering Society of North America (IESNA)
8. National Electrical Testing Association (NETA)
9. National Electrical Contractors Association (NECA), Standard of Installation
10. American Society for Testing and Materials (ASTM)

B Comply with the latest editions of standards applicable to the work.

1.08 MATERIALS

A All material shall be new, and shall comply with the indicated standards.

B All material shall be UL labeled or UL listed, except where the material is of a type not included in the UL listing service, in which case the material shall comply with other applicable industry standards and the Contractor shall provide any examinations or certifications required by the local inspection authority in lieu of UL listing.

C All material shall be of a suitable type and rating for the intended use, and shall be installed in conformance with the instructions and recommendations of the manufacturer.

1.09 DRAWINGS

A The Drawings are schematic in nature and do not indicate all of the required details of the work. All materials customarily considered to be a part of the electrical work and normally required for a complete and operational installation, shall be provided without additional cost to the Owner.

B Refer also to the Drawings of all other trades to coordinate the electrical installation.

C Equipment of other trades is shown schematically on the electrical Drawings. Examine the Drawings of the trade providing the equipment before roughing in the connections for it. Connect the equipment where actually installed, including wiring through any line voltage controllers, without any additional cost to the Owner.

D Prior to roughing in circuits for equipment furnished by other trades, and prior to releasing for manufacture panelboards, starters or motor control centers feeding such equipment coordinate the electrical provisions being planned with the trade providing the equipment and submit any conflicts in writing.

E The Architect or the Architect's Engineer directs the location of any electrical outlet, or wall switch, or luminaries, or other equipment, to a location within 10 feet of the location shown on the Drawings at no additional cost to the Owner provided such relocation is made prior to the installation of the equipment being relocated.

1.10 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Submittals are required for material as noted in other sections of this division.

C Check shop Drawings prior to submission and provide date and signature of checker on each item. Note all corrections. Note any requested deviation from the Drawings or specifications, or if none, then so indicate. The Architect shall return Documents without review where submitted without prior review by the Contractor.

D Review of submittals will be only for general conformance with the design concept indicated on the Drawings and in the Specifications and general compliance with the information given in the Contract Documents. Review will be made only of information clearly and specifically indicated in the submittal, and does not imply the acceptability of details, which are not so described in the submittal. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques,

sequences and procedures of construction; coordination of the Work of all trades; and performing all work in a satisfactory manner.

E Review of the submittal documents by the Architect does not relieve the Contractor of the responsibility to comply with all requirements of the Contract Documents.

1.11 PROJECT CLOSEOUT

A Furnish Closeout Documents in the manner and form described in Specification Section 01 77 00 Contract Closeout.

B Closeout Documents shall include the following:

1. Final shop Drawings.
2. As-built Drawings including as-built field layout Drawings.
3. Operation and maintenance manuals.
4. Receipts from the Owner stating that he has received satisfactory operational demonstrations and instruction for electrical systems.
5. Signed receipts from the Owner for spare parts and materials that are specified to be furnished.
6. Written guarantee.
7. All required certifications, including certificate of inspection approval of the code-enforcing authority.
8. All required test reports (include in operations and maintenance manual).

1.12 AS-BUILT DRAWINGS

A. Provide as-built Drawings in the manner and form described in Specification Section 01 81 00 Project Record Documents.

B. As-built Drawings shall be maintained at the jobsite, and shall be available for review during construction.

C Record the final arrangement of the work and exact locations of the work as installed. Provide photographs of buried grounding work prior to backfill of trenches.

D As-built Drawings shall be kept current during the course of construction of the work.

1.13 OPERATION AND MAINTENCE MANUALS

A. Provide minimum of three (3) copies of operation and maintenance manuals in the manner and form described in Specification Section 01 78 20 Operations and Maintenance Data. Manuals shall be typewritten, indexed, tabbed, and loose leaf bound in heavy duty 3-ring binders.

E Manuals shall include the following:

1. Operating instructions customized to this specific Project
2. Maintenance instructions
3. Parts list
4. Descriptive literature
5. Location, telephone number and contact information of Contractors, distributors, dealers and authorized service agents.
6. Test reports and certifications.
7. Record copies of all shop or submittal Drawings and data
8. Copies of all software on diskette or compact disk, licensed to the Owner.

F Maintenance instructions and parts lists shall include the most detailed and advanced publications available from the equipment manufacturer.

G Demonstrate the operation of the equipment to the Owner, including instruction in its use and operation. Provide instruction by manufacturer's representatives where specified.

H Provide operation and maintenance manuals for equipment and systems as specifically by the sections in Division 26 00 00.

1.14 SPARE PARTS

A Furnish spare parts as specified by the sections in Division 26 00 00.

B Turn over spare parts to Owners representative. Store on site as directed by the Owner. Obtain written receipt detailing specific spare parts turned over and submit with Closeout Documents.

C Replace at no cost to the Owner any spare parts used from the Owners stock prior to Substantial Completion or for warranty related repairs.

1.15 GENERAL TESTING

A Test all parts of the work to verify compliance with the Drawings and Specifications.

B Verify tightness of all mechanical and electrical connections.

C Verify integrity of all wiring systems to assure continuity, absence of unintentional grounds, and integrity of required grounds.

D Perform any required special factory or field testing as specified in the other sections of this division. Provide all wiring, instruments, and personnel required to complete these tests.

E Where other requirements of this division require testing in the presence of the Architect, provide at least seven (7) business days advance written notice of such testing to the Architect.

F Where other requirements of this division require submission of written records of tests and test results, accumulate and submit all such reports and include as a separate section in the operations and maintenance manuals described elsewhere in this section.

END OF SECTION 26 00 00

SECTION 26 05 00

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL

A This section covers items of work required by more than one section of Division 26 00 00 – Electrical General Provisions.

B Refer to other Divisions for requirements pertaining to:

1. Cutting and repairing
2. Excavation and backfilling
3. Concrete
4. Field painting
5. Equipment furnished under other Divisions and installed under this Division

1.02 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Required for fireproofing system materials and

C Provide manufacturer's data sheets with complete description of all components, catalog numbers, specific details of applicable UL listings, and detailed line drawings of fireproofing methodology to be used for each type of penetration.

PART 2 - PRODUCTS

2.01 MANUFACTURE

A Concrete Inserts: Grinnell, Kindorf, Unistrut, B-Line or Hohmann & Barnard.

B Drilled Anchors: All metal; heavy duty, non-caulking, expansion bolt anchor equivalent to Rawl #9650 Series or Red-Head, Hilti or Grinnell. Minimum size used shall be ¼" machine thread.

C Metal Framing Channel: 1-5/8" x 1-5/8", 12 Gauge, equivalent to Kindorf, Unistrut, B-Line, Power-Strut, or Super-Strut. Use appropriate fittings of same manufacture.

2.02 WOOD BACKBOARDS

A Wood backboards shall be ¾" thick, grade B-C, plywood. Paint with gray color fire-retardant paint.

B Use backboards only in interior spaces and sized as indicated on the Drawings.

2.03 NAMEPLATES

A Provide engraved plastic equipment nameplates for all switchboards, panelboards, motor control centers, starters, disconnects, primary selector switches, time clock controls, contactors, and transformers.

B A circuit nameplate indicating circuit number and the equipment served shall be provided for each feeder in service switchboard, and each branch device in power distribution panels, and motor control centers.

C Distribution equipment nameplates shall state equipment designation, ampere rating, voltage and phase, and "fed from (name)".

D Nameplates for individually mounted starters, safety switches, etc., shall state load served, circuit number, voltage and phase.

E Refer also to Section 26 27 26 "Wiring Devices" for additional requirements pertaining to Wiring Device labeling.

F Refer also to Section 26 05 53 "Electrical Identification" for additional Electrical Identification requirements.

2.04 FIREPROOFING

A All fireproofing materials shall be the product of one manufacturer and shall be U.L. listed for the type of application where applied.

B Provide caulk, expanding foam, putty, rigid boards, tape and packing as required by the U.L. listing for the type of penetration being fireproofed.

C Fireproofing of sleeves, cable trays, troughs, and nipples to be used for low voltage cables shall be indefinitely non-hardening and removable with common hand tools.

D Fireproofing for penetrations of floor slabs shall also be waterproof for standing water in a non-fire condition.

E Acceptable Manufacturers:

1. Dow Corning
2. Hilti
3. Nelson
4. 3-M
5. Other manufacturers as determined acceptable by the Architect.

PART 3 - EXECUTION

3.01 SUPPORTS

A All work shall be supported from structural elements of the building, except ceiling mounted equipment such as light fixtures, detectors, remote lamps, which shall be supported from ceiling support members independent of ceiling tiles.

B Size and spacing of supports shall be determined by the load to be supported such that the working load of supports will not exceed a safety factor of 4:1.

C Spacing intervals of supports shall in no case exceed intervals required by applicable codes.

D Plastic anchors and non-removable drive-in type expansion anchors are not acceptable.

E Work under this division shall not be supported from piping, ducts, or work of other trades, unless specifically noted on the Drawings or with the written permission of the Architect.

F Drilled anchors in sides of concrete joists shall be at least 3” from bottom of joist in the vertical plane.

G Provide drilled expansion bolt anchors to support all material mounted on masonry construction.

H All hardware, nuts, bolts, channel, braces, etc., used on exterior of building shall be galvanized.

I Rod supports shall be constructed of minimum 3/8” nominal continuously threaded rod of a continuous length. Use of rod couplings to extend the length of hanger rod shall not be allowed.

J Work installed under Division 26 00 00 supported from or attached to structural steel members shall not be welded to steel member but shall be attached by clamping a device manufactured specifically for this purpose.

K Floor mounted equipment shall be anchored to supporting concrete pad with expansion anchors, minimum ½” nominal stud size.

L Framework required to support electrical equipment shall be constructed of 1 ½” x 1 ½” steel framing channel bolted together with fittings provided by the framing channel manufacturer.

3.02 PAINTING

A Provide the following painting under Division 26 00 00 “Electrical General Provisions” in accordance with the requirements of the specification section describing Finish Painting.

1. Plywood backboards – wood primer and finish coat of ASA 61 gray fire-retardant paint.
2. Exposed conduits that are a part of the life safety distribution system – primer (on conduits only) and one coat of red enamel.
3. Color of all field paint shall be as directed by Architect.

B The vendor for painting furnished under Division 26 00 00 “Electrical General Provisions” shall be Contractor’s primary painting Subcontractor.

3.02 WOOD BACKBOARDS

A Unless otherwise noted on the Drawings, backboards shall be 8’-0” high by the width shown on the Drawings.

B Backboards shall be attached to supporting structure with 3/8” expansion anchors or toggle bolts with fender washers placed a maximum of 48” on center on all sides of backboard.

3.03 CONCRETE

A Provide 3000 PSI concrete where concrete work is required to support equipment furnished under Division 26 00 00, such as for equipment pads, lighting standard bases, and concrete-encased duct banks. Refer to Drawings and other sections for locations where concrete is required.

B Exposed surfaces of concrete placed under this section shall be hand rubbed and all edges shall have 1” chamfer.

3.04 EQUIPMENT PADS

A Provide 4" high concrete pads for all floor mounted electrical distribution equipment, including switchboards, and elsewhere as specifically noted on the Drawings.

B Concrete pads for switchgear, switchboard motor control centers and UPS equipment shall be level to with 1/8" from front to back and from side to side. Provide (2) embedded steel "U" channels; 4" W X 1 ½" H x 0.25" T, inverted and flush with the top of the pad. Channels shall be at the front and back of the pad located as directed by the equipment manufacturer, to provide a level base for the equipment.

C Anchor equipment in accordance with seismic study.

3.05 EQUIPMENT OF OTHER TRADES

A Motors, heaters, and other utilization apparatus shall be mounted by the trade which furnished the apparatus.

B Provide all power wiring and connections for all electrically operated equipment. Power wiring includes wiring through any line voltage control devices, such as thermostats and manual starters.

C Phase connections of motors shall provide proper motor shaft rotation.

D Starters and contactors furnished under other divisions, except those furnished as an integral part of the equipment, shall be installed under this division.

3.06 EQUIPMENT CONNECTIONS

A Connections to motors, transformers, duct heaters and other vibrating equipment shall be made with a short length of liquidtight flexible conduit, minimum 18", installed in a manner to permit movement of equipment.

B For floor-mounted equipment, which is fed overhead and not located adjacent to a wall or column, provide a rigid conduit standpipe from floor to ceiling with a floor flange. Provide appropriate cast conduit "tee" fitting in standpipe for connection of equipment.

3.07 MISCELLANEOUS WORK

A Perform all excavating, backfilling, cutting and repairing required for work included in this division.

B Protect all work from damage and from entry of concrete, moisture, and other foreign material.

3.08 FIREPROOFING

A All penetrations of fire rated walls, slabs, partitions, and ceilings shall be fireproofed with a U.L. listed system that will maintain the original fire rating of the penetrated structure.

B Initial fireproofing of sleeves, cable trays and wireways for low voltage cable shall not be installed until cables are installed or until required for issuance of certificate of final inspection, whichever is earlier.

END OF SECTION 26 05 00

SECTION 26 05 19

600 VOLT BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 SCOPE

A This section covers:

1. Building Wire
2. Flexible Cords

B Wires and cables used with special systems are specified with the respective system.

1.02 SIZE REFERENCE: AWG except as noted.

1.03 QUALITY ASSURANCE

A All wire and cable shall be delivered to the jobsite in original unbroken packages, cartons or reels, with the manufacturer's name, UL label, and characteristics of the product plainly visible.

B Wire or cable with defective or damaged insulation or jackets shall not be installed. Where damage, such as cuts, gouges, or slices, is discovered in the insulation or jacket while being installed, the damaged wire or cable shall be removed, and replaced. Field taping or other repair of damaged wire or cable is not acceptable.

1.04 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Provide for all wire, cable, and accessories.

C Documents shall plainly indicate the construction of the product, illustrating compliance with all requirements of Part 2, "Products".

PART 2 - PRODUCTS

2.01 BUILDING WIRE

A Conductors:

1. Material: copper, 98% conductivity.
2. Construction:

a. AWG 10 and AWG 12: solid only
b. AWG 8 and larger: stranded unless otherwise detailed on the Drawings.
c. AWG 14 and smaller: stranded (control use only).

B Insulation:

1. Type THWN/THHN, dual-rated.
2. Type XHHW: for underground secondary service entrance.
3. Type SFF: for wiring inside of luminaries.
4. Type SIS: for control wiring inside switchboards

C Voltage Rating: 600

D Color Coding:

1. Unless contrary to requirements of local codes, the following color code shall apply:

   120/240 volts
   Phase A – black
   Phase B – red
   Neutral – white
   Ground – green

2. Isolated Ground Conductor color code: AWG 10 and smaller: green with yellow stripe in insulation. AWG 8 and larger: continuous green tape and two bands yellow tape adjacent to each other.
3. If local codes require other than these color codes to be used, the local codes shall be complied with.
4. Color code shall be indicated by:

   a. AWG #10 and smaller: insulation color
   b. AWG #8 and larger: colored tape applied at all terminations, and junction boxes, pull boxes and manholes.
   c. Ground conductors shall be color coded along entire length where visible inside boxes and equipment.

E Accepted Manufacturers:

1. Belden
2. Clifford of Vermont
3. General Cable
4. Pirelli
5. Rome
6. Senator
7. Southwire
8. Triangle
9. West-Penn

2.02 FLEXIBLE CORDS

A 300 Volt – Type SJO with copper conductors

B 600 Volt – Type SO with copper conductors

C Use only where indicated on the Drawings.

2.03 600 VOLT ACCESSORIES

A Conduit wedges: 0-Z/Gedney Type “S”

B Terminations, power connections, splices, taps:

1. Splices: Compression type, copper, insulated with heat shrink sleeves.
2. Taps #8 and larger: Compression type copper or copper alloy with snap-on insulation cover designed for the specific tap. Insulation displacement type fittings are not acceptable.
3. Taps #10 and #12: twist-on insulated spring type connectors (i.e., Buchanan B-4) or squeeze-on insulated connector (i.e., 3M #560)
4. Terminations: feeder cable to bus bar: copper or copper alloy compression lug, two bolt hole tongue if mounting space allows.

5. Terminations: feeder cable to device or other condition where compression lugs mechanically will not fit: copper alloy mechanical lug, T&B "Locktite" series.
6. Accepted Manufacturers:

    a. Burndy
    b. 0-Z/Gedney
    c. T&B
    d. Illsco
    e. Square D
    f. Panduit
    g. Buchanan
    h. 3M
    i. Ideal

C Terminations: Control Conductors:

1. Compression Lug: insulated, T & B "StaKon®" or equal
2. Terminal Strip: barrier style, screw type, suitable for wire size and voltage applied.

D Wire Lubricants:

1. Lubricant used shall be certified by conductor manufacturer to be satisfactory for use with the specific conductor insulation.
2. Approved material:

    a. Ideal "Yellow 77"
    b. Ideal "Yellow 77 Plus"
    c. 3M wire pulling lubricant

E Wire markers: Permanent, machine printed, self-laminating vinyl, T & B Type "WSC", Burndy Type "XC".

F Feeder Identification Labels: Engraved black color laminated plate attached to conductors with nylon tie, or T & B TY-553M marked with WT-163M-1 pen.

PART 3 - EXECUTION

3.01 SIZES, QUANTITIES, TYPES

A Building Wire:

1. AWG 12 minimum, except as noted below.
2. AWG 10 minimum for all outdoor applications, except as noted below.
3. 120 Volt circuits with homerun length over 100 feet shall have AWG 10 minimum homerun conductors.
4. 277 Volt circuits with homerun length over 200 feet shall have AWG 10 minimum homerun conductors.
5. Type THHN/THWN shall be used for all branch circuits, AWG 12 through AWG 8. Conductors shall be stranded, unless otherwise noted on the Drawings. Where stranded wire is to be connected to wiring devices or other equipment whose terminals are not rated for use with stranded wire, "Stakon" type terminals shall be used on the wire.
6. Conductors larger than AWG 8 installed above grade shall be Type THHN or THWN. Where installed in conduit run below grade, shall be type THWN or XHHW.
7. Where branch circuit conductors enter the wiring compartment of lighting fixtures, the insulation used on that segment of the branch circuit shall be UL listed for application at the temperature that will be encountered in the fixture.

8. General-purpose control conductors: AWG 14 minimum, stranded, protected by control circuit overcurrent protection rated not greater than or set at the rated ampacity of the conductor.

B Flexible Cords:

1. AWG 16 minimum
2. Rated for the applied voltage and load
3. Contain full size ground conductor

3.02 INSTALLATION

A Building Wire:

1. Conductors shall not be pulled in an ambient temperature lower than 15º F.
2. Adequate wire lubricants shall be used to minimize pulling tension.
3. Conductors shall not be bent, either manually or with bending tools, in a manner that puts excessive stress on insulation or causes it to buckle. Avoid bending to a radius less than manufacturers recommended minimum. Conductors with visibly damaged insulation shall be replaced at no additional cost to the Owner.
4. Conductors installed in vertical raceways shall be supported by wedge fittings attached to the conduit on intervals as prescribed by code. Provide suitable sized pull box enclosures as required to contain the support wedges.
5. All terminations of feeder conductors not made directly on device terminals shall be made with compression lugs installed in accordance with the manufacturer's instructions and with a compression tool approved for the terminator used.
6. Feeder conductors shall be individually identified at each end and at all intermediate pull boxes and other accessible locations with feeder designation, source, load, voltage, and phase.
7. General-purpose control conductors and all special systems conductors shall be identified on each end with a unique number or designation. This identification shall be recorded on the Contractor's as-built Drawings.

B Flexible Cords: Shall be installed with cord grip and strain-relief connectors.

3.03 TESTS

A Cable Test:

1. Megger test all feeders.
2. Megger test of all feeders shall be accomplished before energizing circuits. Test shall be phase to phase and phase to ground.
3. Submit a written tabulation of the results of each test to the Architect for review. Replace any cable with installed insulation resistance of less than accepted industry standards.

B Replacement of Conductors

1. Replace conductors, determined by testing as not acceptable, without additional cost to the Owner.

END OF SECTION 26 05 19

SECTION 26 05 26

GROUNDING SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A Grounding System: Grounding of all electrical equipment and raceways.

B Buried Grounds: Buried ground ring, buried ground radials, driven ground rods as indicated on the Drawings.

C Miscellaneous grounding, installation of separate ground bus bars and miscellaneous bonding.

D Provide all grounding and bonding described herein and as detailed on the Drawings.

E Contractor shall provide the services of an approved Testing Contractor to perform a ground resistance test of the completed grounding system.

F The completed grounding system installation is subject to review and acceptance by the Architect.

1.02 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Required for materials and fittings for exterior grounding work.

C Documents:

1. Manufacturers data sheets describing each component of the system;
2. Qualifications of the proposed Testing Contractor.

PART 2 - PRODUCTS

2.01 BUILDING GROUNDING SYSTEM

A Raceways for separate ground conductors: Type RNC, Schedule 40 conduit.

B Conductors:

1. 98% conductivity copper, solid or stranded, sizes and types as indicated on the Drawings.
2. In general, main buried ground conductors shall be bare copper, AWG 3/0, seven-strand.

C Connections:

1. Underground or exterior connections shall be exothermic weld between conductors, and between conductors and ground rods.
2. In locations where conductor connects to main structural steel components, exothermic welds shall be used. For connections to light-gauge metals or in other locations where a lug must be used, a 2-hole lug shall be exothermic welded to the grounding conductor.
3. Lugs shall be 2-bolt tongue, compression type.

4. Compression Splices and Taps: Tin plated copper.
5. Water pipe clamps, fence posts, test ground rod: T&B 3900 series or Burndy Type "GAR" Series, cast bronze.
6. Exothermic welds: Cadweld, Thermaweld or Ultraweld.
7. Solid conductor to equipment or bus: Exothermic weld lug bolted to equipment.
8. Flexible copper grounding and bonding jumpers: 0-Z/Gedney Type "FB" series, or Burndy Type "B" Series, rated 190 AMPS, length as required for each application.
9. Ground Rods: "Copperweld", copper clad steel, ¾" diameter, 10' length. Provide sectional rods of same construction where lengths greater than 10 feet are required to be used.

D Non-Oxide Compound:

1. "NO OXID A" compound as manufactured by Sanchem Chemical Company, Chicago Illinois.

PART 3 - EXECUTION

3.01 BURIED GROUNDS

A Unless otherwise indicated, ground rods shall be driven into undisturbed earth.

B Tops of rods and all horizontal buried conductors shall be minimum 30" below finished grade.

C Minimum lateral distance from building footings shall be 24".

D Installed grounding work below grade shall not be covered until reviewed by the Testing Contractor.

3.02 EQUIPMENT GROUNDING CONDUCTORS

A Separate Grounding Conductor: All branch circuits and feeders operating at higher than 50 volts to ground shall have an insulated equipment ground conductor, green color, sized in accordance with the National Electrical Code.

B Raceway Grounds: Other circuits shall utilize the raceway as the equipment ground conductor except where noted otherwise.

C Single grounding conductors, or RNC conduits containing single ground conductors, shall not be totally encircled by ferrous metal. Use nylon bolts in pipe hangers or in Unistrut conduit straps.

D All grounding connections shall be subject to inspection and review by the Testing Contractor and the Consultant. Provide 72 hours advance notice for scheduling review.

E Provide specified "non-oxide" compound between mating surfaces on all equipment bonding connections where mechanical connections are utilized in lieu of exothermic welds.

F Ground conductors shall be installed using long radius bends, minimum 12" radius, and shall maintain a downward or horizontal direction. U-bends or tight radius bends less than 90 degrees are not acceptable.

G All connections to the buried ground ring conductor shall be exothermic welded including connections to ground rods.

H Bond connections to equipment shall utilize exothermic weld lugs, 2-bolt tongue type, attached using machine screw thread type bolts where exothermic welds cannot, or should not, be utilized.

I Provide combination “Do Not Disconnect” and “Destination” tags at all interior bonding and grounding connections. Tags shall be green plastic laminate with white letters. Letters shall be minimum ¼” high. Attach all tags using Nylon cable Ty-raps.

3.03 GROUND TESTING

A Testing of grounding systems and made ground electrodes shall be performed by an approved testing company.

B Measurements shall include the earth resistivity and resistance of the grounding electrode system.

C Record ambient temperature; date; time; condition of soil (wet or dry). Where available, record approximate water table level (as obtained from local geologists, special core drilling is not required); type of earth materials; earth resistivity.

D Provide written record of resistance readings and all other information listed above. Include on “Record Drawings”.

END OF SECTION 26 05 26

SECTION 26 05 33

CONDUIT

PART 1 - GENERAL

1.01 GENERAL

A This section describes conduit and related fittings. Other raceway types are specified in other sections.

B Boxes and other raceway accessories are specified in other sections.

C Concrete-encased duct banks are specified in Specification Section 26 05 33.

1.02 SIZE

A Minimum conduit size shall be ½"; Exception: 3/8" flexible metal conduit or Type AC or MC is permitted for flexible connections to lighting fixtures and fire alarm devices.

B Conduit size may be increased to facilitate pulling of conductors.

1.03 COORDINATION WITH WORK OF OTHER TRADES

A Coordinate the conduit layout with the work of other trades. Conduits shall be located to avoid interference with equipment that requires access, maintenance, adjustment, or repair. Conduits shall not restrict the required working clearance around such equipment.

B Conduits feeding, or connecting to, equipment provided by other trades shall not be installed until such equipment is installed or until the trade providing the equipment furnishes specific rough-in instructions.

C Conduits shall be concealed, unless otherwise indicated.

1.04 SCOPE OF CONDUIT WORK SHOWN ON THE DRAWINGS

A The conduit layout indicated on the Drawings is schematic and is not intended to show the exact location of conduits unless specifically dimensioned. Locate conduit as required by the architectural and structural details of construction and by the coordination with the work of other trades.

B Provide all fittings, offsets, supports, pull boxes and other components of the conduit system as required for a complete raceway system.

1.05 QUALITY ASSURANCE

A The conduit shall be new, of uniform quality and appearance, and marked with U.L. listing and name of manufacturer.

B All seams shall be smooth, without splits, clean, and with threads protected when delivered to or stored on site.

C Provide fittings designed and U.L. listed for use with the specific wiring method used.

1.06 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Provide Submittal Documents for the following:

1. PVC raceways and fittings
2. EMT fittings
3. Conduit bushings
4. Flexible conduit and fittings

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT (TYPE RMC)

A Manufacturers:

1. Allied Tube & Conduit Corp.
2. Jones & Laughlin
3. Pittsburgh-Standard
4. Republic
5. Triangle Wire & Cable, Inc.
6. Wheatland Tube Co.
7. Youngstown
8. ETP
9. Robroy Industries, Inc.

B Material: Full weight, steel, standard size, hot dipped galvanized outside, galvanized or coated inside, threaded ends.

C Fittings:

1. Couplings: Continuous threaded, furnished by the manufacturer with conduit. For IMC, ETP "Uni-Swivel" couplings are acceptable.
2. Threaded joint compound: Fel-Pro C5A.
3. Terminations (dry locations): Double locknuts with insulated throat, metallic grounding bushing, 0-Z/Gedney type "BLG".
4. Terminations (wet locations): Watertight hubs, 0-Z/Gedney Type "CHM", or conduit hubs integral with equipment.

2.02 INTERMEDIATE METAL CONDUIT (TYPE IMC)

A Manufacturers: same as for RMC

B Material: Lightweight steel, standard size, hot dipped or electro-galvanized zinc outside and galvanized or enamel coated inside, threaded ends.

C Fittings: same as for RMC

2.03 RIGID NON-METALLIC CONDUIT (TYPE RNC)

A Manufacturer:

1. Carlon, Division of Lamson & Sessions Co.
2. Sedco
3. Centex, Inc.
4. Heritage Plastics
5. Certainteed Corp.

B Material: PVC Schedule 40, unless otherwise indicated, rated for use with 90ºC conductors.

C Where PVC being run under slabs, or grade, turns up through the slab, or above grade, the elbow and vertical section of conduit from the elbow to the termination of the conduit shall be RMC, or IMC, as protection against the exposed conduit being damaged.

D Accessories: Fittings, couplings, cement, and other accessories shall be of the same manufacture as the PVC conduit that they are used with.

2.04 ELECTRICAL METALLIC TUBING (TYPE EMT)

A Manufacture: same as for RMC.

B Material: Thin-wall steel, galvanized outside, coated inside, threadless.

C Fittings:

1. For EMT (Sizes 1.25" and smaller):

   a. Couplings: All steel, setscrew type, concrete tight where installed in concrete, Raco, T&B, Midwest, or Steel City, O-Z/Gedney
   b. Connectors: All steel, setscrew type, with nylon throat; Raco, T&B, Midwest, or Steel City.

2. For EMT (Sizes 1.50" and larger):

   a. Couplings: All steel, setscrew type, of same manufacture.
   b. Connectors: All steel, setscrew type, of same manufacture, and insulated throat, metallic grounding bushing, 0-Z/Gedney Type "BLG".

2.05 FLEXIBLE METAL CONDUIT (TYPE FMC)

A Manufacture:

1. AFC Cable Systems, Inc.
2. Alflex
3. Electri-Flex Co.
4. Steelflex Electro Corp.

B Material: galvanized steel, Continuous single interlocking strip.

C Fittings: T&B "Tite-Bite" series, Midwest Fittings.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (TYPE LFMC)

A Manufacture: same as for FMC.

B Material: Flexible metallic conduit with PVC jacket, type "UA", with integral copper grounding conductor suitable for use as equipment grounding conductor.

C Fittings:

1. Material: Steel, or malleable iron, liquid-tight connector with insulating throat liner (use bushing above 1.25").
2. Manufacture: T&B, Midwest Fittings, O-Z/Gedney.

2.07 EXPANSION FITTINGS AND ACCESSORIES

A Expansion fittings:

1. For conduit not embedded in concrete while passing across building expansion joint, provide 0-Z/Gedney type AX for GRC and IMC or type TX for EMT. Provide bonding jumper.
2. For conduit embedded in concrete while passing across building expansion joint, provide 0-Z/Gedney type DX expansion joint or type AXDX if required by the degree of expansion possible.

B Seals for exterior wall below grade penetrations:

1. Cast-in-place type: 0-Z/Gedney Type “WSK”.
2. Cored openings: 0-Z/Gedney Type “CSMI” and Type “CSMC”.
3. Non-shrink grout where indicated on the Drawings and where acceptable to the Architect.

C Conduit bodies:

1. Used for pulling conductors: Crouse-Hinds LBD series through 2.00” and LBNEC Series 2.50” and above.
2. Used for motor connection: Crouse-Hinds condulet “T” series.

D Pull strings for empty conduits shall be equal to Greenlee 430 poly pull line.

PART 3 - EXECUTION

3.01 GENERAL

A Conduit supports and seismic bracing is specified in other sections.

B Run exposed conduits parallel or perpendicular to structural elements.

C Two or more raceways run together shall be installed on trapeze type gang hangers. Such raceways assemblies shall be run parallel or perpendicular to structural elements.

D Where bends are made in a rack of exposed conduits, field bent concentric elbows shall be used.

E All wiring shall be installed in conduit, unless plenum rated cable is specified in other sections to be installed without conduit or, unless the wiring is shown to be in a wireway or cable tray.

F Unless specifically noted on the Drawings all raceways shall be concealed in walls, floor slabs, topping slab on floor, or in ceiling plenums.

G Apply threaded joint compound on all Type RMC and Type IMC threaded joint connections.

3.02 SCHEDULE

A Unless otherwise required, provide RMC or IMC for the following applications:

1. Exposed stub-ups from floor.
2. In poured concrete walls and columns.
3. Where subject to damage.
4. Exposed on exterior of building.
5. Exterior circuits under roadways.
6. Feeder or service conduits under slab, or in grade, where concrete encased RNC PVC are not used.

B Provide EMT in dry locations only for the following applications:

1. Concealed work in slabs, walls, and ceiling plenums.
2. Branch circuit feeder wiring not otherwise required to be run in RMC or IMC.
3. Signal or communication raceways (other than underground)

C Provide RNC PVC for the following applications:

1. Concrete encased duct banks where specifically indicated.
2. Single grounding conductors as indicated and where not run in plenum spaces.

D Flexible conduit is permitted only where concealed above suspended ceilings for connections of light fixtures, tele-power poles, and similar equipment and shall not exceed 3'-0" length. Luminary fixture whips may be 6'0" in length.

E Liquid-tight flexible metal conduit (LFMC) shall be used for all connections to vibrating equipment, such as motors and transformers, and where flexible conduit is indicated on the Drawings, except as noted above. Use Type FMC in plenum spaces.

3.03 INSTALLATION

A Conduits embedded in slabs shall have a minimum of 1" cover of concrete on all sides. Outside diameter of conduit shall not exceed 1/3 of the slab thickness and shall not be larger than 1.25".

B For physical protection during construction, include rigid galvanized steel elbows at conduit turn-ups at slab or grade. Otherwise, underground conduits maybe schedule 40 PVC.

C All threaded conduits shall be terminated with specified bushings.

D Paint all underground steel conduits with one coat of Rustoleum 5269 primer and one coat of Rustoleum 5282 acrylic industrial enamel. Touch up all wrench marks and other defects.

E Underground conduits shall be a minimum of 24" below final grade.

F Conduit joints:

1. Ream end of conduit smooth.
2. Conduit ends shall meet in coupling.
3. Provide unions where required, of the Erickson Type.
4. Provide joint compound on the male threads of RMC and IMC conduit.

G Use double locknuts at threaded conduit terminations.

H The conduit system shall be left free of all debris, water and foreign material. Plug or cap all conduits with exposed ends to prevent entrance of concrete or other foreign material. Pull a cleaning swab through all conduits prior to pulling conductors.

I Conduits run parallel to, or crossing hot pipes, shall not be closer than 0'-6" to hot pipe.

J Anchors or supports in waterproof walls shall be of the type and methodology directed by the Architect.

K Empty EMT raceways shall be terminated with connectors, and if over 1.25", specified bushings.

L Raceways in accessible ceiling plenums shall not be installed closer than 8" to ceiling.

M Groups of two or more conduits turned out of a slab shall be neatly arranged parallel to the adjacent wall and evenly spaced with at least (1) inch separation.

N Conduit passing through walls below grade shall be run through specified fittings in the wall and shall be sealed to be waterproof.

O All threaded joints in rigid conduit shall have pipe compound applied to the male thread only, to be watertight where buried below grade and not encased in concrete.

3.04 ACCESSORIES

A Pull wires: provide nylon pull wire in all empty conduits and at all data and telephone outlet locations.

B Expansion fittings: provide at all building expansion joints.

C Fire seals: provide where conduit passes through a floor slab (other than slab on grade) and where conduit passes through fire-rated masonry walls, unless cast in place.

D Install specified seals for exterior wall below grade for penetrations of conduits.

3.05 IDENTIFICATION

A All exposed conduits 2 inches and larger shall be identified with markers 20 feet on center. Also refer to Specification Section 26 05 53 Electrical Identification.

B Markers shall be permanent, plastic-sheet conduit markers extending 360 degrees around conduit.

C Marker shall identify voltage and function of conductors in conduit and be minimum length of 8 inches.

END OF SECTION 26 05 33

SECTION 26 05 34

BOXES

PART 1 - GENERAL

1.01 SCOPE

A This section covers pull boxes, outlet boxes, and junction boxes.

1.02 APPLICATIONS

A All splices, pull boxes, taps, connections, devices, etc., shall be installed using boxes of the appropriate type, designed and approved for the intended purpose.

PART 2 - PRODUCTS

2.01 GENERAL

A Box sizes specified are minimum, and shall be increased where required by code due to the number of conduit entries, conductors, devices, or taps in the box.

B All boxes shall be made of galvanized sheet steel, of code gauge thickness, but no less than 1/16" thick or 14 Gauge.

C Outlet box covers shall be attached by means of machine screws. Self-tapping sheet metal screws are not acceptable.

2.02 MANUFACTURER

A Outlet boxes: Steel City, Appleton, Raco

B Cast boxes: Crouse-Hinds, Appleton

2.03 SCHEDULE

A Schedule indicates box type; select actual box and plaster ring to suit actual conditions:

USE	BOX	COVER
Recessed device outlet	RACO 683	RACO 770
Recessed tele/data outlet	RACO 683	RACO 770
Recessed wall mounted fixture	RACO 683	RACO 767
Flush concrete outlet	RACO 272	RACO 893
Flush concrete junction	RACO 272	RACO 892
Junction box above ceiling	RACO 257	RACO 832
Exposed device outlet	C/H "FS"	C/H DS32
Exposed fixture outlet	C/H "GRFX"	---------
Flush ceiling fixture	RACO 683	RACO 767

2.04 SPECIALTIES

A Boxes installed in concrete shall be UL listed for such use.

B Through-wall boxes are not acceptable.

C Provide 3/8-fixture stud and box supported from structure when required by weight of fixture being supported.

D Junction boxes installed above ceilings shall be plenum type.

2.05 PULL BOXES AND JUNCTION BOXES

A In dry locations, boxes shall be galvanized sheet steel, minimum 12 gauge, with machine screw covers, and welded construction. Welds shall be slag-free and cold galvanized.

B In damp locations or outdoors, unless otherwise shown on the Drawings, boxes in steel raceway runs shall be galvanized cast iron, with gasketed covers and conduit hubs, or drilled and tapped. Boxes in Type RNC PVC raceway runs shall be PVC with gasketed cover.

C All boxes shall be rated for their application, such as sidewalk, or light vehicle traffic.

D Provide insulated cable support racks in feeder pull boxes where conductor length exceeds 48" inside pullbox.

PART 3 - EXECUTION

3.01 GENERAL

A Refer to other sections for mounting heights of boxes for devices and equipment.

B Boxes shall be located clear of other trades, and shall be accessible.

C Coordinate the exact location of ceiling outlet boxes and boxes concealed above ceilings, with ductwork and piping so that the boxes will be accessible.

D All required pull boxes are not indicated on the Drawings. Provided boxes as determined by actual field installation and as required for a complete installation.

E Using a permanent, waterproof, wide black marker, clearly label cover of all branch circuit junction boxes, and smaller pull boxes, with panel and circuit number of circuits contained in, or passing through, the box.

F Branch circuit and feeder junction and pull boxes used with emergency life-safety feeders and circuits shall be painted red.

G Provide engraved "lamicore" nameplate on cover of each major feeder pull, or junction, box as specified under Specification Section 26 05 53 Electrical Identification.

3.02 INSTALLATION

A Boxes shall be securely anchored in place, and shall be supported independent of the raceway system.

B Boxes installed in poured concrete shall be anchored to the formwork and protected against entry of any concrete.

C Boxes shall be set square and plumb with building elements.

D Outlets for ceiling mount fixtures shall be rigidly supported from the grid or structure with an assembly manufactured for this purpose.

E For exposed conduits, use cast boxes; otherwise, use sheet metal 4"x4" boxes.

END OF SECTION 26 05 34

SECTION 26 05 43

CONCRETE ENCASED DUCT BANKS

PART 1 - GENERAL

1.01 DESCRIPTION

A This section covers underground ductbanks.

B Concrete is specified in another section.

PART 2 - PRODUCTS

2.01 DUCT

A Duct shall be PVC pipe, U/L labeled for encased or direct burial and for use with 90° C conductors.

B Duct shall be Carlon, Schedule 40, or Sedco equivalent, unless otherwise indicated on the Drawings.

2.02 ACCESSORIES

A All couplings, cement, solvent, spacers, and other accessories shall be of the same manufacture as the duct.

B Marking tape: Panduit #HTDU-3RE for power and #HTDU-30-7 for communications.

2.03 TERMINATION

A Under equipment, at manholes, or in pits under equipment the duct bank shall be terminated with bell ends arranged to be flush with the face of the concrete.

B Where the raceways in the duct bank extend above concrete slabs or are otherwise exposed the exposed raceways shall be GRC or IMC

2.04 DUCT BANK COVER

A Concrete Encasement:

1. Ductbanks shall be concrete encased except where located beneath the building floor slab. Ductbanks extending beyond to building shall be concrete encased, beginning 5 ft. within the building perimeter.
2. All stub-ups shall be concrete encased.
3. All concrete encasement shall be 3000 PSI concrete.
4. Provide a minimum of 3” concrete cover over the ducts.
5. Provide a minimum of 2” concrete between adjacent ducts, or 7.5” on center, whichever is greater.
6. Where the ductbank extends under paved areas, provide reinforcing steel at each corner of the duct bank, extending 10 ft. beyond the edge of the pavement. Reinforcing steel shall be #4 rods.

B Gravel cover and fill:

1. Except where concrete encasement is required, the ductbank may be backfilled in lieu of encasement.

2. Backfill shall be 89 stone.

PART 3 - EXECUTION

3.01 GENERAL

A All PVC ducts shall be installed in strict accordance with the manufacturer's instructions to ensure that joints are made up securely and are watertight.

B The Architect shall be notified before pouring of the concrete encasement so that he may review the installation prior to the pour.

3.02 PROTECTION

A The ducts shall be protected from damage during installation. Any cracked or damaged pipe or joints shall be replaced before pouring concrete.

3.03 DUCT INSTALLATION

A Bends in the ducts shall be made using manufacturer-approved bending equipment, using plugs in the ends of the pipe to prevent deformation.

B Support the pipe in the ductbank using appropriate base spacers and intermediate spacers to maintain proper alignment of and separation between the ducts.

C GRC or IMC stub-ups shall be supported during installation to prevent damage to the PVC duct from the weight of the steel ell.

D Cement furnished by the duct manufacturer shall be used for all joints, in strict accordance with the manufacturer's instructions.

E Swab inside the ducts clean before pulling conductors.

3.04 LOCATION

A Top of ductbank shall be minimum 24 inches below finished grade where located outside of the building, and 8 inches minimum below finished floor slab where located beneath the slab.

B Install PVC “ELECTRICAL” or “TELEPHONE” marker tape on top of all ductbanks.

END OF SECTION 26 05 43

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SCOPE

A Identification nameplates and labels.

B Wire and cable identification markers.

C Conduit identification markers.

1.02 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Product Data: Provide catalog data for nameplates, labels, and markers.

C Manufacturer's application conditions and limitations of use including, instructions for storage, handling, protection, examination, preparation, and installation of product.

PART 2 - PRODUCTS

2.01 NAMEPLATES AND LABELS

A Engraved three-layer laminated plastic nameplate with minimum 1/4" height letters.

B Equipment connected to non-essential supply (commercial power only): Black letters on white background.

C Locations:

1. Main Service and Distribution equipment enclosures and over-current devices.
2. Electrical distribution equipment enclosures.
3. Transformers
4. Motor Control Devices and Contactors.
5. Disconnect switches.
6. Communication cabinets.

D Labels:

1. Locations required:

a. All motors.
b. All field equipment fed from 120/240 V power source.
c. All field equipment such as motors, control stations, etc.
d. All lighting switches and receptacles in unfinished areas.

E Provide engraved plastic equipment nameplates for all switchboards, panelboards, motor control centers, starters, disconnects, primary selector switches, time clock controls, contactors, and transformers.

F Nameplate wording shall be coordinated with final equipment identification nomenclature and approved by the Owners' designated representative prior to installation.

G Distribution equipment nameplates shall state equipment designation, ampere rating, voltage and phase, and “fed from (name)”.

H Nameplates for individually mounted starters, safety switches, etc., shall state load served, circuit number, voltage and phase.

I Letter Size:

1. 1/4-inch letters: Identify individual equipment, and loads.
2. 1/2-inch letters: Identify major electrical equipment and panelboards.

2.02 WIRE AND CABLE MARKERS

A Description: Non-ferrous identify tag or shrink type label.

B Locations: Each cable feeder, power circuit, and conductor in vaults, manholes, gutters, pull boxes, starters, outlet and junction boxes, control panels, panelboards, switchboards, etc., and each load connection.

C Legend: Each tag or label shall be typewritten with description listed below.

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on Drawings.
2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams.

2.03 CONDUIT MARKERS

A Location: Furnish vinyl markers for each 2.00” or larger conduit longer than 6 feet for power circuits or Type MC Cable with 3/0 or larger conductors longer than 6 feet.

B Spacing: Adjacent to each termination at equipment and pull boxes and intermittently at 20 feet on center.

C Color: Match existing color-coding scheme in the facility. Where color-coding does not already exist, and then use the following color-coding on new work.

1. 208-volt system: White color and black stencil, voltage in 1/2” black letters. At the source end, also indicate the load served in 1/2” black letters. At the load end, also indicate the circuit identification in 1/2” black letters. At intermediate points, also identify both the circuit identification and load in 1/2” black letters.

2.04 UNDERGROUND WARNING TAPE

A Description: 4-inch-wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

B Location: Along length of each underground conduit or direct buried cable or duct bank.

PART 3 - EXECUTION

3.01 PREPARATION

A Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

A Install nameplate and label parallel to equipment lines.

B Secure nameplate to equipment front using screws.

C Secure nameplate to inside surface of door on panelboards that are recessed in finished wall locations.

D Install conduit markers per Section 2.

E Stencil conduit markers or use adhesive letters or order pre-labeled. Handwritten entries that are neat and legible and not smeared are acceptable. Any conduit markers that that are determined not to be neat, legible, and free from smears shall be replaced to the satisfaction of the Architect.

F Identify underground conduits and direct buried cables using underground warning tape. Install one tape per trench at 3 inches below finished grade and at 12 inches above top of conduits.

G Use Scotch +35 marking tape to color-code the phase conductors equal and larger than AWG #6.

H In a high delta service, the phase with the highest voltage to ground shall be orange.

I For other conductor color-coding, see Specification Section 26 05 19 600V Building Wire and Cable.

END OF SECTION 26 05 53

SECTION 26 05 73

PROTECTIVE DEVICE COORDINATION, SHORT-CIRCUIT AND ARC FLASH STUDIES

PART 1 - GENERAL

1.01 SCOPE

A The Contractor shall furnish short-circuit and protective device coordination studies as prepared by the electrical equipment manufacturer or an approved engineering firm.

B The Contractor shall furnish an Arc Flash Hazard Analysis Study per the requirements set forth in NFPA 70E - Standard for Electrical Safety in the Workplace. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E, Annex D.

C The scope of the studies shall include all electrical distribution equipment at all voltage levels.

D The Electrical Distribution System shall include everything on the premises (Owner) side of the service point (as defined by the NEC) of the serving utility. In cases of multiple service points on the premises, power generation located on premises, or separately derived systems; include these additional systems in the Electrical Distribution System and cover in the scope of the Power System Study. At the discretion of the Study Firm, separate electrical systems may be modeled using multiple electrical models; however, include all systems located at a single facility in a single Power System Study Report as specified in this section.

E Incorporate all additions and modifications to the Electrical Distribution System specified in the Contract Documents in the Power System Study and incorporate all existing equipment and portions of the Electrical Distribution System not affected by this Contract, such that the Power System Study consists of the entire Electrical Distribution System including all new and existing equipment.

F Incorporate all changes and modifications to the Contract Documents that occur over the course of the execution of this Contract in the Power System Study. These modifications include, but are not limited to, modifications resulting from Contractor requests for information, Contractor submittals, and Project change requests.

G The Power System Study shall incorporate utility power company data and equipment that affects Electrical Distribution System equipment short-circuit ratings, protective device settings, and arc flash hazards.

H The existing model of the system shall be updated. Request the latest model from the Owner to be updated. All database files and the model shall be turned over to the Owner upon Substantial Completion. The format of all database/model files shall be in the SKM format and ready for direct use in SKM Power tools for Windows latest version in use by the Owner.

1.02 REFERENCES

A IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems

B IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems

C IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis

D IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings

E IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.

F IEEE 1584 - Guide for Performing Arc-Flash Hazard Calculations

G ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

H ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures

I ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis

J ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.

K NFPA 70 – National Electrical Code, latest edition

L NFPA 70E – Standard for Electrical Safety in the Workplace

1.03 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B The short-circuit and protective device coordination studies shall be submitted to the Architect prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the studies may cause delay in equipment manufacturing, approval from the engineer may be obtained for preliminary submittal of sufficient study data to ensure that the selection of device and characteristics will be satisfactory.

1.04 SUBMITTALS FOR CONTRUCTION

A The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. Electronic copies of the complete report shall be provided on CD in PDF format.

B The Contractor is required to provide the study Project files, in the native format of the computer analysis software, to the Owner in electronic format.

C The report shall include the following sections:

1. Executive Summary.
2. Descriptions, purpose, basis and scope of the study
3. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties
4. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip unit settings, fuse selection
5. Fault current calculations including a definition of terms and guide for interpretation of the computer printout
6. Details of the incident energy and flash protection boundary calculations
7. Recommendations for system improvements, where needed

8. One-line diagram

D The Contractor shall provide a hard copy of all arc flash labels.

1.05 QUALIFICATIONS

A The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the supervision and approval of Contractor's Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B The Contractor's Registered Professional Electrical Engineer shall be a full-time employee of the equipment manufacturer or an approved engineering firm

C The Contractor's Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.

1.06 COMPUTER ANALYSIS SOFTWARE

A The studies shall be performed using the latest revision of the SKM Systems Analysis Power*Tools for Windows (PTW) software program.

PART 2 - PRODUCT

2.01 STUDIES

A Contractor to furnish short-circuit and protective device coordination studies as prepared by equipment manufacturer or an approved engineering firm.

B The Contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D.

2.02 DATA COLLECTION

A Contractor shall furnish all data as required by the power system studies. The Contractor's Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the Contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B Source combination may include present and future motors and generators.

C Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.

D If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

2.03 SHORT-CIRCUIT AND PROTECTIVE DEVICE EVALUATION STUDY

A Use actual conductor impedances if known. If unknown, use typical conductor impedances based on IEEE Standard 141-1993.

B Transformer design impedances shall be used when test impedances are not available.

C Provide the following:

1. Calculation methods and assumptions
2. Selected base per unit quantities
3. One-line diagram of the system being evaluated
4. Source impedance data, including electric utility system and motor fault contribution characteristics
5. Tabulations of calculated quantities
6. Results, conclusions, and recommendations.

D Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault at each:

1. Electric utility's supply termination point
2. Incoming switchgear
3. Unit substation primary and secondary terminals
4. Low voltage switchgear
5. Motor control centers
6. Standby generators and automatic transfer switches
7. Branch circuit panelboards
8. Other significant locations throughout the system.

E For grounded systems, provide a bolted line-to-ground fault current study for areas as defined for the three-phase bolted fault short-circuit study.

F Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short circuit ratings
2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses
3. Notify Owner in writing, of existing, circuit protective devices improperly rated for the calculated available fault current.

2.04 PROTECTIVE DEVICE COORDINATION STUDY

A Proposed protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B Include on each TCC graph, a complete title and one-line diagram with legend identifying the specific portion of the system covered.

C Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E Plot the following characteristics on the TCC graphs, where applicable:

1. Electric utility's overcurrent protective device
2. Medium voltage equipment overcurrent relays
3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves
6. Conductor damage curves

7. Ground fault protective devices, as applicable
8. Pertinent motor starting characteristics and motor damage points, where applicable
9. Pertinent generator short-circuit decrement curve and generator damage point
10. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

2.05 ARC FLASH HAZARD ANALYSIS

A The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E, Annex D.

B The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, disconnects, contactors, starters and busway) where work could be performed on energized parts.

C The Arc-Flash Hazard Analysis shall include all equipment in 240 volt and 208-volt systems.

D Safe working distances shall be based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm2.

E When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations

F The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for all normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum and will assume a minimum motor contribution (all motors off). Conversely, the maximum calculation will assume a maximum contribution from the utility and will assume the maximum number of motors to be operating. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable.

G The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators should be decremented as follows:

1. Fault contribution from induction motors should not be considered beyond 3-5 cycles.
2. Fault contribution from synchronous motors and generators should be decayed to match the actual decrement of each as closely as possible (e.g., contributions from permanent magnet generators will typically decay from 10 per unit to 3 per unit after 10 cycles).

H For each equipment location with a separately enclosed main device (where there is adequate separation between the line side terminals of the main protective device and the

work location), calculations for incident energy and flash protection boundary shall include both the line and load side of the main breaker.

I When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.

J Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.

K Arc Flash calculations shall be based on actual overcurrent protective device clearing time. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

2.06 REPORT SECTIONS

A Input data shall include, but not be limited to the following:

1. Feeder input data including feeder type (cable or bus), size, length, number per phase, conduit type (magnetic or non-magnetic) and conductor material (copper or aluminum).
2. Transformer input data, including winding connections, secondary neutral-ground connection, primary and secondary voltage ratings, kVA rating, impedance, % taps and phase shift.
3. Reactor data, including voltage rating, and impedance.
4. Generation contribution data, (synchronous generators and Utility), including short-circuit reactance (X"d), rated MVA, rated voltage, three-phase and single line-ground contribution (for Utility sources) and X/R ratio.
5. Motor contribution data (induction motors and synchronous motors), including short- circuit reactance, rated horsepower or kVA, rated voltage, and X/R ratio.

B Short-Circuit Output Data shall include, but not be limited to the following reports:

1. Low Voltage Fault Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:

    a. Voltage
    b. Calculated fault current magnitude and angle
    c. Fault point X/R ratio
    d. Equivalent impedance

2. Momentary Duty Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:

    a. Voltage
    b. Calculated symmetrical fault current magnitude and angle
    c. Fault point X/R ratio
    d. Calculated asymmetrical fault currents
        (1) Based on fault point X/R ratio
        (2) Based on calculated symmetrical value multiplied by 1.6
        (3) Based on calculated symmetrical value multiplied by 2.7

e. Equivalent impedance

3. Interrupting Duty Report shall include a section for three-phase and unbalanced fault calculations and shall show the following information for each applicable location:

a. Voltage
b. Calculated symmetrical fault current magnitude and angle
c. Fault point X/R ratio
d. No AC Decrement (NACD) Ratio
e. Equivalent impedance
f. Multiplying factors for 2, 3, 5 and 8 cycle circuit breakers rated on a symmetrical basis
g. Multiplying factors for 2, 3, 5 and 8 cycle circuit breakers rated on a total basis

C Recommended Protective Device Settings:

1. Phase and Ground Relays:

a. Current transformer ratio
b. Current setting
c. Time setting
d. Instantaneous setting
e. Recommendations on improved relaying systems, if applicable.

2. Circuit Breakers:

a. Adjustable pickups and time delays (long time, short time, ground)
b. Adjustable time-current characteristic
c. Adjustable instantaneous pickup
d. Recommendations on improved trip systems, if applicable.

D Incident energy and flash protection boundary calculations

1. Arcing fault magnitude
2. Protective device clearing time
3. Duration of arc
4. Arc flash boundary
5. Working distance
6. Incident energy
7. Hazard Risk Category
8. Recommendations for arc flash energy reduction

PART 3 - EXECUTION

3.01 FIELD ADJUSTMENT

A Adjust relay and protective device settings according to the recommended settings table provided by the coordination study.

B Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.

C Notify Owner in writing of any required major equipment modifications.

3.02 ARC FLASH WARNING LABELS

A Provide arc flash hazard labels for each evaluated piece of equipment per referenced NEC, NFPA and ANSI standards as modified in this section.

B Provide and apply arc flash hazard labels that comply with the following:

1. Color, ultraviolet (UV)-resistant, surface-printed or thermal transfer polyester with clear polyester over laminate.
2. Suitable for outdoor use with rubber-based permanent self-adhesive designed for adhesion to textured, powder-coated, or painted metals.
3. Abrasion-, chemical-, and heat-resistant (-40°F to 230°F).
4. Manufacturer: Brady B-302, B-483 or equal.
5. Label color shall indicate danger level as follows:
   (a) 0-4 cal./cm^2 – Level 1 –orange
   (b) 4-8 cal./cm^2 – Level 2-orange
   (c) 8-25 cal./cm^2 – Level 3 – orange
   (d) 25-40 cal./cm^2 – Level 4 – orange
   (e) >40 cal./cm^2 – Level DANGEROUS- red

C Where incident energy levels indicated on labels are achieved with an alternate system configuration through the use of maintenance switches or settingschanges, such as RELT, ARMS, Alternate Relay Settings Group, or other means, provide a placard below the arc flash label that clearly describes the location and operating instructions for the alternate system configuration and complies with the following:

1. Material shall be of the same type and manufacturer as the arc flash labels.
2. Minimum size 2" x 6", Minimum 18-point sans serif font.
3. White letters on red background.

D All labels will be based on recommended overcurrent device settings and will be provided after the results of the analysis have been presented to the Owner and after any system changes, upgrades or modifications have been incorporated in the system.

E The label shall include the following information:

1. Location designation
2. Nominal voltage
3. Flash protection boundary
4. Incident energy
5. Working distance
6. Issue date.

F Labels shall be machine printed, with no field markings.

G Labels shall be field installed by the Contractor and shall comply with the following:

1. NEC Article 110.16 and NFPA 70E.
2. Install labels in a neat and workmanlike manner.
3. Do not cover moving parts, airflow vents, cabinet exhaust, operating handles, pilot devices, signs, name plates, labels, etc. or otherwise interfere with equipment operation with label installation.
4. Provide only one label per piece of equipment. For dual-ended main-tie-main lineups two labels may be provided. Do not label each individual bucket or section.
5. Floor-standing equipment: Install label on the front of each piece ofequipment.
6. Wall-mounted equipment: Install label on the front of equipment or nearby adjacent wall depending on equipment size and configuration.

3.03 ARC FLASH TRAINING

A The Contractor of the Arc Flash Hazard Analysis shall train the Owner's qualified electrical personnel of the potential arc flash hazards associated with working on energized equipment (minimum of 4 hours).

END OF SECTION 26 05 73

SECTION 26 20 00

SERVICE AND DISTRIBUTION EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

A Specification Section 26 24 16 describes electrical distribution equipment such as switchboards, panelboards, motor control, transformers, and similar equipment. This section describes general requirements pertaining to the distribution system and all equipment specified in Specification Section 26 24 16.

B Fuses, safety switches, and individually enclosed circuit breakers are specified in other Sections.

1.02 UNIFORMITY

A All switchboards, motor control centers, circuit breakers, panelboards, and other items of distribution equipment furnished under this specification shall be of the same manufacture except as otherwise noted.

1.03 STANDARDS

A All material shall be listed and labeled by Underwriters Laboratories, Inc., where such listing is available for that class of equipment.

1.04 LOCKS

A All locks for switchboards, power panels, branch circuit panels, and other distribution equipment doors shall be keyed identical.

1.05 SYSTEM CHARACTERISTICS

A The service voltage is 240/120 volts, 1–phase, 3–wire, with grounded neutral.

1.06 POWER COMPANY COORDINATION AND SCHEDULING

A Field coordinate new secondary service installation and any required utility outages with the power company.

B Verify and comply with utility company requirements for installation of services of this type and install equipment furnished by the utility company for mounting by the Contractor.

C The Power Company will provide revenue metering equipment.

1.07 FAULT CURRENT

A Equipment fault current ratings (SCCR) indicated on the drawings, or specified herein, shall be the minimum rating of the equipment, including device interrupting ratings and bracing.

B UL Tested and Recognized Series-connected Combination Component Ratings are not acceptable; all equipment shall be fully rated as indicated on the drawings.

1.08 ARC FLASH HAZARD LABELS

A All switchboards, motor control centers, individually enclosed circuit breakers, panelboards, and other items of distribution equipment furnished under this specification shall be labeled with the appropriate Arc Flash Hazard Labels required by the NEC.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A Acceptable equipment manufacturers are listed within Specification Section 26 24 16.

END OF SECTION 26 20 00

SECTION 26 20 01

DISTRIBUTION EQUIPMENT TESTING

PART 1 - GENERAL

1.01 DISTRIBUTION EQUIPMENT TESTING

A. All costs incurred for testing shall be included under Division 26 00 00.

B. Description of Tests:

1. Preliminary Inspections and Tests: Visual inspections of electrical equipment, wire checks of factory wiring and any other preliminary work required to prevent delays during performance of electrical acceptance tests.
2. Electrical Acceptance Tests: Those inspections and tests required to show that the workmanship, methods, inspections, and materials used in erection and installation of the electrical equipment conforms to accepted engineering practices, IEEE, ICEA and NEMA Standards, the National Electrical Code, National Electric Testing Association (NETA) specifications, and manufacturer's instructions, and to determine that the equipment involved may be energized for operational use.
3. Operating Tests: Tests performed on electrical equipment, installed under other sections, to show that the electrical equipment will perform the functions for which it was designed.
4. Final Acceptance: Final acceptance of electrical equipment will depend on equipment integrity as determined by the electrical acceptance test, and also depend on complete operational tests.

C. Test and calibrate all new circuit breakers furnished under this contract and "spare" breakers scheduled to be placed into service, prior to acceptance of the building. This requirement shall apply to breakers rated 100 amp and larger.

D. Tests shall be conducted by a NETA certified and approved independent testing company per NETA recommendations and in accordance with NETA Standard Practices

E. In general, tests shall include the following:

1. Determine proper operation of circuit breaker trip devices.
2. Determine trip ratings or settings are correctly adjusted
3. Determine control and interlock devices perform as specified.
4. Determine electrical resistance across contact surfaces in switches, circuit breakers and busway are acceptable.
5. Torque all bolted connections
6. Determine bus bars are properly braced as specified.

F. Contractor shall advise in writing as to when the distribution equipment will be tested so that the Owner's representative may be present to witness this test. At least one week's notice of this test shall be given.

G. At the Contractor's option, a representative of the switchgear manufacturer may be present to witness the test and verify the results.

H. These tests shall not alter the Contractor's guarantee of the equipment. All work and materials found to be in non-compliance shall be replaced and re-tested by the Contractor without additional cost to the Owner.

I. Provide three (3) copies of bound test reports, bound and included in the Closeout Documentation.

END OF SECTION 26 20 01

SECTION 26 24 16

BRANCH CIRCUIT PANELBOARDS

PART 1 - GENERAL

1.01 DESCRIPTION

A This section describes panelboards as scheduled on the Drawings as “Panelboards” and also referred to on the Drawings and in the specification as “panel”.

B Definition: As defined in the National Electrical Code.

1.02 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Provide a schedule of each panelboard demonstrating placement of branch breakers in accordance with the schedules on the Drawings. Circuit numbering shall be indicated and configured as scheduled.

C Dimensioned Drawings of panel can and panel cover detailing construction of hinged front cover. Gutter sizes shall be indicated.

D Provide ratings of each main and branch device, panelboard electrical characteristics, and assembly fault current rating.

1.03 OPERATION AND MAINTENCE MANUALS

A Provide record copy of Submittal Documents.

B Provide maintenance instructions, detailed Drawings, and parts lists.

C Provide manufacturers published recommended procedures for preventative maintenance, repair, and normal operation of the panelboards and all components.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A ABB – General Electric

B Eaton

C Siemens

D Square D

2.02 CONSTRUCTION

A Main lug panels shall be either top or bottom fed and shall not use plug-on lug assemblies for main lugs.

B Panelboards shall be factory assembled with bolt-on breakers.

C Bus shall be plated copper.

D Construction shall be dead front with separately mounted interior trim.

E Branch breakers shall be arranged as scheduled on the Drawings.

F Multi-pole breakers shall be common trip. Tandem breakers shall not be furnished.

G Enclosure shall be galvanized sheet steel. End panelboards shall be blank without knockouts.

H All panels shall have finished door cover trim "hinge-mounted" to box on surface mounted panelboards. Factory paint cover with two coats of standard gray color enamel.

I Provide flush lock and catch. Lock mechanism shall be metal construction.

J Gutter sizes:
1. Manufacturers standard, unless otherwise required.
2. Provide additional 8" gutter width with sheet metal barrier where feeder passes through panel can or is tapped in gutter.

K Provide ground bus bonded to enclosure.

L Where a panelboard is shown to be fed by more than one conductor per phase, an individual lug shall be provided for each conductor.

M Provide circuit breaker mounting hardware where a "space" is scheduled.

N Minimum interrupting rating of main and all breakers shall be the minimum assembly rating as scheduled on the Drawings.

PART 3 - EXECUTION

3.01 GENERAL

A For all flush mounted panelboards provide (6) six ¾" empty conduits stubbed out at top of wall from panel.

B Branch circuit conductors shall be run at right angles to enclosure sides, bundled neatly and laced with nylon Ty-Raps.

C Provide typewritten panel directories indicating location and type of load served by each branch circuit.

D Conductors shall not be spliced within the panelboard enclosure. Branch circuit conductors not long enough to reach the scheduled branch circuit breaker shall be replaced.

E Tighten all factory connections, including breaker mounting hardware prior to energizing panelboard.

F All unused breaker mounting spaces shall be covered or blanked.

G Provide specified nameplate on panel front cover.

3.02 MOUNTING

A Surface mount or flush mount, at locations as indicated on the drawings, at same height to top of trim, generally 6'-6", unless otherwise required by specific site conditions.

B Mount flush panelboards in accurately cut openings, with face of can flush with face of wall.

END OF SECTION 26 24 16

SECTION 26 27 00

MISCELLANEOUS DISTRIBUTION EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A This section describes disconnect switches, separate individually-enclosed circuit breakers, and fuses for other than devices furnished with integral current-limiting fuses, such as fused circuit breakers and motor circuit protectors.

B Spare fuses of all types are included in this section.

C Provide required fuses, including spare fuses, for all fusible equipment furnished under this division.

1.02 NAMEPLATES

A Provide engraved “lamicore” nameplates for all disconnect switches, time clocks, contactors, and individually enclosed circuit breakers, indicating the equipment served. Refer also to Specification Section 26 05 53 Electrical Identification.

1.03 SPARE FUSES

A Provide (3) three spare fuses of each type and rating for all power and control fuses, including current-limiting fuses furnished as an integral part of fused circuit breakers or motor circuit protectors.

1.04 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Required for all equipment specified by this section.

C Circuit breaker submittal shall indicate device ratings, including interrupting capacity, dimensions of enclosure, and wire bending space.

1.05 OPERATION AND MAINTENCE MANUALS

A Provide record copy of all Submittal Documents and assemble as identified in another section.

PART 2 - PRODUCTS

2.01 GENERAL

A All devices shall be UL labeled.

2.02 FUSES

A Manufacturer:

1. Bussman
2. Ferraz-Shawmut
3. Little-Fuse

B Fuses applied on circuits operating at 250 Volts or less shall be 250 Volt rated.

C Fuses applied on circuits operating at 600 Volts or less shall be 600 Volt rated.

D All fuses shall have an interrupting capacity of 200,000 amps, RMS symmetrical, at rated voltage.

E Fuses for transformer feeders and motor branch circuits shall be dual-element time delay, current-limiting, Class J for 600 Amp and smaller, Class L for larger than 600 Amp.

F Fuses for feeders, control circuits, and other loads shall be fast acting, current limiting, Class J for 600 Amp and smaller, Class L. for larger than 600 Amp.

2.03 DISCONNECT SWITCH (SAFETY SWITCH)

A Manufacturer:

1. ABB – General Electric
2. Eaton
3. Siemens
4. Square D

B Shall be of the fusible or non-fusible type, as indicated on the Drawings.

C Shall be heavy duty, quick-make, quick-break, HP rated, hinged cover dual interlocked with switch handle and with external interlock defeat mechanism, with provision for handle and door padlocking.

D In dry locations shall be Type NEMA 1 enclosed.

E In damp locations, or outdoors, shall be Type NEMA-3R, enclosed, except where the applied use requires an alternate Type NEMA enclosure rating.

2.04 DOUBLE-THROW DISCONNECT SWITCH

A Manufacturer:

1. G.E.
2. Eaton
3. Siemens
4. Square D

B Shall be of the fusible or non-fusible type, as indicated on the Drawings.

C Shall be heavy duty, quick-make, quick-break, HP rated, hinged cover dual interlocked with switch handle and with external interlock defeat mechanism, with provision for handle and door padlocking.

D Switch handle shall have padlocking provisions in all (3) switch positions and external interlock defeat mechanism.

E In dry locations shall be Type NEMA 1 enclosed.

F In damp locations, or outdoors, shall be Type NEMA-3R, enclosed, except where the applied use requires an alternate Type NEMA enclosure rating.

G Provide separate ground bus. Provide insulated neutral bus where the scheduled feeder contains a neutral conductor.

H Provide lugs sized for actual feeder conductors where standard factory lugs are not suitable.

2.05 INDIVIDUALLY ENCLOSED CIRCUIT BREAKERS

A Manufacturer:

1. G.E.
2. Eaton
3. Siemens
4. Square D

B Breakers shall be of appropriate frame size for the indicated trip setting, and rated for the applied circuit voltage. Fault current interrupting rating of each breaker shall be as noted on the Drawings, minimum 42,000 A.I.C.R.

C Installed in dry locations: NEMA-1, enclosed.

D Installed in damp locations or outdoors: NEMA-3R enclosed, except where the applied use requires an alternate rating.

2.06 COMBINATION TIME SWITCH/PHOTOCONTROL

A Two-channel digital time switch with 30A SPDT contacts, capable of 20 set points, automatic Daylight Savings Time and Leap Year compensation, and LCD display.

B Unit shall have astronomic option with offset up to 4 hours and 59 minutes, before or after sunrise.

C Real time clock shall be retained by super capacitor for 100 hours.

D Unit shall be capable of manual override ON or OFF either to next scheduled event or permanently.

E Provide electronic light sensor which can be mounted up to 1000 feet from the controller.

2.07 TIME SWITCH

A Two-channel digital time switch with 30A SPDT contacts, capable of 20 set points, automatic Daylight Savings Time and Leap Year compensation, and LCD display.

B Unit shall have astronomic option with offset up to 4 hours and 59 minutes, before or after sunrise.

C Real time clock shall be retained by super capacitor for 100 hours.

D Unit shall be capable of manual override ON or OFF either to next scheduled event or permanently.

2.08 LIGHTING CONTACTORS

A Mechanically held, multi-pole, minimum of (1) one spare pole space. Contacts shall be field convertible with N.O. and N.C. indicators.

B Ratings: 30 Amp fluorescent lighting; 20 Amp tungsten lighting.

C Enclosure: Type NEMA 1, except where the applied use requires an alternate rating.

2.09 SURGE PROTECTION DEVICES

A Provide integral Surge Protection Device rated at 100kA per mode, 7-mode type.

B SPD units and all components shall be designed, manufactured, and tested in accordance with the latest applicable UL standard (ANSI/UL 1449 3rd Edition).

C SPD units shall be covered by a 5-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon Substantial Completion.

PART 3 - EXECUTION

3.01 INSTALLATION

A Mount disconnects on building structural elements, or on auxiliary framing, with top at 6’-0” A.F.F. where allowed by surrounding conditions.

B Devices shall not be supported from, or mounted to, equipment of other trades unless approved in writing by the manufacturer of that equipment.

C Raceways connecting NEMA-3R enclosed devices shall be installed in such a manner as to prevent the entry of water. Raceways shall enter only the bottom of the enclosure.

D Provide engraved lamicore nameplate for each disconnect and separately enclosed breaker. Nameplates shall state source of circuit, load served, circuit number, voltage, and phase. Refer to Section 26 05 53, Electrical Identification.

E Provide disconnect switches for all motors, HVAC, plumbing equipment, and other electrically operated equipment where not connected by cord and plug, unless fed from a motor control center located in the immediate area of the motor. Disconnect switches shall be fused where equipment manufacturers electrical data label plate states “Maximum Fuse Size”, or similar wording.

F Mount individual line voltage photoelectric controls on suitable weatherproof box, or suitable cast conduit fitting, in the directional orientation as recommended by the manufacturer. Adjust sensor window for suitable operation at dusk and at dawn.

G Install SPD units in accordance with Manufacturer’s written instructions, as indicated on the Drawings and as specified herein.

H Conductors from the power source to the SPD shall be routed without sharp bends and straight and short as possible. The absolute maximum conductor length shall be 3’-0”.

END OF SECTION 26 27 00

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 SCOPE

A This section describes wall switches, occupancy sensors, receptacles, faceplates, and other wiring devices.

B Outlet boxes are specified in another section.

1.02 STANDARDS

A All devices shall be UL labeled.

B All devices shall meet applicable NEMA wiring device standards.

C All special-purpose receptacles shall be NEMA Standard configuration.

1.03 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Submit manufacturer catalog cut sheets of wiring devices specified in this section.

1.04 OPERATION AND MAINTENANCE MANUAL

A Provide record copy of device submittal incorporated into the Project O&M Manuals.

PART 2 - PRODUCTS

2.01 MANUFACTURE

A Switches, receptacles, plates:

1. Arrow-Hart
2. Bryant
3. Hubbell
4. P&S/Legrand

B Occupancy Sensors

1. Wall Mounted: dual technology with passive infrared and ultrasonic or microphonics sensors; suitable for single or multi-gang mounting in standard depth wall box.
2. Ceiling Mounted: dual technology with passive infrared and ultrasonic or microphonics sensors, suitable for mounting at ceiling height in suitable outlet box.
3. Manufacturer: Cooper: Greengate or equivalent by The Watt Stopper, Inc. or Sensorswitch. Additional manufacturers shall be by prior approval.
4. Device types and manufacturer series numbers on the Drawings are based on Cooper: Greengate.

2.02 DESCRIPTION

A The color of all devices mounted in finished interior spaces shall be as selected by the Architect.

B Switches, receptacles:

1. Standard wall toggle switches for lighting circuits shall be heavy-duty, 277-volt, 20 Amp, AC only, nylon, quiet type, with ground bonding screw terminal, Hubbell #HBL1221 Series, back wired using screw and clamp.
2. Special purpose switches, such as 3-way, double-pole, and 4-way switches shall be similar construction.
3. Duplex receptacles shall be heavy-duty, 125-volt, 20 Amp, 3-wire grounding, nylon face, with self-grounding attachment, with ground bonding screw terminal, Hubbell #HBL5362 Series, back wired using screw and clamp.
4. Individual duplex receptacles on separate 20 Amp circuits shall be rated 20 Amp.
5. Special purpose receptacles shall be of NEMA type indicated, heavy-duty, with nylon face where available.
6. Wall toggle switches mounted adjacent to wall box dimmers shall be of the same manufacture and appearance as the wall box dimmer.
7. G.F.C.I. Type receptacles shall be rated 20 Amp, Hubbell #GF5362 Series.

C Device plates/covers for interior application:

1. Finished Room Areas: Jumbo type, material and finish as selected by Architect.
2. Utility and Mechanical Room Areas: Jumbo type, stainless steel cover.

D Device plates/covers for exterior exposed outlets:

1. Weatherproof, heavy-duty cast aluminum, “in-use” type where required by the location to be applied, Hubbell #WPxxx Series, or cast iron for FS/FD box mounting.
2. Weatherproof receptacle covers shall be suitable for the specific application.

PART 3 - EXECUTION

3.01 GENERAL

A Refer to Specification Section 26 05 34 Boxes for outlet box requirements.

B All devices shall be installed in appropriate boxes designed for the purpose, in accordance with manufacturer’s directions.

C Adjacent outlets of any type, including dimmers and fan speed controls, shall be installed in multi-gang boxes with a single multi-gang faceplate.

3.02 INSTALLATION

A Locations, unless otherwise required by local codes or noted on the Drawings (dimensions in center):

1. Switches: 48 in. above finished floor, 4 in. from doorjamb on strike side of door.
2. Receptacles: 1 ft. 6 in. above finished floor, except where indicated above a countertop.
3. Telephone and data outlets: 1 ft. 6 in. above finished floor, except where indicated above a countertop.

B Grounding: Provide AWG 12, green color, insulated copper ground bonding jumpers for all switches and receptacles, bonded to the grounding screw provision within the box with separate grounding screw or lug.

C Device Labeling (applies to branch circuit devices wiring outlets under this section):

1. Provide adhesive backed label on each wall switch and receptacle device outlet coverplate indicating panelboard served from and circuit number (i.e.: LPA-6).
2. Labels shall be made on 3/8" or ½" inch stock, black color letters with clear background.
3. Label system shall be Brother "P-Touch" System or equivalent.
4. Labels shall not be applied until final touch-up painting is complete and covers are permanently mounted.

END OF SECTION 26 27 26

SECTION 26 50 00

LUMINAIRES

PART 1 - GENERAL

1.01 SCOPE

A. Interior lighting fixtures, lamps, ballasts, and drivers.

B. Emergency lighting units.

C. Exit signs.

D. Lighting fixture supports.

E. Retrofit kits for fluorescent lighting fixtures.

1.02 STANDARDS

A. ANSI/NFPA 70, National Electrical Code

B. IESNA LM-79, Electrical and Photometric Measurement of Solid-State Lighting Products

C. IESNA LM-80, Approved Method of Measuring Lumen Maintenance of LED Light Sources

D. IESNA TM-21, Luminaire Classification System for Indoor Luminaires

E. UL1598, Standard for Safety of Luminaires

F. All material shall bear the label of the Underwriters Laboratories, Inc.

1.03 VOLTAGE

A. Fixture voltage is indicated by circuit in which it is connected. Contractor shall determine fixture voltage from Drawings.

1.04 CEILING INTERFACE

A. Specific catalog numbers shown for fixtures do not necessarily describe all mounting hardware or accessories required for a particular installation. Determine ceiling types from the finish schedule specified under another division, and furnish all required materials for a complete and proper installation. Provide plaster frames for wet plaster or stucco ceilings.

1.05 COORDINATION

A. Provide other trades with a schedule of the outside dimensions of each type of recessed fixture when Submittal Documents have been approved. Examine applicable plans and shop Drawings describing the work of other trades for possible conflicts in the clearances required for installation. The Architect shall be notified prior to fabrication of any material of any conflict that cannot be resolved at no cost to the Owner by normal jobsite coordination between trades.

1.06 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Furnish a bill of material cover sheet and original data sheet, combined into binder, describing each fixture type. If a catalog page describes more than one fixture, the page shall be appropriately marked identifying the exact item being submitted. Photometric data shall be submitted for each fixture type that has a reflector or lens for directing the light output. Drawings larger than 8 ½ x 14 shall be submitted in 8 ½ x 11 envelopes bound into the submittal brochure.

C. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

D. Copy of Solid-State Ballast warranty.

E. Copy of driver warranty.

F. Point by point plot on a scaled drawing to indicate the foot-candle performance of all exterior fixtures.

G. A tabulation of all lamps to be utilized in each fixture.

H. Where equivalent manufacturers for lighting fixtures are not indicated or scheduled, one manufacturer and model number is listed as "Design Standard" on the fixture schedule. The intent is to define the appearance, style, function, performance, and level of quality deemed necessary by the Architect as well as to define the standard used by the Architect as the basis of the design described by the Drawings and specifications. Light fixtures equal in the appearance, style, function, performance, and level of quality as manufactured by other than the "Design Standard" manufacturer may be proposed by the Contractor in accordance with specification section 01 63 00. The proposed material will be evaluated by the Architect and determination of equality with the "Design Standard" will not be unreasonably withheld. To assist in this determination, the Contractor shall submit detailed photometric and power density calculations for each space that the proposed alternate fixture will be utilized. If the alternate manufacturer or model is determined by the Architect to not be equal to the "Design Standard" in a parameter whose acceptance would not be in the best interest of the Owner, the alternate fixture will be rejected. The Contractor may then submit, at no additional cost to the Owner, another alternate fixture or the fixture scheduled as the "Design Standard" for review by the Architect. Alternate material furnished shall comply with all requirements of the material specification, shall be, as determined by the Architect, equal in form and performance to the "Design Standard" and shall be dimensionally identical to the design standard where features are visible or where the work of other trades is affected. Determination of equality shall remain solely with the Architect and his decision shall be final.

1.07 OPERATING and MAINTENANCE MANUAL

A. Provide record copy of Submittal Documents.

B. Provide tabulation of lamp type furnished for each fixture type.

C. Bind all information together with other Division 26 manuals.

1.08 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Luminaires shall be fully assembled and individually electrically tested prior to shipment.

D. Manufacturers of LED luminaires shall demonstrate a suitable testing program to ensure system reliability and to substantiate lifetime claims.

E. The sole use of IESNA LM-80 data to predict luminaire lifetime is not acceptable.

F. Luminaires shall be provided with a minimum 5-year warranty covering, LEDs, drivers and paint finish.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

D. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

E. Metal Parts: Free of burrs and sharp corners and edges.

F. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. All lamps of any one type shall be of the same manufacturer.

I. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least [0.125 inch (3.175 mm)] minimum unless otherwise indicated.
   b. UV stabilized.

2. Glass: Annealed crystal glass unless otherwise indicated.

2.02 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. General Requirements for Electronic Ballasts:

1. Comply with UL 935 and with ANSI C82.11.
2. Designed for type and quantity of lamps served.
3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.

4. Sound Rating: Class “A”
5. Total Harmonic Distortion Rating: Less than 10 percent.
6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
7. Power Factor: 0.95 or higher.
8. UL, CBM, & ETL listed.
9. Suitable for continuous operation in fixtures where used.
10. Warranty by ballast manufacturer to fixture end user: minimum 2 years non-prorated.
11. Ballast shall have an RFI filter on line input and shall comply with FCC Part 18 and NEMA requirements limiting EMI and RFI and shall not interfere with the operation of other normal electrical equipment.
12. Design standard: Triad Ballastar.
13. Acceptable manufacturers: Advance, Valmont, Osram/Sylvania, General Electric/Motorola.

B. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.

C. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.

1. Ballast Manufacturer Certification: Indicated by label.

D. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

2.03 BALLAST FOR COMPACT FLUORESCENT LAMPS

A. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: Class A.
4. Total Harmonic Distortion Rating: Less than 10 percent.
5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher unless otherwise indicated.
9. Power Factor: 0.95or higher.
10. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.

2.04 BALLAST FOR HID LAMPS

A. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 22 deg F (Minus 30 deg C) for single-lamp ballasts.
3. Rated Ambient Operating Temperature: 104 deg F (40 deg C).
4. Open-circuit operation that will not reduce average life.

5. Open-circuit operation that will not reduce average life
6. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.
7. UL listed.
8. Type as noted by fixture type.
9. Rated to operate at voltages within ±10% of nominal.
10. Provide with individual fuse for each ungrounded input conductor. Fuse size as recommended by ballast manufacturer.

2.05 DRIVERS FOR LED FIXTURES

A. Electronic Driver for LED Fixtures: Comply with UL 1310 Class 2 requirements for dry and damp locations. Include the following features unless otherwise indicated:

1. Rated for 50,000 hours of life, unless otherwise noted.
2. Sound Rating: Class A.
3. Total Harmonic Distortion Rating: 15 percent or less.
4. Current Crest Factor: 1.5 or less.
5. 0-10V Dimming Standard (Step Dimming does not qualify).

2.06 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

a. Battery: Sealed, maintenance-free, nickel-cadmium type – unless noted otherwise.
b. Charger: Fully automatic, solid-state type with sealed transfer relay.
c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

2.07 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type – unless noted otherwise.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.
3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

2.08 EMERGENCY BATTERY BALLAST

A. Emergency lighting shall be provided by using a standard fluorescent fixture equipped with emergency ballast. This emergency ballast shall consist of a field-replaceable, high-temperature, maintenance-free nickel-cadmium battery, charger and electronic circuitry contained in one metal case with a 2' length of flexible conduit.

B. A solid-state charging indicator light to monitor the charger and battery, single-pole test switch and installation hardware shall be provided.

C. The emergency ballast shall be capable of operating all fluorescent lamps within the fixture at the minimum lumens initial output listed below for a minimum of 90 minutes:

1. 1 Linear fluorescent lamp a minimum of 2250 to 3000 lumens.
2. 2 Linear fluorescent lamps a minimum of 1375 to 1500 lumens per lamp.
3. 3 Linear fluorescent lamps a minimum of 1083 to 1133 lumens per lamp.
4. 1 Compact fluorescent lamp a minimum of 350 to 750 lumens.
5. 2 Compact fluorescent lamps a minimum of 212 lumens to 375 lumens per lamp.

D. The emergency ballast shall be suitable for indoor locations.

E. The emergency ballast shall have 8 Watts maximum of input power and a 57.6 Watt-hour battery capacity and shall exceed emergency standards set forth by the current NEC.

F. The emergency ballast shall be U.L. listed for installation on top of or remote from the fixture and shall be warranted for a full five years from date of purchase.

2.09 FLUORESCENT LAMPS

A. Linear Fluorescent Lamps:

1. T8 rapid-start lamps as scheduled, CRI 80 (minimum), color temperature 3500° K and average rated life 20,000 hours unless otherwise indicated.
2. T5 rapid-start lamps as scheduled, CRI 80 (minimum), color temperature 3500° K and average rated life 20,000 hours unless otherwise indicated.
3. Install clear lamp protection sleeves on linear T8 fluorescent lamps mounted in turret type industrial fixtures.
4. Acceptable manufacturers: GE, Osram/Sylvania, Philips.

B. Compact Fluorescent Lamps:

1. 4-Pin, CRI 80 (minimum), color temperature 3500°K, average rated life of 10,000 hours at three hours operation per start, and suitable for use with dimming ballasts – unless otherwise indicated.
2. Acceptable manufacturers: GE, Osram/Sylvania, Philips

2.10 HID LAMPS

A. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), color temperature 1900 K, and average rated life of 24,000 hours, minimum.

B. Metal-Halide Lamps: ANSI C78.43, with minimum CRI 65, and color temperature 4000° K – unless noted otherwise.

C. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature 4000 K – unless noted otherwise.

D. Acceptable manufacturers: GE, Osram/Sylvania, Philips.

2.11 LED FIXTURES

A. Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

B. Include the following features unless otherwise indicated:

1. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).
2. Each luminaire shall be rated for a minimum operational life of 50,000 hours utilizing a minimum ambient temperature of (25°C).
3. Light Emitting Diodes tested under LM-80 Standards for a minimum of 12,000 hours.
4. Color Rendering Index (CRI) of 82 at a minimum.
5. Color temperature 3500°K, unless otherwise indicated.
6. Rated lumen maintenance at 70% lumen output for 50,000 hours, unless otherwise indicated.
7. Fixture efficacy of 60 Lumens/Watt, minimum.
8. 5-year luminaire warranty, minimum.
9. Photometry must comply with IESNA LM-79.
10. Luminaire shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.

C. Technical Requirements

1. Luminaire shall be constructed such that LED modules may be replaced or repaired without the replacement of the whole fixture.
2. Operation Voltage: The luminaire shall operate from a 50 HZ to 60 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
3. Power Factor: The luminaire shall have a power factor of 0.9 or greater.
4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 15 percent.
5. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.

D. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
2. The LED manufacturer’s maximum thermal pad temperature for the expected life shall not be exceeded.
3. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
4. The luminaire shall have a minimum heat sink surface such that LED manufacturer’s maximum junction temperature is not exceeded at maximum rated ambient temperature.

2.12 TROFFERS

A. Housing

1. All steel parts shall be painted after fabrication with a minimum 90% reflective paint.
2. The housing for a fixture with parabolic louvers shall be a minimum of 5½" deep.
3. The housing for a fixture with lens shall be a minimum of 4½" deep.
4. 3-lamp fixtures with 18-cell parabolic louver shall have two ballast covers for use with multi-level switch control of the inner lamps separate from the outer lamps.

B. Parabolic Louvers

1. The finish shall be silver, semi-specular, and low-iridescent.
2. The louver shall be a minimum 3" deep.
3. The louver shall be hinged and secured to the housing with reversible cam-action latches.

C. Lens

1. The lens shall be a minimum of 1/8" thick, and shall be pattern A-12.
2. The lens frame shall be regressed aluminum, hinged and secured to the housing with reversible cam-action latches.
3. Submit a 4" x 4" sample of lens with submittals.

2.13 RECESSED DOWN LIGHTS

A. Reflector cones shall be one-piece, self-flanged.

2.14 POLES, POLE MOUNTED FIXTURES, BOLLARDS, WALL MOUNTED AREA LIGHTS

A. Fixture and Bollard Finish

1. Powder coating, 5mil minimum thickness
2. Color as selected by Architect

B. Area Lighting Poles:

1. Aluminum square non-tapered pole with finish as scheduled.
2. Constructed of seamless 6063 alloy aluminum tubing with internal vibration damper.
3. With galvanized anchor bolts and hardware.
4. With handhole at base and ground lug accessible through handhole.
5. With anchor bolt cover with finish on all surfaces identical to pole finish.
6. Wind rating: 100 MPH when supporting scheduled fixtures.

C. Provide in-line, waterproof disconnecting fuse holders at each pole at handhole with fuses sized at 300% of ballast line amps.

2.15 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

B. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

C. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steelrod.

D. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

E. Fixtures suspended with aircraft cable

1. The fixture manufacturer shall provide the field adjustable, 1/16", galvanized, steel aircraft cable.
2. Provide cable length as required to mount the fixture at the height shown on the Drawings measured to the top of the fixture.
3. In areas with finished ceiling, the aircraft cable shall be supported with a ¼ - 20 threaded rod anchored in/to the structure and extended ¾" below the finished ceiling.
4. The fixtures shall be supported at a maximum of 8'-0" centers.

2.16 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

A. Ballast and Lamp Change Kit: UL 1598, Type II. Suitable for changing existing ballast, lamps, and sockets.

2.17 FIXTURE TYPES:

A. As scheduled on the Drawings.

B. All downlights shall be by the same manufacturer.

C. All parabolic fluorescent troffers shall be by the same manufacturer.

D. All direct/indirect and indirect suspended fixtures shall be by the same manufacturer.

PART 3 - EXECUTION

3.01 LOCATION

A. The exact location of all fixtures in finished areas shall be as shown on the reflected ceiling plans. If the location shown on the reflected ceiling plan for a fixture differs from the location shown on the electrical plans, the fixture shall be installed as shown on the reflected ceiling plan. In utility and mechanical rooms, the Contractor shall adjust the location and mounting height of the indicated fixtures for best coordination with the work of other trades.

3.02 INSTALLATION

A. Lighting fixtures shall be set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Comply with NFPA 70 for minimum fixture supports.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end

D. Fluorescent fixtures with steel housings shall not be installed in direct contact with concrete structure, but shall be held off of the structure at least ½ inch with approved spacers.

E. All wire run into a fluorescent or HID fixture housing or raceway shall be minimum 90ºC rated, Type THHN/THWN. Wiring run into incandescent fixture housings shall be 150ºC rated, Type SFF, or better.

F. Flexible conduit connections to recessed fixtures shall be six (6) ft. lengths of 3/8-inch steel flex with flex connectors as specified in the "Basic Materials and Methods" section. The flexible connections shall contain stranded conductors, AWG #14 minimum, Type THWN, with a separate grounding conductor bonded securely to the fixture housing.

G. Flexible conduit connections to recessed fixtures located in accessible ceilings shall be installed such that each fixture can be relocated one (1) ceiling tile space in any direction.

3.03 SUPPORTS AND ANCHORS

A. Fixtures shall not be supported from ducts or piping of other trades without the approval of the Architect.

B. Recessed fixtures not designed to lay-in a ceiling grid, and suspended fixtures, shall be supported by a threaded rod dropped from approved channels or brackets transmitting the fixture weight to the building structure. If the fixture is outlet box mounted, the box shall be supported in the same manner.

C. Provide four (4) clips with each lay-in type fixture anchoring the fixture to its supporting grid members.

D. Hardware and unpainted metal used for mounting of exterior fixtures shall electrogalvanized.

3.04 ACCEPTANCE

A. Incandescent fixtures used for construction lighting shall be provided with new lamps prior to final acceptance.

B. Adjust locations of fixtures shown in mechanical equipment rooms to best suit the actual conditions based on final placement of equipment of other trades. Install in a manner and location to obtain optimum illumination.

C. Target and focus adjustable fixtures in the presence of the Architect's Electrical Engineer.

D. Noisy ballasts shall be considered defective and shall be replaced.

E. All fixtures trims shall be free of light leaks as viewed from the occupied space. Suitably seal around trims to eliminate any light leakage around downlight trims and fluorescent fixtures. Louvers and lens shall be clean and free from fingerprints, dust, and physical damage.

F. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

END OF SECTION 26 50 00

SECTION 28 31 00

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A A complete microprocessor controlled analog addressable, intelligent fire detection system. The equipment shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, annunciators, auxiliary control devices, power supplies, wiring and conduit.

1.02 SCOPE

A All of the products described by this section shall be manufactured by a single U.S. manufacturer and furnished by the manufacturer or authorized representative.

B The installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to guide the final checkout and to ensure the system integrity.

C The Drawings are schematic in nature. The manufacturer's listed device spacing requirements and applicable code requirements shall be maintained at all times.

1.03 CODES AND STANDARDS

A The fire alarm system specified in this section shall be in accordance with the National Fire alarm Code (NFPA 72), the National Electrical Code (NFPA 70) and the Life Safety Code (NFPA 101).

B The fire alarm system and installation shall comply with provisions of UL safety standards pertaining to fire alarm systems. All products and components shall be UL listed and/or labeled.

1.04 SUBMITTALS

A General: Submittals shall be in accordance with Specification Section 01 33 00.

B Submittals should include technical product data including specifications and installation instructions for each type of component, control panel elevations, system point-to-point wiring diagrams, termination details, and battery capacity calculations.

C Submittals shall include sufficient information to determine compliance with Drawings and specifications.

D All substitute equipment proposed as equal to the equipment specified herein, shall meet or exceed the following standards. For equipment other than that specified, the Contractor shall supply proof that substitute equipment equals or exceeds the standards of the specified equipment.

E Submit a software copy of all point-to-point wiring diagrams on a CD in 'DXF' or latest AutoCAD version format.

1.05 MANUALS

A Complete operating and maintenance manuals shall be submitted with the shop Drawings.

B Manuals shall include wiring diagrams indicating internal wiring for each component and the interconnections between components.

1.06 DELIVERY, STORAGE AND HANDLING

A Handle fire alarm equipment carefully to prevent damage, breaking, and scoring. Do not install damaged equipment or components.

B Store fire alarm equipment in a clean, dry place. Protect from weather, dirt, water, construction debris, and physical damage.

1.07 QUALITY ASSURANCE

A The vendor of the system shall currently maintain a locally run business for a minimum of five years and shall be an authorized distributor of the supplied equipment with full warranty privileges.

B The vendor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the equipment manufacturer to maintain and service the equipment being supplied. This facility shall be available for inspection by the Architect's Engineer.

C The supplying vendor shall have attended the manufacturer's installation and service school.

D The vendor shall furnish manufacturer's manuals of the completed system including individual specification sheets, schematics, inter-panel and intra-panel wiring diagrams. In addition, all information necessary for the proper operation of the system must be included. Any bidder using other than the specified equipment must provide this information prior to bidding.

E As built Drawings that include any changes to wiring, wiring designations, junction box labeling and any other pertinent information shall be supplied upon completion of Project.

1.08 TRAINING

A Contractor shall make arrangement for training and shall ensure that the manufacturer's authorized representative shall furnish training for a minimum of three of the Owner's designated employees. This instruction shall include two (2) copies of a written, bound summary for future reference.

B The training shall include the following:

1. Training in receipt, handling, and acknowledgement of alarms.
2. Training in system operation including manual control of output functions from the control panel.
3. Training in testing of the system including logging of detector sensitivity, walk test of devices, and response to common troubles.
4. Training in all required periodic maintenance.

C The total training requirement shall be a minimum of 8 hours, but shall be sufficient to cover all items specified.

D The training may be waived, deleted, or reduced in the number of required hours only with the Owner's written approval.

1.09 WARRANTY

A All equipment and devices furnished and all work performed shall be free from defects and shall remain so for a period of at least one year from the date of Substantial Completion.

B Warranty hours shall be from 8 AM to 5 PM, Monday through Friday.

C The Owner shall not be held responsible for the cost of labor and materials required to correct any defect during this one-year period.

D The Owner shall not be held responsible for the cost of materials required to correct defects outside of the warranty hours.

E The fire alarm system vendor shall respond to all service calls within a minimum of 4 hours.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIAL – GENERAL

A All equipment and components shall be new and the manufacturer's current model. The devices, components, appliances and equipment shall be tested and listed by a nationally recognized approval agency for use as part of a protected premise protective signaling system.

B All equipment and components shall be installed in accordance with the manufacturer's recommendations.

2.02 CONDUIT AND WIRE

A Conduit

1. Conduit shall be installed and sized in accordance with the National Electrical Code (NEC), state and local requirements.
2. All wiring shall be installed in conduit or raceway
3. Conduit shall be ½" minimum.

B Wire

1. All fire alarm system wiring shall be new.
2. Wiring shall be in accordance with the NEC, state and local codes and as recommended by the fire alarm system manufacturer. Number and size of conductors shall be as recommended by the system manufacturer, but shall not be less than 18 AWG for initiating device circuits and signaling line circuits, and 14 AWG for notification appliance circuits.
3. All wire and cable shall be listed and approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit, wire and cable shall have a fire resistance rating suitable for the installation as indicated in the NEC. However, wire and cable shall be installed in conduit to the greatest extent possible.

2.03 FIRE ALARM CONTROL PANEL

A. The Fire Alarm Control Panel (FACP) shall be a nominal 24VDC, microprocessor (CPU) based, non-coded, supervised, analog intelligent, addressable, modular system. The FACP shall include a full-featured operator interface.

B. The FACP shall perform the following functions:

5. Supervise and monitor all intelligent addressable detectors and monitor modules for normal, trouble, and alarm conditions.
6. Supervise all initiating, signaling, and notification circuits.
7. Detect the activation of any initiating device and the location of the alarm condition.
8. Operate all notification appliances and auxiliary devices as programmed.

9. Visually and audibly annunciate any trouble, supervisory, or alarm condition on operator's terminals, panel display, and annunciators.

C The FACP shall be able to provide the following features:

1. Block Acknowledge for trouble conditions
2. Automatic Day/Night Sensitivity Adjustment
3. Environmental Drift Compensation
4. Pre-Alarm Indication at FACP
5. Smoke Detector Sensitivity Test
6. System Status Reports
7. Alarm Verification
8. Multiple Printer Interface
9. Multiple CRT Display Interface
10. Automatic Detector Test
11. Upload/Download of System Database
12. One-Man Walk Test
13. Smoke Detector Maintenance Alert
14. Multi-Level Password Entry
15. Device Blink Control

D The Central Processing Unit shall provide the following features:

1. Communicate with and control intelligent detectors, addressable modules, local and remote operator terminals, printers, annunciators, and other system-controlled devices.
2. Communicate with, monitor and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display.
3. Contain and execute all control-by-event (including ANDing, ORing, and NOTing) programs for specific action to be taken if an alarm condition is detected.
4. Provide a real-time clock for time annotation of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.
5. Continuously scan peripheral devices for proper operation.

E The operator's interface shall include the following features:

1. An alphanumeric keypad capable of controlling all system functions, entry of any alphanumeric information, and field programming.
2. An 80-character backlit alphanumeric Liquid Crystal Display that displays, as required, custom labels for all intelligent detectors, addressable modules, and software zones.
3. Five LED's indicating the system status parameters AC Power, System Alarm, System Trouble, Display Trouble, and Signal Silence
4. Operator control switches for Signal Silence, Lamp Test, Reset, System Trouble, and Acknowledge.

F Loop Interface Board

1. Loop Interface Boards shall be provided to monitor and control each of the Signaling Line Circuit (SLC) Loops in the system. The Loop Interface Board shall contain its own microprocessor, and shall be capable of operating in Local Mode in the case of a failure in the Main CPU of the Control Panel. In Local Mode, The Loop Interface Board shall detect alarms and activate output devices on its own SLC loop.
2. The Loop Interface Board shall not require any jumper cuts or address switch settings to initialize SLC Loop operations.

3. The Loop Interface Board shall provide power to, and communicate with, all of the Intelligent/Addressable Detectors and Addressable Modules connected to its SLC Loop over a single pair of wires. This SLC Loop shall be capable of operation as NFPA Style 4, Style 6, or Style 7.
4. The Loop Interface Board shall be able to drive two Style 4 runs of these SLC Loops, each up to 10,000 feet in length, for an effective Loop span of 20,000 feet.
5. The Loop Interface Board shall receive analog information from all Intelligent Detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular detector. The Loop Interface Board software shall include software to automatically adjust and compensate for dust accumulation to maintain detector performance as it is affected by environmental factors. The analog information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
6. The Loop Interface Board shall communicate with each Intelligent/Addressable Detector and Addressable Module on its SLC loop and verify proper device function and status. Communication shall be performed every 6 seconds or less. Average time to detect an alarm shall be 3 seconds (longer for detectors utilizing alarm verification).

G Serial Interface Board

1. The Serial Interface Board shall provide the EIA-232 interface between the Fire Alarm Control Panel and the UL Listed Electronic Data Processing (EDP) Peripherals.
2. The Serial Interface Board shall allow the use of multiple printers, CRT monitors, and other peripherals connected to the EIA-232 ports.
3. The Serial Interface Board shall provide one EIA-485 port for the serial connection of the optional Annunciator and Control Subsystem components.
4. The Serial Interface Board shall have LED's which will show that it is in regular communication with the Annunciators or other EIA485 connected peripheral device.
5. All EIA-232 circuits shall be optically isolated and power limited.

H Field Wiring Terminal Blocks

1. All wiring terminal blocks shall be the plug-in type and have sufficient capacity for 18 to 12 AWG wire. Fixed terminal blocks are not acceptable.

I Field Programming

1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
2. All programming shall be accomplished through the standard FACP keyboard.
3. All field-defined programs shall be stored in non-volatile memory.
4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.
5. The system shall be capable of programming any addressable input or initiating device to operate any single or group of addressable output devices or indicating circuits. Inputs shall be programmable to generate alarm or trouble or no audible alarm.
6. The system shall be programmed with means to bypass the HVAC shutdown feature.
7. The system shall be programmed with means to bypass the door release feature.

2.04 ENCLOSURES

A Control panels shall be housed in UL listed cabinets suitable for surface or semi-flush mounting.

B The backbox and door shall be constructed of 0.060 steel minimum with provisions for conduit connections into the sides and top.

C The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.

D The enclosure shall be modular in structure for ease of installation, maintenance and future expansion.

2.05 PRIMARY POWER SUPPLY

A The main power supply shall operate on 120VAC, 60Hz, and shall provide all necessary power to the FACP.

B It shall provide a battery charger using dual-rate-charging techniques for fast battery recharge. It shall charge up to 55 Amp-hour batteries within a 48-hour period.

C It shall be power-limited and include meters to indicate battery voltage and charging current.

2.06 SECONDARY POWER SUPPLY

A Batteries shall be 12-volt, Gel-Cell type.

B Batteries shall have sufficient capacity to power the fire alarm system for not less than 24 hours of standby plus 10 minutes of alarm upon a normal AC power failure.

C Batteries shall have a 25% capacity safety factor.

D Batteries are to be completely maintenance free.

2.07 SYSTEM COMPONENTS

A Strobe Lights

1. Shall operate on 24 VDC nominal.
2. Shall meet the requirements of the ADA as defined in UL standard 1971 and the following criteria:

    a. The maximum pulse duration shall be 2/10ths of one second with a maximum duty cycle of 40%.
    b. Unless otherwise specified on the Drawings, in corridors the intensity shall be a minimum of 15/75 candela.
    c. Unless otherwise specified on the Drawings, in assembly areas the intensity shall be a minimum of 30 candela.
    d. The flash rate shall be a minimum of 1 Hz and a maximum of 2 Hz.
    e. Wall mounted appliances shall have their bottoms at a height above the finished floor of 80 in. (2m).

3. Visual only devices shall have flush cover plate.
4. Visual devices shall be synchronized per NFPA 72.

B Audible/Visual Combination Devices

1. Shall meet the applicable requirements of Section A listed above for visibility.
2. Shall meet the following criteria for audibility:

a. Audible devices shall have a sound level of not less than 75 dBA at 10 feet (3 m) or more than 120 dBA at the minimum hearing distance.
b. To ensure that signals are clearly heard, audible devices shall have a sound level at least 15 dBA above the ambient sound level.
c. Wall mounted appliances shall have their bottoms at a height above the finished floor of 80 in. (2m).

3. Audible/Visual devices shall have a flush cover plate.
4. Visual devices shall be synchronized per NFPA 72.

C Addressable Manual Stations

1. Addressable Manual Stations shall be provided to connect to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops. Manual stations shall be single action type unless otherwise indicated on the Drawings.
2. The Manual Station shall, on command from the Control Panel, send data to the panel representing the state of the manual switch. Manual Fire Alarm Stations shall use a key operated test-reset lock, and shall be designed so that after actual Emergency Operation, they cannot be restored to normal use except by the use of a key.
3. All operated stations shall have a positive, visual indication of operation that cannot be reset without the use of a key.
4. Manual Stations shall be constructed with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
5. Stations shall be suitable for surface mounting as shown on the plans, or semi flush mounting, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.
6. The Manual Station shall provide address-setting means such as rotary decimal switches or binary dip switches.

D Intelligent Photoelectric Type Smoke Detectors

1. Smoke detectors shall be intelligent and addressable devices, and shall connect with two wires to one of the Fire Alarm Control Panel Signaling Line Circuit loops. Provide photoelectric detectors only where specifically required by the Drawings or specifications.
2. Photoelectric detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
3. The detectors shall be ceiling-mount and shall include a twist-lock base.
4. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself, by activating a magnetic switch, or may be activated remotely on command from the control panel.
5. The detectors shall provide address-setting means on the detector head such as rotary decimal switches or binary dip switches. The detectors shall also store an internal identifying code, which the control panel shall use to identify the type ofdetector.
6. The detectors shall have local indications of alarm and power with an LED. The LED shall flash under normal conditions, indicating the detector is operational and in regular communication with the control panel. The LED may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LED's shall be controlled through the system field program.
7. The detector sensitivity shall be set through the Fire Alarm Control Panel, and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

8. Using software in the FACP, the detectors shall automatically compensate for dust accumulation and other slow environmental changes, which may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72E.

E Duct Smoke Detectors

1. The in-duct smoke detector housing shall accommodate an intelligent photoelectric detector with integral auxiliary contacts.
2. Each in-duct smoke detector shall include air-sampling tubes installed per manufacturer's recommendations and NFPA 72.

F Intelligent Heat Detectors

1. Heat Detectors shall be Intelligent and addressable devices, and shall connect with two wires to one of the Fire Alarm Control Panel Signaling Line Circuits.
2. The detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements.
3. The detectors shall be ceiling-mount and shall include a twist-lock base.
4. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself, by activating a magnetic switch, or initiated remotely on command from the control panel.
5. The detectors shall provide address-setting means on the detector head such as rotary decimal switches or binary dip switches.
6. The detectors shall have local indications of alarm and power with an LED. The LED shall flash under normal conditions, indicating the detector is operational and in regular communication with the control panel. The LED may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LED's shall be controlled through the system field program.
7. An output connection shall also be provided in the base to connect an external remote alarm LED.

G Monitor Module - (ADDRESSABLE INPUT DEVICE)

1. Addressable Monitor modules shall be provided to monitor waterflow, tamper, and pressure switches
2. The Monitor Module shall mount in a 4-inch square, 2-1/8" deep electrical box.
3. The module may be wired for Style D or Style B operation. The Monitor module shall provide address-setting means using rotary decimal switches or binary dip switches and shall also store an internal identifying code, which the Fire Alarm Control Panel shall use to identify the type of device. An LED shall be provided which shall flash under normal conditions, indicating that the Monitor module is operational and in regular communication with the control panel.

H Control Module (ADDRESSABLE OUTPUT DEVICE)

1. Addressable Control Modules shall be provided to supervise and control the operation of the gas furnaces upon alarm.
2. The Control Module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, or to a surface mounted backbox, or directly in the Fire Alarm Control Panel.
3. The Control Module shall provide address-setting means using rotary decimal switches or binary dip switches and shall also store an internal identifying code, which the Control Panel shall use to identify the type of device. An LED shall be

provided which shall flash under normal conditions, indicating that the Control Module is operational and is in regular communication with the Control Panel.

I Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on addressable loops. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit on the addressable loop.
2. If a wire-to-wire short occurs, the isolator module shall automatically open the addressable loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
3. The isolator module shall not require any address-setting, and its operation shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator shall mount in a standard 4" deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

J PIV Supervisory Switches

1. Each Post Indicator Valve (PIV) or main gate valve shall be equipped with a supervisory switch.
2. Mount switch so as not to interfere with the normal operation of the valve. Adjust switch to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
3. The mechanism shall be contained in a weatherproof aluminum housing, which shall provide a 3/4-inch tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.
4. Switch housing to be finished in red baked enamel.
5. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
6. PIV supervisory switches shall be provided and connected under this section.

K Automatic Digital Alarm Communicator Transmitter

1. A dual line, 8 channel Digital Alarm Communicator Transmitter (DACT) shall be provided for transmission of fire alarm, supervisory, and trouble signals to a supervising station.
2. The DACT shall include a secondary power source (battery and charging unit) separate from the FAC secondary source.
3. The following signals shall be reported as applicable:
4. Fire Alarm
5. Fire Alarm Trouble (over 60 seconds)
6. Sprinkler Valve Tamper Supervisory Signal
7. Sprinkler Low Temperature/Air Pressure Supervisory Signal
8. The DACT shall be provided with two dedicated phone lines of the loop start type. Connection to PBX trunk lines or station circuits or to ground start type phone lines is not acceptable.

L Remote Annunciators

1. Remote annunciators shall be supervised, backlit, 80-character alphanumeric LCD displays.

2. The annunciator shall display all alarm, trouble, and supervisory conditions in the system.
3. Each annunciator shall include switches for system acknowledgements, alarm silence, and system reset. These switch inputs shall be capable of being disabled permanently or by a key lockout function on the front plate.
4. Wiring for remote annunciators shall be Style 7.

M High-powered Audible Appliance

1. Shall operate on 24 VDC nominal.
2. Appliance tone shall be a slow whoop pattern.
3. Audible devices installed in mechanical equipment rooms shall maintain a minimum average sound level of 85 dBA.

N Speakers

1. Shall operate on 25 VRMS with field selectable output taps from 0.5 to 2.0W.
2. Speakers in corridors and public spaces shall produce a nominal sound output of 84 dBA at 10 feet (3 m).
3. Frequency response shall be a minimum of 400 Hz to 4000 Hz.

2.08 ACCEPTABLE SYSTEM MANUFACTURER

A Honeywell/Firelite

B Silent Knight

C Edwards

D Notifier

PART 3 - EXECUTION

3.01 INSTALLATION

A Installation shall be in accordance with the NEC, NFPA 72, state and local codes, as shown on the Drawings and as recommended by the equipment manufacturer.

B All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

C All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

D The system shall be equipped with the following protective devices to prevent damage or nuisance alarms by nearby lightning strikes, stray currents, or voltage transients.

1. On AC input: Ditek DTK-120HW or DTK 120/240CM, EFI HWM-120, Leviton OEM-120EFI, Northern Technologies TCS-HW, Transtector ACP100BWN3, or equal UL listed device. Install device at the electrical panelboard and trim excess lead lengths. Wind small coil in the branch circuit conductor just downstream of the suppressor connection. Coil shall be 5 to 10 turns of about 1” diameter and tie-wrapped.

2. On DC circuits extending outside building: Near the point of entry to the building, provide suppressors equal to Simplex 2081-9027 and 2081-9028, Transtector TSP8601, Ditek DTKxLVL series, Citel America B280-24V, Northern Technologies DLP-42.

E Monitor, control, isolation, and other auxiliary control devices shall be located at a height not to exceed 6' above finished floor where possible.

F All addressable loop circuits shall have a minimum of 20% spare capacity for future use.

G Isolation modules shall be installed for each circuit extending outside the building, in or immediately adjacent to the FACP at each end of the addressable loop circuit, and after each T-tap serving five (5) or more addressable devices.

H There shall be no splices in the system other than at terminal blocks. Wire nuts and crimp splices are not acceptable.

I All devices and appliances shall be clearly identified by addressable loop name, floor, device type and device number as shown on Drawings.

J High-powered audible devices shall be installed in mechanical equipment rooms and other areas with high ambient noise levels.

3.02 GENERAL OPERATION

A When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED shall flash.
2. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
3. The 80-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
4. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

B When a trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

1. The system trouble LED shall flash.
2. A local piezo-electric audible device in the control panel shall sound a distinctive signal.
3. The 80-character LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
4. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

C When a supervisory condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

1. The system supervisory LED shall flash.
2. A local piezo-electric audible device in the control panel shall sound a distinctive signal.

3. The 80-character LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
4. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

D Acknowledge Switch

1. Activation of the control panel acknowledge switch in response to a single new alarm and/or trouble condition shall silence the local piezo electric signal and change the system alarm or trouble LED from flashing mode to steady-ON mode. If additional alarm or trouble conditions exist or are detected and reported in the system, depression of this switch shall acknowledge and/or advance the LCD display to the next alarm or trouble condition.
2. Depression of the acknowledge switch shall silence all remote annunciator piezo sounders.

E Signal Silence Switch

1. Activation of the signal silence switch shall cause all notification appliances and relays which are programmed to do so to return to their normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards.

F System Reset Switch

1. Activation of the system reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
2. If the alarm condition(s) still exist, or if they reoccur in the system after system reset switch activation, the system shall then re-sound the alarm condition(s).

G System Test Switch

1. Activation of the system test switch shall initiate the automatic test of all Analog/Addressable detectors in the system. The system test switch shall activate the electronics in each sensor, simulating an alarm condition and causing the transmission of the alarm condition from that sensor to the fire alarm control panel. The fire alarm control panel shall interpret the data from each sensor installed in the system. A report summarizing the results of this test shall be displayed automatically on the control panel's LCD and printer. This report shall display the number of detectors tested per addressable loop, the total number tested in the system, any detector that failed, or an all "Tested OK" message. Also included shall be a time/date stamp of when the test was performed.

H Lamp Test Switch

1. Activation of the lamp test switch shall sequentially turn on all LED indicators, LCD and local piezo electric signal, and then automatically return the fire alarm control panel to the previous condition.

3.03 INSTALLATION

A Conductor insulation colors used in the fire alarm system shall be as follows:

1. SMOKE DETECTORS Yellow and Blue

2.	PULL STATIONS	Orange and Brown
3.	24 V.D.C.	Red and Black
4.	DUCT DETECTORS	Yellow and Blue
5.	HEAT DETECTORS	Gray and Violet
6.	120 V.A.C.	Black and White
7.	GROUND	Green
8.	FLOW SWITCH	Orange and Brown
9.	TAMPER SWITCH	Gray and Violet
10.	SHIELDED SIGNAL CABLE conductors	Red and Black
11.	SHIELDED AUDIO CABLE conductors	Black and White

B Fire alarm system circuits shall be installed in EMT with metallic boxes or another raceway as specified herein.

C Door holder and electric locks shall be 24 V.D.C.

D Duct detectors shall reset directly from the transponders' monitor card.

E Each duct detector shall be equipped with a remote indicator at the entrance to the zone served.

F All annunciator and fire alarm panelboards shall identify zones by area name not number, e.g., basement, first floor, elevator, etc.

G Sprinkler valve supervisory switches shall be connected to initiate a rouble condition. Water flow alarm switches shall be connected to initiate an alarm condition. Tamper and water flow switches shall be connected to separate zones.

H Dedicated branch circuits shall provide primary power to the fire alarm control panel and remote power supplies.

I Dedicated branch circuit(s) and connections shall be mechanically protected.

J Cicuit disconnecting means shall have a red marking shall be accessible only to authorized personnel, and shall be identified as “FIRE ALARM CIRCUIT.”

K The location of the circuit disconnecting means shall be permanently identified as the fire alarm control unit.

3.04 ACCEPTANCE TESTS

A Provide the service of a competent, factory-trained engineer or technician authorized by the system manufacturer to technically supervise and participate during all of the adjustments and tests of the system.

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
3. Verify activation of all flow switches.
4. Open initiating device circuits, signaling line circuits, and notification appliance circuits to verify that the trouble signal activates.
5. Ground initiating device circuits, signaling line circuits, and notification appliance circuits to verify response of trouble signals.
6. Check alert tone and prerecorded voice message to all alarm notification appliances.
7. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.

8. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

3.05 SPARE PARTS

A Provide the following spare parts with the system, each individually packaged and labeled.

1. Fuses – 2 of each size used in system
2. Manual Stations – 1% of installed quantity.
3. Visual and Combination Notification Appliances – 2% of installed quantity.
4. Detectors and Bases – 2% of installed quantity.

B Increase decimal quantities of spare parts to the next higher whole number.

END OF SECTION 28 31 00

SECTION 31 22 00

GRADING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. This Section covers excavation, fill, disposal of surplus earth and debris and finished grading. Also included are wrecking, demolition and removal of on-grade or below-grade obstructions.

B. Related Work Specified Elsewhere:
   1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
   2. Excavating, filling and backfilling for building construction is covered in Section 31 23 00, EXCAVATION AND FILL.
   3. Granular fill is covered in Section 31 23 00, EXCAVATING AND FILL.
   4. Erosion, sedimentation and pollution control measures is covered in Section 31 25 00, EROSION AND SEDIMENTATION CONTROL.

1.2 QUALITY ASSURANCE

A. Workmanship.
   1. Perform all Work in accordance with requirements of the Drawings and Specifications and in a manner which will insure reasonable accuracy in preserving lines and levels shown.

B. Tests:
   1. Sufficient tests to ascertain that the specified density is being obtained, throughout the fill and backfill, will be made by a geotechnical engineer selected by the Owner and paid by the Owner.

C. Observations & Instruction
   1. Removal of unsuitable material shall be made at the direction and under the observation of the Geotechnical Engineer.

D. Conform to applicable Local, State and Federal (OSHA) rules and regulations.

E. A Georgia Registered Land Surveyor will lay out all work and survey and maintain all property lines and bench marks throughout construction.

1.3 SUBMITTALS

A. Contractor shall submit a detailed time schedule of all earthwork operations to the Architect/Geotechnical Engineer for review prior to commencing work.

B. Any deviations from earthwork design concept shall be represented by the submittal of detailed engineered shop drawings which clearly illustrate the intent and scope of said deviation(s) for review and approval prior to proceeding with same.

1.4 NOTIFICATION

A. Contractor shall notify Architect and Geotechnical Engineer 24 hours prior to commencing grading, excavation, land clearing and removal operations.

B. Contractor shall notify all utilities in ample time for necessary measures to be taken to prevent interruption of service when utility lines which are to be removed, relocated and/or severed are encountered.

1.5 JOB CONDITIONS

A. Subsurface Soil Data.
   1. Soil borings for design purposes have been made at the sites. The Geotechnical Investigation Reports are provided at Division 02 for the Contractor's information. The depth of the water table at the time the borings were made is shown on the log. The Contractor shall examine the site and the record of the exploration and shall decide for himself the character of the materials to be encountered.

B. Contractor shall survey and establish all property lines, property monumentation, clearing boundaries, and existing grades and lay out grade stakes for structures and appurtenances. If existing grades are at variance with Drawings, Contractor shall promptly notify Architect and receive instructions prior to proceeding further with the Work. Contractor shall be fully responsible for conditions resulting from his failure to do so. Contractor shall utilize a Registered Land Surveyor currently registered to practice land surveying in the State of Georgia.

C. Contractor, upon becoming aware of subsurface or latent physically changed conditions differing from those disclosed by the subsurface investigations, shall promptly notify Owner and the Architect verbally to permit verification of the conditions, and follow immediately in writing to describe the nature and extent of the differing conditions. No claim by Contractor for any conditions differing from those anticipated in the Drawings and Specifications and disclosed by the subsurface investigation shall be allowed, unless Contractor has so notified Owner, verbally and in writing, as required above, of such changed conditions.

D. Contractor is solely responsible for all earth quantities and to render the finished grade elevations of the Project as indicated on the Drawings. Any exportation (i.e. “haul off”) of “excess” soil materials regardless of its composition; or importation (i.e. “haul in”) of suitable soil, as defined in Part 2, to achieve final design grade shall be included in the Contract Sum unless provided for otherwise in these Specifications or as otherwise directed by Owner’s Representative.

E. Environmental Requirements:
   1. Burning. No burning of waste from clearing or grubbing will be permitted.
   2. Newly Graded Areas. Take every precaution and temporary measure necessary, such as temporary seeding, to prevent damage from erosion of freshly graded areas. Repair any settlement or washing that may occur prior to acceptance of the Work and re-establish the grades to the required elevations and slopes at no additional cost to the Owner. This shall apply to damage to the newly graded areas within the construction limits and damage to adjacent properties by eroded materials.
   3. Any underground utilities found to exist within the earthwork and not shown on the drawings shall be removed and/or relocated in accordance with the GENERAL REQUIREMENTS.

F. Utility Location:
   1. Notify all utility companies by calling the Utility Protection Center at 811 in ample time for necessary measures to be taken to prevent interruption of service when utility lines which are to be removed are encountered.
   2. Move, relocate, reroute any and all said utilities, poles, guys, appliances or appurtenances as required or coordinate said relocation as part of the base bid.

G. Protection:
   1. Trees.
      a. General Protection. The Contractor shall be responsible for the protection of tops, trunks and roots of existing trees on project site that are to remain. Box, fence or protect existing trees subject to construction damage before any work is started, remove boxing when directed. Do not permit heavy equipment or stockpiles within branch spread. Remove interfering branches without injury to trunks and cover scars with tree paint.
      b. Grading Around Trees. Where excavating, fill or grading is required within the branch spread of trees that are to remain, the Work shall be performed as follows:
         (1) Trenching. When trenching occurs around trees to remain, do not cut the tree roots but tunnel the trench under or around the roots by careful hand digging and without injury to the roots.
         (2) Raising Grades. When the existing grade at tree is below the new finished grade, and fill not exceeding 6 inches (150 mm) is required, place clean washed gravel graded from 1 to 2 inch (25 to 50 mm) size directly around the tree trunk. The gravel shall extend out from trunk on all sides a minimum of 18 inches (450 mm) and finish approximately 2 inches (52 mm) above the finished grade at tree. Install gravel before any earth fill is placed. New earth fill shall not be left in contact with the trunks of any trees requiring fill.
         (3) Trees marked for preservation that are buried in fills over 6 inches (150 mm) deep shall have an open dry well of durable masonry (without mortar) situated at least 12 inches (300 mm) from the tree trunk. Drain all wells properly. Before fills of over 6 inches (150 mm) are made upon the tree root areas, spread at least a 6 inch (150 mm) layer of broken stone or coarse gravel covered by inverted sods to facilitate proper drainage and aeration.
         (4) Lowering Grades. Under the drip-line of existing trees in areas where the new finished grade is to be lowered, regrading Work shall be done by hand to elevation as indicated. Cut roots as required cleanly 3 inches (75 mm) below finished grade and cover scars with tree paint.
         (5) Trees marked for preservation that are located more than 6 inches (150 mm) above proposed grades shall stand on broad rounded mounds and be graded smoothly into the lower level. Cut exposed or broken roots clean and cover with topsoil.
      c. Tree Surgery: Before the building is occupied, trim of all dead and diseased limbs of existing trees. All cuts shall be made close to the trunk and shall be covered with an acceptable tree paint manufactured for this specific purpose. The services of a qualified tree surgeon are required.

H. Maintain vehicular access to all properties nearby and adjacent throughout the duration of the project.

I. Contractor shall provide dewatering and drainage as required to accomplish the Work. No excavation may proceed until a suitable dewatering plan has been provided and approved by the Architect/Geotechnical Engineer and the Owner. Contractor shall take care to ensure that ponding of water does not occur. In the event that ponding of water does occur, Contractor shall immediately take the necessary measures to eliminate said ponding. Submit dewatering procedures to Architect for review. All dewatering shall be included in the Contract Sum.

J. All expenses related to removal, relocation, replacement and/or rerouting of any and all existing utilities or other built, stored, stockpiled items of any kind, surface or subsurface is the responsibility of Contractor and shall be included in the Contract Sum.

PART 2 – PRODUCTS

2.1 TOPSOIL

A. Topsoil shall consist of local, fertile, friable, natural soil of loamy character, free of clay lumps, stones in excess of 3" in greatest dimension, typical of project locality, and containing no chemicals harmful to plant growth.

2.2 UNSUITABLE SOIL

A. Unsuitable soil materials shall consist of materials not capable of being compacted to density required; rock, debris and organic material including muck, which is a wet organic material which cannot support rolling or light trawler tractor type of equipment and requires removal by power shovels or draglines; or material otherwise identified, classified and quantified as unsuitable by the Geotechnical Engineer.

B. Non-organic materials are considered as unsuitable include non-organic debris not capable of being compacted to density required including, but not limited to, metal objects such as appliances, metal fencing, tires, etc.

C. Wet soil is not considered unsuitable soil; Contractor must dry wet soil out to render it usable and must be capable of being compacted to the density requirements.

D. Suitability of materials encountered on site relates only to the utility of said materials within the context of this project, on the subject site. Suitability to be determined by the Geotechnical Engineer.

2.3 FILL

A. Suitable fill material shall consist of local, clean, non-active, organic free subsoil, free from debris, roots, topsoil, frozen material and rock fragments equal to or less than 3". In areas of massive fills or disposal pits, the Geotechnical Engineer shall determine the maximum size of rock. The soil should exhibit a plasticity index of 30 or less and a dry unit weight of at least 90 pcf. Residual material to be used as fill material shall be tested and approved by Geotechnical Engineer for degree of compaction specified for its intended use.

B. For fill soils to be imported, the Contractor is responsible to provide samples of same for laboratory testing by the Geotechnical Engineer to determine moisture/density relationship (Proctor value). Additionally, the Contractor shall identify the location of any "borrow pits" so that the Geotechnical Engineer may inspect same to determine suitability of the general soils which the Contractor intends to import to the project site.

2.4 GRAVEL

A. Gravel fill shall consist of crushed stone or gravel, graded so that 100% passes 1-1/2" sieve, meeting ASTM C33 specification for #57 stone.

2.5 CRUSHED STONE (CRUSHER RUN)

A. Crushed stone shall consist of sound durable particles of crusher run rock, passing a two inch sieve and not more than seven percent passing a No. 200 sieve and free from unsuitable materials.

2.6 GRANULAR BEDDING

A. Granular bedding and backfill material shall consist of a granular soil, sand, chert, crushed stone or mixture of these, all of which passes a 3/4 inch sieve, 80% passing a 3/8 inch sieve and not more than 12% passing a No. 200 sieve. Material shall be free of organic matter and debris.

2.7 ROCK

A. Rock consists of three (3) types: Rippable Weathered Rock, Mass Rock and Trench Rock. Rippable Weathered Rock is part of the Work and shall be included in the Contract Sum. Mass Rock and Trench Rock removal shall be paid for above Contract Sum as classified, qualified and quantified by Geotechnical Engineer.
   1. Rippable Weathered Rock is defined as residual material having a volume greater than one cubic yard that, in the opinion of the Geotechnical Engineer, can be effectively plowed, spaded, or removed with power driven excavating equipment having been first loosened with a track-mounted bulldozer equipped with a ripper shank.
   2. Mass Rock and Trench Rock are defined as residual material having a volume greater than 1 cubic yard for mass excavation or ¾ cubic yard for trench or pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, or blasting.
      a. Mass Rock – Mass Excavation: Late-model, track mounted bulldozer equipped with single-tooth ripper shank; rated at not less than 230 HP flywheel power and developing a min. of 50,000-lbf pryout force; measured according to SAEJ-732.
      b. Trench Rock – Excavation of Trenches and Pits: Late-model., track-mounted hydraulic excavator; equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crown force of not less than 18,700 lbf; measures according to SAEJ-1179.

PART 3 – EXECUTION

3.1 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Grading.
   1. When fills are to be constructed over cultivated or fallowed land, the entire area upon which the fill is to be constructed shall first be cleared of vegetation and then smoothed with a blade grader. When fills are to be constructed over sodded surfaces, strip the sod to a depth of 2 inches (50 mm). Then roll these smoothed or stripped surfaces to the specified density required for fill prior to the fill material placement. Dispose of stripped material as waste and completely remove from the site.
   2. Conservation of Topsoil. Excavate the topsoil as necessary to reach underlying non-organic soils and spread on areas already graded and prepared for topsoil or deposit in storage piles convenient to the areas which are subsequently to receive application of topsoil. All landscape areas to receive 4 inches (100 mm) of topsoil. Stockpile topsoil free of roots, stones and other undesirable material. Keep topsoil, when stored, separate from other excavated materials. Cover storage piles as required to prevent wind blown dust. Topsoil stockpiles are to be contained with at least one row of type 'A' silt fence and are to be seeded and mulched to prevent erosion.
   3. Proofrolling. After the site has been properly drained, and all organic surface soils have been removed, the site shall be inspected by a Geotechnical Engineer and proofrolled at that time. Proofrolling shall consist of several overlapping passes of a loaded 25 ton dump truck. The purposes of the proofrolling will be to detect any areas where soft or unstable soils are present, as well as to improve the density of the loose near-surface soils. Proofrolling shall be performed in the presence of the Geotechnical Engineer who can observe any areas where remedial action

may be required. Any soft or yielding area shall be thoroughly undercut and replaced with structural fill compacted to meet the requirements of the area being undercut as directed by a Geotechnical Engineer. The groundwater level should be maintained at a depth of at least 2 feet below the depth of vibratory rolling operations. This work should be anticipated. A minimum of four complete overlapping passes shall be made in each of two perpendicular directions.

4. Excavation. Perform excavation of material of every description and of whatever substances encountered within the grading limits of the project to the lines and grades indicated on the Drawings. Any material excavated that is not required to achieve final grade elevations shall be considered excess and is the responsibility of the Contractor. Perform excavation and filling in a manner and sequence that will provide drainage at all times.
    a. Rock: If rock is encountered, as described in Section II.7, clear away earth and expose materials. Notify Architect/Geotechnical Engineer and receive written instructions prior to excavations. Geotechnical Engineer shall identify, qualify and verify quantity extent of rock to be excavated. Only rock excavation done in accordance with Architect/ Geotechnical Engineer's instructions will be paid for by Owner as additional work in accordance with Section 01 27 00 of the Contract. Contractor shall remove rock in accordance with the following:
        i. To a depth of six inches (6") below proposed slabs and pavement.
        ii. Twenty four inches (24") on each side of and below footings of the proposed building walls.
        iii. Six inches (6") below and eight inches (8") to each side, conduits, ducts and pipes installed in utility trenches, with minimum width of thirty six inches (36").
        iv. Twelve inches (12") below finished design level in areas to receive landscaping and seeding.
    b. Suitable Material: Transport to and place all suitable excavated material in the fill areas within the limits of the work as specified and as shown on the drawings.
    c. Unsuitable Material: All excavated materials to achieve designed subgrades, such as weeds, sod, trash, construction debris, perishable materials, logs, stumps, and any surplus or excess of excavated material which is not required for fill, shall be removed from project site and legally disposed of by the Contractor at no additional cost to the Owner.
5. Preparation of Ground Surface for Fill. Sloped ground surfaces steeper than 5 to 1 upon which fill is to be placed shall be plowed, stepped or broken up in such a manner that fill material will bond with the existing surfaces. Wet and compact prepared surfaces as specified.
6. Fills. Construct fills at the locations and to the lines and grades indicated on the Drawings. Make sure that the completed fill corresponds to the shapes shown on the drawings or meets the requirements of the particular case. Use all suitable material removed from the excavation in forming the necessary fill. All fill material shall be reasonably free from logs, stumps, sod, weeds, or other perishable material, trash, frozen material and from all stones having a maximum dimension greater than 6 inches (150 mm). No stones shall be permitted in the top 12 inches (300 mm) of fills. Place the material in successive horizontal layers to a depth that will allow required compaction to be achieved throughout the full depth of the lift and in no case exceeding 12 inches (300 mm) in loose depth. Keep fill material spread uniformly. Remove any soft sections, and fill holes or depressions to required grades with approved material and shape the entire area to line, grade, and cross section and thoroughly compact as specified. The Contractor is responsible for adjustment of the moisture content of the fill material if necessary so that the specified compaction can be obtained. The rough grade for the entire site or portion thereof shall be approved by the Architect before placement of any topsoil.
    a. Subgrade Preparation. Shape, dress, moisten and compact as specified subgrades for all drives, parking areas, sidewalks and other structures. Test the subgrade for crown, elevation and density in advance of placing pavement.
    b. Spreading of Topsoil. Upon completion of rough grading, spread the stockpiled topsoil for a uniform depth of 4 inches (100 mm), after settlement, over all areas graded under this Contract not receiving other surfacing, just prior to the seeding or landscaping operation. Before spreading the topsoil, scarify the graded areas for a depth of 3 inches

(75 mm) and repair all settlements and washes.

7. Finished Grading. Accomplish uniformly smooth grading of all areas covered by the Project, including excavated and filled sections and adjacent transition areas so that the finished surface is smooth, compacted and free from irregular surfaces changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations except as otherwise specified. The finished surface shall be not more than 2 inches (50 mm) above or below the established grade or approved cross section. Finish all swales so as to drain readily.
8. Backfill material shall be the same as specified for fill and shall be placed and compacted as specified for fill unless otherwise noted.
9. Granular Fill.
    a. Construct granular fill material when called for on the Drawings on the previously prepared subgrade to the lines and grades and thicknesses and dimensions shown on the Drawings.
    b. Place and spread materials on previously prepared subgrade that has been moistened sufficiently to prevent moisture loss in foundation materials but not enough to cause soft spots. Place sufficient material so that when spread, struck off by an approved template and compacted as required herein, the resulting granular fill shall be of the required thickness and shape.
    c. After compaction, check the surface with template and straightedge and correct and recompact all high or low spots.
10. Controlled Blasting
    a. All blasting operations shall be conducted in full compliance with all the laws of the State of Georgia, all local ordinances and with all possible care so as to avoid injury to persons and property. The rock shall be well covered and sufficient warning shall be given to all persons in the vicinity of the work before blasting. Care shall be taken to avoid damage to all water pipes, gas pipes, or other structures and to private property. In addition, to observing all municipal and other ordinances relating to the storage and handling of explosives, conform to any further regulations which the Architect/Geotechnical Engineer shall deem necessary.
    b. If rock below design limits as indicated on the drawings is shattered on account of holes having been drilled too deep or too heavy charges of explosives used or for any other reasons due to blasting, and if, in the opinion of the Architect/Geotechnical Engineer, said shattered rock is unfit for foundation, the shattered rock shall be removed and the excavation refilled as required by the Architect/Geotechnical Engineer at the expense of the Contractor.
    c. Contractor shall perform blasting only after receiving written approval from Architect and notifying Owner's insurance company of intent. Engage skilled mechanics to perform blasting. Provide heavy mats to minimize concussion. Handle, store and use explosives in accordance with the "Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc.", latest edition, with amendments.
    d. Adequate and timely notification to all residents within a one-half mile (½) radius of the site of intent to conduct blasting operations.

3.2 FIELD QUALITY CONTROL

A. Compaction.

1. Compact each layer of fill by rolling with approved rollers to at least the following percentages of maximum density at a moisture content no less than 3 percent above to 3 percent below optimum moisture as determined by ASTM D 698.

MINIMUM PERCENT OF MAXIMUM DENSITY

Material	Percent
Fill	95% of Standard Proctor
Subgrade – top 24 inches (300 mm) beneath pavements, slabs and footings	98% of Standard Proctor

2. In cut sections, compact top 12 inches (300 mm) of subgrade under pavements and top 6 inches (150 mm) of subgrade under sidewalks to the same density as required for fill hereinbefore.

3. Crushed stone is to be placed in maximum 18" lifts and consolidated with hand compaction equipment.

B. Testing. A geotechnical engineer selected by the Owner shall make the following tests. All costs for tests shall be as covered in GENERAL REQUIREMENTS.

1. Soil compaction testing frequencies as follows:
   a. (1) test per 2' depth per 2000 sf. under building pads.
   b. (1) test per 2' depth per 5000 sf. under paved areas.
   c. (1) test per 2' depth per 10000 sf. elsewhere.
   d. (1) test per 2' depth per 50 lf. of trench backfill.

END OF SECTION 31 22 00

SECTION 31 23 00

EXCAVATING AND BACKFILLING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. This Section covers the excavation, filling and backfilling complete.

B. Related Work Specified Elsewhere:
1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
2. Clearing and grubbing is covered in Section 31 11 00, CLEARING AND GRUBBING.
3. Site excavating, filling, disposal of surplus earth and debris and finished grading is covered in Section 31 22 00, GRADING.
4. Erosion, sedimentation and pollution control measures is covered in Section 31 25 00, EROSION AND SEDIMENTATION CONTROL.

1.2 QUALITY ASSURANCE

A. Tests:
1. Sufficient tests to ascertain that the specified density is being obtained, throughout the fill and backfill, will be made by a geotechnical engineer selected by the Owner and paid by the Owner.

B. Observation and Instruction:
1. Remove unsuitable material at the direction and under the observation of the Geotechnical Engineer.

C. A Survey of all property lines and bench marks by a Georgia Registered Land Surveyor. Maintain same throughout the duration of the project.

1.3 SUBMITTALS

A. Test Reports:
1. Submit all field test results to Architect for review.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Storage of Materials, Equipment, and Fixtures:
1. Material storage. Stockpile suitable excavated materials, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage. Do not stockpile on edge of excavations.

1.5 JOB CONDITIONS

A. Existing Conditions:
1. Subsurface Information.
a. Soil borings for design purposes have been made at the site. The Geotechnical Investigation Reports are provided in Division 02 for the Contractor's information. Examine the site and Geotechnical Investigation Report of the exploration and decide the character of the materials to be encountered.

B. Environmental Requirements:
   1. Water.
      a. Ground Water. Keep the building excavation free of seepage and ground water at all times. The Contractor shall be responsible for the lowering of the ground water level to at least three feet below the proposed foundation bearing elevation.
      b. Surface Water. Prevent surface water from running into the excavated areas. Water which accumulates in the excavation shall be removed promptly. Furnish and maintain all necessary bailing, draining, pumping and sheathing.
      c. The Contractor shall be responsible for all additional work required if ingress of ground and/or surface water softens excavated areas.

C. Protection:
   1. Repair damage done to Owner's property or any other property on or off premises by reason of required Work.
   2. Existing Underground Utilities. Have all utilities marked and verify horizontal and vertical locations of all utilities. Contact the Utility Protection Center at 811. Any underground utilities found to exist within the building excavation and not shown on the drawings shall be removed and/or relocated in accordance with the terms of the GENERAL REQUIREMENTS.
   3. Temporary Protective Fence. Erect and maintain a temporary fence around any excavations for public safety in accordance with local ordinances as shown on the Drawings.

D. Access:
   1. Maintain vehicular access throughout the duration of the project to all adjacent or nearby properties.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Use fill and backfill material consisting of suitable soil excavated from the excavation, select borrow material or granular material, all subject to approval. Reference Section 31 22 00 - Part 2 - PRODUCTS, 2.3 Fill. If the Contractor elects to use other sources for fill material instead of natural excavation he shall do so at his own expense. Use material free of organic soil, trash, lumber, frozen material, chunks of concrete or other debris.
   1. Structural fill material - Reference Section 31 22 00 - Part 2 - PRODUCTS, 2.3 Fill.

B. Granular Material. When called for on the Drawings, use the material specified herein, placed and compacted as specified under "PART 3. EXECUTION."
   1. Granular Fill or GAB Beneath Slabs-On-Grade. Use free draining gravel or GAB conforming to GA DOT specifications.
   2. Free Draining Granular Fill for Backfill. Use sand-gravel conforming to the gradation for granular fill beneath slabs-on-grade if noted on plans.

C. Unsuitable Soils - Reference Section 31 22 00 - Part 2 - PRODUCTS - 2.2

D. Definition of Rock: Reference Section 31 22 00 - Part 2 - PRODUCTS - 2.7 - Rock.
   1. The contractor should exercise extreme caution when blasting near the proposed finished grade or in localized blasting for individual footings. If blasting damages soil, partially weathered rock, or rock which is to support foundations or slabs, the damaged material shall be removed.

PART 3 – EXECUTION

3.1 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. The Contractor accepts full responsibility for all excavations. Protect all excavations from collapse. Where possible, embankments over 5' shall have a slope no greater than 1-1/2 horizontal to 1' vertical.

B. Excavation, General Requirements:
   1. General Excavation. Excavation shall conform to the dimensions and elevations indicated on the drawings for each building and structure and all work incidental thereto. Excavation shall be carried far enough beyond the wall line to permit removal of forms and application of dampproofing or waterproofing as specified. The bottom surface of all excavations shall be leveled off at the depth required.
      a. All material shall be unclassified, and is to be excavated by normal excavation methods, including ripping, blasting, etc.
      b. All excavated material required for grading around buildings shall be placed as specified under Section 02 26 13.
      c. Excavated materials which are considered unsuitable and surplus of excavated material not required for fill shall be known as waste and shall be legally disposed of off site.
      d. Additional costs of labor and materials due to careless excavation beyond the lines and depths shown by the drawings shall be borne by the Contractor.
   2. Footing Excavation. Excavation for footings shall be cut vertically from the widest part of the footing. Undercutting for footing projections will not be permitted.
      a. Footings shall be cast immediately after excavation is completed and reinforcing placed, or the last 4 to 6 inches (100 to 150 mm) of subsoil shall not be removed until preparations are complete for casting footings. For footings which bear on earth, place concrete on undisturbed soil.
      b. In conditions where suitable bearings are encountered at different elevations from those indicated on the drawings, the Architect shall direct in writing that the excavation be carried to elevations above or below those indicated on the drawings.
      c. Cold Weather Protection: Protect excavation bottoms against freezing when temperature falls below 32 degrees F. (0 degrees C.).
   3. Trench Excavation. Carefully excavate trenches included in the building maintaining a minimum width and in no way impairing the bearing value of any footing or foundation.
   4. Slabs-on-grade. Where existing grade is at or below the elevation of the floor slabs-on-grade, remove the top 6 inches (150 mm) and bring the grade to the proper elevation by filling. Where excavation is made below the elevations indicated on the Drawings, restore to the proper elevation in accordance with the procedure hereinafter specified for filling.
   5. Employ bracing designed by a Georgia Registered Structural Engineer as needed.

C. Filling and Backfilling.
   1. Placement. Prior to filling or backfilling, clean area of all trash and debris. Remove forms prior to any backfilling. When subgrade is of less than the specified density, bring to proper moisture content and compact as herein specified. This may include scarifying the top 6 inches (150 mm) of subgrade surface. Place earth or friable materials in successive horizontal layers of material of not more than 6 inches (compacted thickness). Hand tamp or vibrate backfill adjacent to foundation walls and around piers. Wet or dry by aeration each layer and then compact as specified. Methods of compacting shall be subject to review. Do not damage or endanger adjacent construction or facilities.
      a. Fill shall be brought to the grades indicated on the Drawings.
      b. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage thereof. Work to the final grades established immediately around the building.
      c. Construct granular fill beneath slabs-on-grade on the previously prepared subgrade to the

lines, grades, thicknesses and dimensions shown on the drawings at the locations indicated. Place and spread material on previously prepared subgrade that has been moistened sufficiently to prevent moisture loss in foundation materials but not enough to cause soft spots. Place sufficient material so that when spread, struck off by an approved template and compacted as required herein, the resulting granular fill is of the required thickness and shape. After compaction, check the surface with template and straight edge, and correct and recompact all high or low spots.

2. Compaction.
   a. Maximum density determination. Make tests on two separate samples to determine maximum density at optimum moisture. Take samples where directed by the Architect. However, if the tests specified in Section 02 26 13, have been taken on the same soil, their results may be used in lieu of the tests herein specified.
   b. General Compaction. Wet or dry by aeration, all fill and backfill and then compact to at least the following percentage of maximum density at a moisture content above or below optimum moisture within the range specified as determined by "Moisture-Density Relations of Soils Using 5.5 lb. (2.5 kg) Rammer and 12 inch (304.8 mm) Drop" ASTM D 698:

MATERIAL	PERCENT OF MAX. DENSITY	WATER CONTENT RANGE ABOVE OR BELOW OPTIMUM
Top 24" under pavement,	98 Percent	3 Percent
Other fill	95 Percent	3 Percent

   c. Compact granular material (GAB) to 95 percent of the maximum dry density determined by ASTM D 1557.

D. Performance:
   1. Perform all Work in accordance with the requirements of the Drawings, specifications, and applicable local codes and in a manner which will ensure reasonable accuracy in preserving lines and levels shown on the Drawings.
   2. Filling and compaction shall be monitored by the Geotechnical Engineer.
   3. The Contractor shall be responsible for the documentation of the quantities of any blast rock to be removed from the site. Measurements of the elevations of blast rock (prior to blasting) shall be made by the blasting subcontractor by drilling test holes in the presence of the Geotechnical Engineer. The actual volume of rock removed from the project will be calculated from the comparison of before-blast rock elevations and the elevations of excavation as required by the construction documents.

3.2 FIELD QUALITY CONTROL

A. Field Tests:

   1. Compaction Tests. Soil compaction testing frequencies as follows:
      a. (1) test per 2’ depth per 2000 sf. under building pads.
      b. (1) test per 2’ depth per 5000 sf. under paved areas.
      c. (1) test per 2’ depth per 10000 sf. elsewhere.
      d. (1) test per 2’ depth per 50 lf. of trench backfill.
   2. Areas which do not meet the compaction specifications should be recompacted to achieve compliance. In confined areas, such as utility trenches, the use of portable compaction equipment and thin lifts of 3 to 4 inches may be required to achieve compaction. Where full-time inspection by a Geotechnical Engineer is required, the number of tests shall be as required by the Geotechnical Engineer.

a. Test Failure. When fill or backfill does not meet the required compaction, remove, recompact and retest at no expense to the Owner or Architect.

b. Inspection. The Contractor shall notify the Geotechnical Engineer at least two (2) days prior to the Work to be inspected. Cooperate with the Geotechnical Engineer to facilitate the keeping of records specified herein and as required by the Geotechnical Engineer. The Geotechnical Engineer is a representative of the Owner and the Contractor shall assume toward him all the obligations and responsibilities that he assumes toward the Architect.

END OF SECTION 31 23 00

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.1 SCOPE

A. Submittals and Permits

1. The Owner will obtain Land Disturbance Permits from the appropriate authority and shall pay any fees for said permits. All fines imposed for improper erosion, sedimentation and pollution control shall be paid by the Contractor.
2. Land disturbance activity shall not commence until the Land Disturbance Permit is issued.
3. Submit with the required Schedule of Values a monthly monetary figure for maintenance of all erosion, sediment and erosion controls and Best Management Practices (BMP's) controls.
4. Include within the overall project schedule all erosion, sediment and pollution control operations. Illustrate understanding that all said measures are to be continuously maintained throughout the duration of the project until vegetation is stabilized and all sources of pollution are rendered non-active.
5. All replacement of measures as operations progress or are sequenced are part of the scope of this contract.
6. The Contractor shall adhere to all NPDES measures and requirements.
7. The extent of all erosion, sediment, and pollution control measures are the Contractor's responsibility.

B. Basic Principles

1. Contain all erosion, sediment and pollution on the project sites.
2. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.
3. Minimize the disturbed area and the duration of exposure to erosive elements.
4. Stabilize disturbed areas immediately.
5. Safely convey run-off from the site to an outlet such that erosion will not be increased off site.
6. Do not encroach upon watercourses or any downstream properties.
7. Hold and treat the first one inch (1") of rainfall for pollutants such as, but not limited to, petroleum and heavy metals through the effective use of Best Management Practices (BMP's).
8. Install and/or replace erosion, sediment and pollution control measures concurrent with or prior to any land disturbance activities.

C. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

1. Preventing soil erosion at the source.
2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.
3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.

D. Permanent Erosion Control: Permanent vegetative cover shall be established on all non-paved disturbed areas and permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

1.2 QUALITY ASSURANCE

A. General: Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated herein and these Specifications.

B. All work shall conform to the "Manual for Erosion and Sediment Control in Georgia published by the Georgia Soil and Water Conservation Commission.

C. Acquire a copy of "Field Manual for Erosion and Sediment Control in Georgia, Vegetation and Structural Best Management Practices (BMP's) for Land Disturbing Activities" as published by the Georgia Soil and Water Commission, latest edition.

D. Conflicts: Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

PART 2 – PRODUCTS

2.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL MATERIALS

A. Silt Fence: Silt fence shall meet the requirements of Section 171 - Temporary Silt Fence of the Department of Transportation, State of Georgia, Standard Specification, latest edition. Silt fence fabric must be on the Georgia DOT qualified Product List.

B. Erosion Control Blanket

1. Slopes > 3:1 (33% or greater) as shown on the drawings.
   a. Biodegradable netting impregnated with excelsior woodfiber such as manufactured by "Curlex".
   b. "Ero-Mat" by Verdyol
   c. "Bon Terra CS2" (slopes > 3:1)
   d. Or Equal as approved by Engineer
2. Slopes < 3:1 (33% of less) as shown on the drawings
   a. "Bon Terra CS1"

C. Filter stone shall be crushed stone conforming to Georgia Department of Transportation Table 800.01H, Size Number 3.

D. Colloidal Polymer applied as a liquid such as silt stop APS 600 series as manufactured by Applied Polymer Systems, Norcross, GA or approved equal.

E. Colloidal Polymer applied in a dry form such as Silt Stop 700 Series as manufactured by Applied Polymer Systems, Norcross, GA or approved equal.

2.2 RIP RAP

A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or greater. Rip rap shall have less than 66 percent wear when tested in accordance with AASHTO T-96. Unless shown or specified otherwise, stone rip rap shall be Type 3 rip rap.

1. Type 1 Rip Rap: The largest pieces shall have a maximum volume of two cubic feet. At least 35 percent of the mass shall be comprised of pieces which weigh 125 pounds or more. The remainder shall be well graded down to the finest sizes. Rock fines shall comprise a maximum of 10 percent of the total mass. Rock fines are defined as material passing a No. 4 sieve. Rip rap size shall conform to Georgia Department of Transportation Section 805.01 Stone Dumped Rip Rap, Type 1.

2.3 FILTER FABRIC

A. The filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.

B. Filter fabric under rip rap shall be equal to Mirafi, Amoco or Exxon.

C. Filter fabric shall not be used under rip rap at stream crossings.

2.4 CONCRETE

A. Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

B. Provide a concrete mix design for job mixed concrete for the Engineer's approval.

PART 3 – EXECUTION

3.1 GENERAL

A. Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Georgia Erosion and Sedimentation Act of 1975 as amended in 1989, local enforcing agency guidelines and these Specifications.

B. Implementation: The work shown on the approved plans and working drawings shall be considered a minimum requirement. What is shown does not relieve the Contractor of the responsibility to actively take all steps necessary to control soil erosion, sedimentation and pollution.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from departing the site boundaries or enter any drainage ways.

B. Silt dams, silt fences, traps, barriers, rock, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the approved plans and working drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.

C. Where permanent grassing is not appropriate, and where the Contractor's temporary erosion and sediment control practices are inadequate, the Engineer may direct the Contractor to provide temporary vegetative cover. Such temporary vegetative cover shall be provided by the Contractor in accordance with the Vegetative Schedules shown on the Drawings.

D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary or as directed by the Engineer.

E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures and permanent vegetative cover is established on all non-paved disturbed areas. At that time, temporary devices shall be removed.

F. For all newly disturbed, graded or exposed soil surfaces, apply 1.5 gals/acre of APS 600 Series Silt Stop as manufactured by Applied Polymer Systems, Norcross, GA or equal in a hydroseeder mix of appropriate seed, fertilizer, lime, and mulch for the same acre. Follow all manufacturer's instructions and recommendations. Do not mechanically disturb treated areas after application. (This does not include foot traffic as necessary to install erosion control blanket). Contractor shall furnish and install as necessary a minimum 200 lbs. of APS 700 Series Silt Stop as manufactured by Applied Polymer Systems, Norcross, GA. or equal for incidental "touch-up" or point source erosion areas.

3.3 PERMANENT EROSION CONTROL

A. Permanent erosion control shall include:

1. Restoring the work site to its original contours, unless shown otherwise on the Drawings or directed by the Engineer.
2. Permanent vegetative cover shall be performed in accordance with Article 3.04 of this Section.

B. Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the Project. In no event shall implementation be postponed when no further construction activities will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

3.4 GRASSING

A. General

1. All references to grassing shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.
2. When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Engineer.
3. Specified permanent grassing shall be performed at the first appropriate moment following establishment of final grading in each section of the site.

B. Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of grass.

C. Where permanent vegetative cover (grassing) cannot be immediately established due to season or other circumstances, the Contractor shall provide temporary vegetative cover. The Contractor shall return to the site at the appropriate season to install permanent vegetation in areas that have received temporary vegetative cover, if not previously provided. If a permanent species was sown at the same time as the temporary species, the Contractor shall return to the site at the appropriate season to inspect the grassing, and if necessary, reseed those areas which are unsatisfactory.

3.5 EROSION CONTROL BLANKET

A. Furnish and install erosion control blanket in coordination with permanent grassing on all disturbed areas.

B. Follow manufacturer's recommendations and instructions relating to installation.

3.6 RIP RAP

A. Rip rap shall be placed as shown on the Drawings and at all points where banks of streams or drainage ditches are disturbed by excavation, or at all points where natural vegetation is removed from banks of the streams or drainage ditches. Carefully compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to construction along side a stream or drainage ditch as well as crossing a stream or drainage ditch.

B. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonable close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers.

C. Placement of Filter Fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3 inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.

D. Placement of Rip Rap: The rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the filter fabric. Rip rap shall be placed with its top elevation conforming with the finished grade or the natural slope of the stream bank and stream bottom.

1. Stone Rip Rap: Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be –6 inches and +12 inches. If the Drawings or the Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18 inches.
2. Grouted Rip Rap: Reference the drawings for grouted rip rap which is required as a minimum at the outlet headwalls.

END OF SECTION 31 25 00

SECTION 31 31 16

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 this Section.

1.2 SUMMARY

A. This Section includes soil treatment for termite control.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data and application instructions.

C. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides.

1.4 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.

B. Engage a professional pest control operator who is licensed according to regulations of governing authorities to apply soil treatment solution.

C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

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 ensure 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 WARRANTY

A. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

B. Warranty Period: Five (5) years from date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 – PRODUCTS

2.1 SOIL TREATMENT SOLUTION

A. Basis-of-Design Product: Termidor termiticide/insecticide by BASF or equal.

PART 3 – EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations.

B. Mix and apply product in strict accordance with manufacturer's written requirements.

C. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.

D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 31 31 16

SECTION 32 12 16

BITUMINOUS PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Work required under this Section includes all labor, material, equipment and services necessary for and reasonably incidental to the proper completion of bituminous pavements as indicated on the Drawings or herein specified.

B. Related Work Specified Elsewhere:

1. Division 31, Section 31 32 00 “Excavating and Backfilling” for sub-grade preparation.

1.02 QUALITY ASSURANCE

A. Use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot mix, job-laid asphalt concrete.

B. Comply with applicable requirements of The Latest Edition Georgia Department of Transportation, Standard Specifications for Construction of Roads and Bridges and any supplemental standards and specifications thereto.

C. Testing Agency: Testing and sampling shall be performed by an independent testing laboratory provided by Owner.

D. All areas to receive pavement shall be proof-rolled in the presence of a representative of the Geotechnical Engineer immediately prior to the placement of base course. Refer to Geotechnical Report for information.

E. Tests: The following tests are required:

1. Graded Aggregate Base Course. Test one (1) sample of the compacted base course of the first 200 cubic yards of material or fraction thereof and for each additional 400 cubic yards or fraction thereof to determine that the density requirement herein specified is met.
2. Bituminous Materials. Each shipment shall be covered by a manufacturer's certified analysis or certificate of compliance.
3. Mineral Aggregates. One sample from each source for complete test of all requirements. Additional gradation tests at the rate of one test per each 1000 yards of material furnished.
4. Asphaltic Concrete.
   a. Job Mix Formula. One test prior to starting work for each type of mix to determine percentage of various aggregates to be used and amount of asphalt cement to be added. For projects with less than 1000 tons of each material, Contractor may use a mix formula which has been used or is being used on other projects. This information to be supplied by the Contractor.
   b. Compaction Test. One Test for each 500 square yards of surface area shall be taken as directed by the Geotechnical Engineer.

1.03 SUBMITTALS

A. Certificates: Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

B. Mix Design: Submit mix design for each course to Engineer for acceptance.

C. Sampling Pavements and Mixtures:

1. Remove suitably sized samples, as required by the Engineer for the determination of thickness and density of the completed pavements. Use cores drilled from the base and surface courses to test the density of the pavement by either ASTM D 1188 or ASTM D 2726 whichever is applicable. Use the same cores used to test the density to measure the thickness of the pavement. Make up any deficiency in base thickness with the surface mixture when the surface course is applied. Furnish all tools and labor for cutting samples and replacing the pavement to the satisfaction of the Engineer.

1.04 JOB CONDITIONS

A. Weather Limitations.

1. Apply bituminous prime and tack coats only when the ambient temperature in the shade has been at least 40 degrees F. for two hours and rising.
2. Do not conduct paving operations when surface is wet, frozen or contains excess of moisture which would prevent uniform distribution and required penetration.
3. Construct asphaltic courses only when atmospheric temperature in the shade is above 35 degrees F, when the underlying base is dry and when weather is not rainy.
4. Place base course when air temperature is above 35 degrees F and rising. No base course shall be placed on a frozen or muddy subgrade.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Graded Aggregate Base Course: Grade aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.2.01 of the Georgia Department of Transportation Standard Specifications.

B. Binder Course: Binder course shall be uniform quality throughout and shall conform to the requirements of Section 828.2.03, 19mm Superpave GP 1 or 2, of the Georgia Department of Transportation Standard Specifications.

C. Surface Course: Surface course shall be of uniform quality throughout and shall conform to the requirements of Section 828.2.03, 9.5 mm Superpave TP 2 GP2, of the Georgia Department of Transportation Standard Specifications.

D. Tack coat shall conform to the requirements of Section 413 of Georgia Department of Transportation Standard Specifications.

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE

A. Construct all pavements in a workmanlike manner at the location and to the lines and levels shown on the Drawings and place pavement in a manner to insure uniform surfaces free from defects.

1. Shaping and compacting graded aggregate rock base course. Spread the materials uniformly over the subgrade in layers whose depth does not exceed that which the equipment on the Project is capable of compacting to the required density.

a. Accomplish the preliminary compaction by rolling with tamping or grid type rollers. Accomplish the final compaction by rolling with multiple wheel pneumatic rollers and a tandem or three-wheel roller. Continue rolling until the base course material is compacted throughout the full depth, to at least 95 percent of the density at optimum moisture based on the weight per cubic foot of the material passing the No. 4 sieve, as determined by ASTM D 1557.

b. The use of vibratory compactor in lieu of rolling equipment will be permitted, provided the compaction requirements can be met and a satisfactory surface can be obtained.

c. Continue blading, rolling and tamping until the surface is smooth and free from waves and inequalities. Add water before and after the final rolling as directed by the Engineer.

d. To facilitate the obtaining of a smooth satisfactory surface, the use of a small application of crushed rock screenings (material passing the 1/2 inch sieve), may be permitted.

e. The surface shall not show any deviations in excess of 3/8 inch when tested with a 10 foot straightedge applied parallel with and at right angles to the centerline of the surfaced area.

2. Shaping and compacting asphalt base course. Accomplish mixing and placing in accordance with the best practices and conform to ASTM D 995. Mixing time shall not exceed 60 seconds. Lay the mixture only upon a surface which is dry. Make sure that the surface is clean and free of any loose or foreign matter at the time of placing the mixture. Do not place the bituminous mixtures when the weather is rainy or the atmospheric temperature is below 40 degrees F., unless otherwise directed by the Engineer. Mixes with temperatures below 250 degrees F. will be rejected. Place the base course in one or more lifts. The minimum lift thickness shall be at least two times the maximum particle size.

a. Place the mixture with an acceptable bituminous spreader in strips having a width of ten (10) feet and do not roll the 6 inch strip adjacent to the area on which additional material is to be laid until such additional material is placed, except when the work is to be discontinued. After the first strip has been placed and rolled, place the second strip and succeeding strips and extend rolling to include the 6 inches of the first strip not previously rolled. Place the succeeding strips while the unrolled 6 inch section of the adjoining is hot and in a readily compactable condition.

b. Perform the compaction by the use of three-wheel rollers, tandem rollers, vibratory rollers and pneumatic-tired rollers.

c. Begin rolling of the mixture as soon after placing as the mixture will bear the roller without undue displacement. Delays in rolling freshly spread mixture will not be tolerated. Start rolling longitudinally at the extreme sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least one-half of the width of the rear wheel of the roller.

d. In all places not accessible to the rollers, compact the mixture thoroughly with hot hand tampers. Hand tampers shall weigh not less than twenty-five (25) pounds and shall have a tamping face of not more than fifty (50) square inches. Skin patching of an area that has been finish rolled will not be permitted. Remove any mixture that becomes mixed with foreign material or in any way defective and replace it with fresh mixture, and compact it to the density of the surrounding area. The roller shall pass over the unprotected edge of the course only when the laying of the course is to be discontinued for such length of time as to permit the mixture to become cold. Continue rolling of the base course until all roller marks are eliminated, and a density has been obtained of at least 94 percent of the density of a laboratory specimen of the same mixture subjected to 50 blows of a standard Marshall on each side of specimen.

3. Tack Coat:
   a. Apply tack coat to asphalt base course immediately prior to spreading surface course materials.
   b. Quantity. Apply from 0.05 to 0.15 gallons per square yard of surface to be covered as directed by the Engineer. Emulsified asphalt shall be diluted with an equal part of water.
   c. Application. Apply tack coat by means of a bituminous distributor so that a uniform distribution is obtained at all points. Apply tack coat on each layer of the base course and allow to cure before placing the succeeding course. Apply tack coat only as much pavement as can be covered with asphalt aggregate mixture in the same day.
4. Asphaltic Concrete Surface Course:
   a. The asphaltic concrete surface course shall consist of plant or hot-mix asphaltic concrete to be placed on previously prepared surfaces. It shall be placed in one or more courses and of the thickness as shown on the Drawings.
   b. Weather Limitations. Place the asphaltic concrete only when the primed or tack coated base course is dry, when the weather is not rainy and when the atmospheric temperature is above 40 degrees F.
   c. Mixing and Placing. Accomplish in accordance with the best practices and ASTM D 995. Place the mixture with an acceptable bituminous spreader in strips having a minimum width of 10 feet, and do not roll the 6 inch strip adjacent to the area on which additional material is to be laid until such additional material is placed, except, when the work is to be discontinued. After the first strip has been placed and rolled, place the second strip and succeeding strips and extend rolling to include the 6 inches of the first strip not previously rolled. Place the succeeding strips while the unrolled 6 inch section of the adjoining strip is hot and in a readily compactable condition.
   d. Compaction of Mixture. Perform compaction by the three-wheel rollers and tandem rollers. Begin rolling of the mixture as soon after placing as the mixture will bear the rolling without undue displacement. Make tests for conformity with the specified crown, grade and smoothness immediately after initial compression. Before continuing the rolling, correct any variations by removing or adding materials. Continue rolling until all roller marks are eliminated and density has been obtained of at least 96 percent of the density of a laboratory specimen of the same mixture subjected to 50 blows of a standard Marshall on each side of the specimen. During rolling, moisten the wheels of the rollers to prevent adhesion of the mixture to the wheels but an excess of water will not be permitted. In all places not accessible to the roller, compact the mixture thoroughly with hot hand tampers. Hand tampers shall weigh not less than

25 pounds and shall have a tamping face of not more than 50 square inches.

e. Joints. Make sure that all joints present the same texture, density and smoothness as other sections of the course.

f. Smoothness. The finished surface shall not vary more than 1/8 inch when tested with a 10 foot straightedge applied both parallel with and at right angles to the centerline of the paved area.

g. No bird baths deeper than 1/8" will be allowed, positive drainage is required throughout.

3.02 CLEANING AND PROTECTION

A. Cleaning. After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the Engineer.

B. Protection.

1. Concrete curb and gutter or concrete crosswalks shall be protected from tack-coat overspray and asphalt track marks for the period necessary for the asphalt concrete pavement to cool and harden or until a time designated by the Engineer.
2. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 24 hours.
3. Provide barricades and warning devices as required to protect pavement and the general public.
4. Cover openings of structures in the area of paving until permanent coverings are placed.

END OF SECTION 32 12 16

SECTION 32 16 00

COMBINATION CURB AND GUTTER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers the construction of combination curb and gutter when not integral with the pavement slab.

B. Related Work Specified Elsewhere:
1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
2. Subgrade preparation is specified in Section 31 32 00, Excavating and Backfilling.
3. Concrete is specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.02 QUALITY ASSURANCE

A. Source Quality Control:
1. Mill tests and/or manufacturer's certification of compliance with the Specifications will be required for all materials when requested by the Architect.

B. Georgia Department of Transportation Standards for Roads and Bridges, Latest Edition.

1.03 JOB CONDITIONS

A. Environmental Requirements:
1. Placing Temperature.
a. Warm Weather. Concrete placement will not be permitted when, in the opinion of the Architect, the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete in accordance with the requirements of these Specifications.
b. Cold Weather. In addition to other requirements, in cold weather, heat, protect and prepare the subgrade to produce a satisfactory subgrade entirely free from frost when the concrete is deposited. Concrete shall not be placed when the ambient temperature is below 35 degrees F. (2 degrees C.), nor when the concrete without special protection is likely to be subject to freezing temperature before final set has occurred.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete. Use class A with minimum compressive strength at 28 days of 3,000 psi. Concrete curb and gutter within public rights-of-way shall be GADOT approved.

B. Expansion Joint Filler. Preformed non-extruding bituminous-treated fiberboard conforming to ASTM D 1751.

C. Joint Sealer. Hot poured type consisting of a resilient and adhesive plastic. The material shall be in accordance with ASTM D 1190.

D. Curing Materials: Membrane curing compound shall be water soluble emulsion type linseed oil base compound and conform to the requirements for Type 2 compound as specified in ASTM C 309, except that requirements for the sag test and the drying time shall not apply.

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Concrete.
1. General. Use metal forms unless otherwise specifically authorized by the Architect, except that on curves having a radius of 150 feet or less, wood forms may be used. All forms shall be reviewed by the Architect.
   a. Form Setting. The subgrade under the forms shall be compact and cut true to grade, so that the forms will be firmly in contact with it for their entire length. Correct imperfections and variations of the grade in a manner satisfactory to the Architect. Join each form section tightly by locked joints, free from play or movement in any direction. Check conformity to the alignment and grade elevation indicated on the Drawings and make necessary corrections prior to placing the concrete.
   b. Coating. Oil forms each time they are used.
   c. Removal. Keep forms in place at least 12 hours after concrete has been placed against them or for a longer period if so directed by the Architect. Do not use crowbars or other heavy tools against green concrete in removing the forms. Clean forms well before re-oiling and reuse.
2. Finishing. Test the subgrade for elevation and density in advance of placing concrete. Correct any discrepancies in accordance with the requirements for subgrade preparation.
   a. Tamp and space the concrete so as to produce a dense concrete in which the mortar has been worked to the surface. Strike off the concrete to the required cross section and smooth the upper face of the gutter slab and the front face and top of the curb with a wood float. Use an edging tool on all exposed corners. When completed, the surface of the curb and gutter shall be straight and true, and shall conform to the shape and dimensions indicated on the plans and shall have a first-class float finish of sandy or gritty texture.
3. Joints.
   a. General. Provide contraction and expansion joints in all curb and gutters. Place and finish joints as indicated on the Drawings or as directed by the Architect. Make sure all joints are perpendicular to the finished grade.
   b. Contraction Joint. Place contraction joints so that monolithic sections shall be in 8 foot sections. Separate each section by a 1/8 inch thick steel template. Remove templates as soon as practicable after the concrete has been struck off, and set sufficiently to preserve the shape of the joint.
   c. Expansion Joint. Form expansion joints by a preformed filler material cut and shaped to the cross section of the curb and gutter. Provide expansion joints at the ends of all return radii. Expansion joints shall be provided 1/2 inch in width at intervals not exceeding 40 feet.
   d. Sealing. Fill the joints with sealing material, specified herein, as indicated on the Drawings or as directed by the Architect. Make sure that the joints are cleaned, dried and poured as soon after the end of the curing period as weather conditions permit. Perform the work in a neat workmanlike manner without spilling and remove all excess material.
4. Patching. After removal of forms, fill all damaged and honeycombed areas with mortar, one part cement to two parts sand. No patching is allowed on the surface.
5. Curing.
   a. General. Cover and protect all concrete fully from moisture evaporation, rapid temperature change and from rain, flowing water, and mechanical injury during a

period of at least 72 hours immediately following the finishing. The use of a covering material which contains, or becomes contaminated with sugar in any form, tannic acid, or any other substance considered detrimental to portland cement, will not be permitted. The initial curing medium shall be effective and applied so as to prevent checking, cracking, and the appearance of dry spots in the surface of the concrete. Protect the sides of concrete slabs exposed by the removal of forms immediately to provide continuance of curing and prevent injury of the curb and gutter edges and the underlying subgrade. When it is expected during the progress of the work, and before all concrete has attained final set, that the temperature may fall below 35 degrees F. (2 degrees C.), a sufficient supply of straw, hay or other material suitable in the opinion of the Architect must be maintained on hand on the Project Site, to cover the concrete and to adequately protect its surface and edges against freezing until it is at least 10 days old.

b. Membrane Curing Compound. No compound shall be used until it has been reviewed by the Architect.
   (1) Application. Agitate curing compounds thoroughly during use, and spray uniformly, in a single coat, by approved spraying equipment, on all concrete surfaces, at a rate recommended by the manufacturer and based on moisture retention tests. Application will be made immediately following the final finishing operation.

6. Protection:
   a. Protection of Treated Surfaces. Keep concrete surfaces to which membrane compounds have been applied free from all foot and vehicular traffic and all other sources of abrasion for a minimum period of 72 hours.
   b. Protection. Protect the curb and gutter against all damage prior to final acceptance of the work by the Owner. Exclude the traffic from the pavement by erecting and maintaining barricades and signs until the concrete is at least 14 days old, or for a longer period if so directed by the Architect.

3.02 FIELD QUALITY CONTROL

A. Workmanship.
   1. Construct all curbs in workmanlike manner at the location and to the lines and levels indicated on the Drawings.

B. Curbs damaged during construction shall be replaced in sections at no cost to Owner

END OF SECTION 32 16 00

SECTION 32 31 00

CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers fencing at detention and BMP locations and alignments shown on the Drawings, complete. Fence around detention/BMP facilities to be 6'-0" in height.

B. Related Work Specified Elsewhere: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

1.02 REFERENCES

A. ASTM F567 Standard Practice for Installation of Chain Link Fence

B. ASTM F626 Specification for Fence Fittings

C. ASTM F900 Specification for Industrial and Commercial Swing Gates

1.03 SUMMARY

A. This Section includes industrial/commercial chain link fence and gates specifications:
   1. PVC coated chain link fabric
   2. PVC coated steel framework and fittings
   3. Gates: swing
   4. Barbed wire
   5. Installation

B. Related Sections:
   1. 01 33 00 Submittals/ Product Data/Shop Drawings
   2. 01 43 13 Manufacturers Qualifications
   3. 03 30 00 Cast in Place Concrete

1.04 QUALITY ASSURANCE

A. Galvanizing:
   1. All tubular members shall comply with provisions of ASTM A120, Schedule 40, for weight and coating.

B. Coating. All tubular steel posts, gate frames, rails and braces shall be coated to a thickness of not less than 10 mils with polyvinylchloride. All other component parts shall be coated to match the color of the coated framework. All items shall be supplied by Allied Fence Division, Anchor Fence, Inc., Merchants Metal Co. or Semmerling Mfg. Corp.

1.05 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Shop Drawings. Submit Shop Drawings, including details, showing fence height, size of posts, rails, braces, gates, footings and accessories.

PART 2 – PRODUCTS

2.01 VINYL COATED CHAIN LINK FENCE

A. Fence Fabric. Fabric shall be PVC coated (7 mil) over galvanized 9 gage (core wire size, not finished wire size) steel wire with a 2" mesh. Fabric coating shall be of the thermally fused type as per ASTM F 668. Type 2B. Steel core wire shall have a tensile strength of 75,000 psi with 0.30 oz./sq. ft. zinc coating. Wire shall have a break load strength of 1,290 lb. minimum. Selvage shall be knuckled at the bottom.

B. Corner and Terminal Posts. Posts shall be constructed of schedule 40 steel pipe. Posts shall have an outside diameter of 2-3/8" (2.375"), a minimum wall thickness of .130 and a minimum weight per ft. of 3.117 lb. Posts shall have PVC-coated Finish. Finish shall be in accordance with ASTM F 1234. Apply supplemental color coating of 10-14 mils of thermally fused PVC in black.

C. Line Posts. Posts shall be constructed of schedule 40 steel pipe. Posts shall have an outside diameter of 1-7/8" (1.875"), a minimum wall thickness of .120" and a minimum weight per ft. of 2.281 lb. Posts shall have a PVC-coated Finish as above.

D. Top Rails and Braces. Top rails and braces shall be constructed of schedule 40 steel pipe. They shall have an outside diameter of 1-5/8" (1.625"), a minimum wall thickness of 0.111" and a minimum weight per ft. of 1.83 lb. They shall have PVC-coated Finish as above.

E. Caps, Hardware, Miscellaneous. Post caps shall be of formed steel, cast malleable iron or aluminum alloy. Install one cap for each post where barbed wire supporting arms are not required. Top rail and brace ends shall be of formed steel, malleable iron or cast iron for the connection of rails and braces to terminal posts. Top rail sleeves shall be 6" and shall allow for expansion and contraction of top rails. Use 9 gage galvanized steel wire for the attachment of fabric to line posts. Double wrap 13 gage for rails and braces. Hog ring ties of 12-1/2 gage for attachment of fabric to tension wire. Tension bars shall be in one piece lengths equal to 2" less than full height of fabric with a minimum cross-section of 3/16" x 3/4". Install tension bars where chain link fabric meets terminal posts. 7 gage zinc coated tension wire with a tensile strength of 75,000 psi shall be installed at the bottom of the fence fabric. All parts shall have PVC-coated Finish (where applicable) as above.

F. Barbed Wire. Refer to Drawings for location of fencing to receive barbed wire.
1. Metallic Coated Steel Barbed Wire: Comply with ASTM A121, Design Number 12-4-5-14R, double 12-½ gauge (0.099 in.) (2.51 mm) twisted strand wire, with 4 point 14 gauge (0.080 in.) (2.03 mm) round barbs spaced 5 inches (127 mm) on center. Match coating type to that of the chain link fabric. <12-4-5-14R is specifically designed for chain link fence applications>
2. Coating Type Z - Zinc-Coated: Strand wire coating Type Z, Class 3, 0.80 oz/ft² (254 g/m²), barb coating 0.70 oz/ft² (215g/m²).

G. Swing Gates: Galvanized steel pipe welded fabrication in compliance with ASTM F900. Gate frame members 1.900 in. OD (48.3 mm) ASTM F 1083 schedule 40 galvanized steel pipe. Frame members spaced no greater than 10 ft. (2440 mm) apart vertically and horizontally. Welded joints protected by applying zinc-rich paint in accordance with ASTM Practice A780. Positive locking gate latch, pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Provide lockable drop bar and gate holdbacks with double gates. Match gate fabric to that of the fence system. Gateposts per ASTM F1083 schedule 40 galvanized steel pipe. Gate posts shall be minimum 4" in diameter.

H. Concrete. Concrete for setting posts shall have minimum 28 day compressive strength of 3,000 psi.

2.02 EXECUTION

A. Fence Framing: Install in accordance with ASTM F 567 and manufacturers instructions. Locate terminal posts at each fence termination. Space line posts at 10 feet on center. Concrete set all posts in holes bored with a diameter at least 4 times greater than the outside dimension of the post. Holes shall be 42" deep. Set post bottoms 36" below grade. Place concrete in a continuous pour, trowel finish the surface and slope to direct water away from posts. Install horizontal pipe brace at mid-height on each side of terminal posts. Install diagonal truss rods at these points, install braces and adjust truss rod. Install bottom tension wire before stretching fabric and attach to each post with ties or clips. Install the top rail in lengths of 21 feet. Connect top rail joints with sleeves for rigid connections with expansion/contraction. Install fabric on security side, and attach so that fabric remains in tension after pulling force is released. Leave approximately 2 inches between finished grade and bottom selvage. Attach fabric with wire ties and clips, to line posts at 15 inches on center, and to rails, braces, and tension wire at 24 inches center. To install tension bars, pull fabric taut, thread bar through fabric and attach to terminal posts with bands or clips spaced a maximum of 15 inches on center.

B. Barbed Wire: Stretched taut between terminal posts and secured in the slots provided on the line post barb arms. Attach each strand of barbed wire to the terminal post using a brace band. Barb arm shall be type I outward.

C. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F 567. Direction of swing shall be as indicated on drawings. Gates shall be plumb in the closed position having a bottom clearance of 3 in. (76 mm), grade permitting. Hinge and latch offset opening space shall be no greater than 3 in. (76 mm) in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum 6 in. (152 mm) diameter 24 in. (609.6 mm) deep. Gate leaf holdbacks shall be installed for all double gates.

D. Accessories: Bend ends of tie wires to minimize hazard to persons and clothing. Install nuts on fasteners opposite the fabric side of the fence for added security. Install extension arms of posts and align perpendicular to the fence. Uniformly space parallel rows of barbed wire on the security side of the fence. Pull wire taut and attach in clips or slots of each extension.

END OF SECTION 32 31 00

SECTION 32 94 00

LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Work covered under this Section includes all permit, fees, taxes, insurance, labor, materials, tools, equipment, and expertise to properly execute all work identified or implied by the Drawings and the Specifications.

B. Related Work Specified Elsewhere:

1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.

1.02 QUALITY ASSURANCE

A. The Contractor shall provide, on site, an experienced foreman who shall be present al all times during the execution of the work, and who shall be thoroughly familiar with the type of materials being installed and the proper materials and methods for their installation. The foreman may not be replaced without the written permission of the Owner and Landscape Architect.

B. The City of Monroe Tree Protection Ordinance, Zoning Ordinance, and Georgia Storm Water Management Manual are hereby made a part of this specification. Conform to all plant material specifications referred to therein.

1.03 SUBMITTALS

A. Contractor shall submit proof of acquisition or securement of plant materials a minimum of sixty (60) calendar days prior to the planned date of commencement of planting.

B. The Contractor shall submit to the Landscape Architect shop drawings and or samples as required by the Drawings.

C. Submit photographs a minimum of sixty (60) calendar days prior to the planned acquisition of plant materials (not brochure photos) of actual plant material to be installed. Include a legible measuring device in photo so that size of material can be ascertained.

1.04 JOB CONDITIONS

A. Services for construction:

1. Water will be available at the site and is furnished by the Owner at no cost to the Contractor. Water transportation will be furnished by the Contractor.
2. The Contractor's attention is directed to the fact that there are active utilities located within the limits of work. Before commencing work, the Contractor shall familiarize themself with the layout and operation of all utility systems and shall protect from damage, all of their parts above and below ground. Any indicated damage resulting from the Contractor's operations shall be immediately reported to the Owner and Landscape Architect. The Contractor shall be responsible for the cost of all repairs to utilities damaged by the Contractor.

B. The Contractor shall exercise care to protect existing work, buildings, trees, shrubs, lawns, etc. from any and all damage. Damage caused by the execution of the work by the Contractor shall be repaired to the satisfaction of the Owner at the expense of the Contractor.

C. It shall be the Contractor's responsibility to control and establish watering rates for all plant material and to conduct his activities in a clean, neat manner throughout the contract period. Sidewalks, streets, and other paved areas shall be continuously kept clean when planting and maintenance operations are in progress, and the entire area shall be cleaned at the end of each day's work.

D. The Contractor will provide watering for all plant material through the installation, maintenance and until landscape is acceptable to owner (landscape architect) whether the irrigation system is functioning or not.

1.05 GRADING & BACKFILLING

A. Fill Material: The Grading Contractor will be responsible for achieving the finish grades indicated on the grading plan (or as otherwise defined by these Specifications). The Contractor shall be responsible for fine grading (top 4") and preparation for planting. Such earth shall be topsoil, typical of the region, which shall be friable, natural topsoil, reasonably free of roots, rocks, weeds, and foreign matter. It shall not be handled in a muddy or frozen condition. Every effort shall be made to preserve organic matter.

B. Unsatisfactory Materials: If any of the topsoil brought in by the General Contractor is determined by the Landscape Architect or Contractor to be unsuitable for planting use, the material shall be removed and replaced as directed by the Landscape Architect.

C. Raking and Smoothing: The Contractor shall smooth and rake topsoil by machine and hand methods. Surfaces shall be first smoothed with a tractor and or hand drawn screen and then the entire surface shall be raked clean of roots and debris - providing a smooth surface which shall assure surface drainage away from buildings, walks, and curbs to drainage structures. All grading shall be approved by the Landscape Architect prior to planting.

PART 2 - PRODUCTS

2.01 PLANTING MATERIALS

A. Planting Soil: Any variation from this specification shall be fully described in writing by the Contractor and a sample approved on-site by the Landscape Architect.

1. Topsoil shall be fertile, friable, natural topsoil, brown in color and reasonably free of weeds and foreign matter. It shall not be handled in a muddy or frozen condition. Every effort shall be made to preserve organic matter.
2. Organic matter shall be peat humus (FS Q-P-166) and with texture and pH range suitable for intended use. Above components shall be mixed as follows: 1/3 Topsoil, 1/3 Organic Matter, and 1/3 Existing Soil (if suitable). The components shall be thoroughly mixed to a uniform consistency by hand or machine methods. Note: If existing backfill is deemed unsuitable, the planting soil mix shall consist of 50% topsoil and 50% organic matter.

B. Plants:

1. General: All plant material shall conform to or surpass minimum quality standards as defined by the American Association of Nurserymen, current edition of American Standards for Nursery Stock, 635-636 Southern Building, Washington D.C. In all instances, specifications outlined in the plant materials schedule take precedent.
2. Certificates of Inspection for Plant Materials: All necessary inspection certificates shall be

supplied to the Landscape Architect for each shipment of plant material, as required by law. Certificates showing source of origin shall be filed with the Landscape Architect prior to acceptance of material.

3. Inspection: All plant material shall be subject to inspection and approval. The Landscape Architect reserves the right to reject any an all plant material which fail to meet this specification. All rejected plant material shall be removed from the site by the Contractor within seven days of notification.
4. All plant material furnished shall be nursery grown, freshly dug, of normal habit, well branched, proportioned width to height, healthy and vigorous in growth, and shall have a well developed root system. All plants shall e true to species and variety. Plants used where symmetry is required shall match as nearly as possible.
5. Height and spread dimensions refer to the main body of the plant and not from branch tip to branch tip. The minimum acceptable sizes for plants measured before pruning with branches in normal position shall conform to measurements specified. Stock furnished in a size range specified shall mean not less than fifty percent and shall be of the maximum size specified within each range. Plants larger than specified may be used with the approval of the Landscape Architect at no additional cost to the Owner.
6. All plants shall be of healthy stock - free of diseases, insects, eggs, larvae, and parasites of an objectionable nature.
7. Availability and Substitutions: Substitutions for the plants specified will be accepted only when satisfactory evidence is submitted (in writing) to the Landscape Architect, showing that the plant material is not available. Requests for approval of substitutions of at least equivalent size and having essential characteristics similar to the originally specified material will be considered for approval.

C. Materials for Guying and Staking:

1. Stakes for supporting trees under two inch (2") caliper or multi-stem plants, shall be of sound timber, straight, uniform, sized as shown in the details, and of sufficient length to adequately support the plant. All stakes are to be painted dark gray.
2. Stakes for anchoring guy wires in the ground shall be #3 rebars as indicated in the planting details and shall be of sufficient length to hold guy taut and maintain tree firmly in upright position.
3. Wire shall be #12 gauge galvanized wire in double twisted strands.
4. Hose shall be suitable lengths of new or used reinforced black rubber or plastic garden hose with a maximum diameter of one-half inch (½").
5. Wrapping material for tree with two inch (2") trunks, or larger, shall be standard crinkled paper cemented together with bituminous material in strips eight to ten inches (8" - 10") wide.
6. Twine for wrapping material shall be lightly tarred, medium coarse sisal yarn.

D. Additional Materials:

1. Mulch shall be clean, fresh, shredded pine bark and shall be free of branches, cones and foreign material, delivered to the site in bales or in bulk.
2. Fertilizer shall be Sta-Green Nursery Special, or equal delivered to the site in unopened containers.
3. Burlap for wrapping earth ball shall be made of jute and weigh not less than 7.2 ounces per square yard.

PART 3 - EXECUTION

3.01 PLANTING OPERATIONS

A. Preparation, Handling, and Digging:

1. Retain as many fibrous roots as possible. Plants designated B&B shall be adequately balled with firm natural balls of soils in sizes as specified in American Standards for nursery Stock. Balls shall be wrapped firmly in burlap and secured tied with heavy twine or rope.
2. Handle plants so that root systems and branches are adequately protected at all times from drying out. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil, wet moss, or other acceptable material, and shall be kept well watered. Plants shall not remain unplanted for longer than three (3) days after delivery.
3. Prepare plants for shipment in a manner that will prevent any damage to the branches, shape, or future development of the plant.
4. Do not remove container grown stock from their containers until planting time.
5. At least one plant of each species and variety specified shall have a securely attached waterproof tag bearing legible designation of botanical name and source.

B. Layout of Major Planting: the Contractor shall stake out all trees, shrubs, and ground cover beds indicated in the Drawings, for approval by the Landscape Architect, prior to the installation of Plant material. Plant material installed without approval will be relocated by the Contractor as directed by the Landscape Architect at the expense of the Contractor.

C. Planting Operations and Conditions: All plants, deciduous and evergreen, shall be planted at such times of the year as the job may require, with the agreement of the Contractor to guarantee the material as herein specified. Actual planting shall be performed only during periods when weather conditions are suitable.

D. Excavation for Planting Trees and Shrubs:

1. Circular plant pits with vertical sides shall be dug by machine or hand methods as indicated on the Drawings for planting trees and shrubs. Plant pit diameters shall be two (2) times greater than that of the spread of the root mass.
2. All tree pits must be loosened to a depth of two feet (2') below the bottom of the pit to such a depth that any hardpan has been broken up and moisture is allowed to move through freely. The Contractor shall fill each pit with water and observe the pit for a period of twelve (12) hours. If the water has not dissipated by fifty per cent (50%), the pit shall be drilled with a twelve inch (12") auger to a depth of four feet (4') below the bottom of the pit and filled with gravel. If in the opinion of the Contractor the drainage is still insufficient, the Contractor shall notify the Landscape Architect in writing prior to installing the plant material. Otherwise, the Contractor is deemed to be totally responsible for the guarantee and livability of the plant material.

E. Excavation for Planting Groundcover, Perennial, and Annual Color Beds.

1. Beds shall be scarified by hand or machine methods to a depth of twelve inches (12"). Two inches (2") of organic matter and twenty (20) pounds per one thousand (1,000) square feet of Sta-Green Nursery Special Fertilizer (or equal) shall be incorporated into the soil unless otherwise specified.
2. Seasonal color beds shall be scarified by hand or machine method to a depth of twelve inches (12"). Two inches (2") of organic matter and four (4) pounds per one hundred (100) square feet of 0-20-20 fertilizer shall be incorporated into the soil.
3. Under existing tree canopy scarification and preparation of groundcover and seasonal color beds shall be by hand methods only with extreme care being exercised to avoid damage to the existing tree roots.
4. Seasonal color beds shall be excavated to a depth of eighteen inches (18") below finish grade. Backfill with 50% topsoil and 50% organic matter and fertilizer (5-10-10, at the rate of ½ cup per square yard) shall be thoroughly worked into the planting soil mix.

F. Setting Trees and Shrubs:

1. All plants shall be set so that when settled they will occur approximately two to three inches (2"-3") above finish grade, (allow an additional two to three inches (2"-3") to compensate for settling). Each plant shall be planted neatly in the center of the pit.
2. Set plants plumb and brace rigidly in position until planting soil has been tamped solidly around the ball and roots.
3. Balled and container plants shall be placed firmly upon scarified subgrade and backfilled with the planting soil mixture. Remove non deteriorating binder from root ball. Hand tamp carefully around and under ball to fill all voids. Water during backfilling. Form saucer from planting soil mix in order to retain water.
4. Repair any disturbed areas as necessary to return them to their original state.

G. Guying, Staking, Wrapping and Mulching:

1. Staking shall be completed immediately after planting. Plant shall be plumb after staking in accordance with the appropriate detail.
2. Guy trees over two inches (2") caliper. Space three (3) guys equally about each tree, attached at approximately two-fifths (2/5) of the trunk height and at a forth-five (45) degree angle and anchored in the ground with deadmen. Guy to trunks with wire loops and rubber hose drawn taut in all directions. Guys shall be equally taut. Safety flags shall be installed on all guy wires as detailed on the drawings.
3. Trunks of deciduous trees larger than two inches (2") in caliper which are subject to sun scald, shall be wrapped spirally with standard paper or fiber wrapping material from the second branch down to the base of the trunk and the wrapping securely in place (only if required).
4. Stake trees less than two inches (2") in caliper with two (2) wooden stakes driven approximately one half (½) of trunk height. Stake to be one foot (1') from trunk, fastened at approximately two fifths (2/5) of trunk height with wire run through black rubber hose. Do not drive stakes through rootball.
5. Mulch all planting beds and other areas as designated with three inches (3") of fresh mulch. Individual plants are to be mulched as detailed.

H. Maintenance of Planted Areas:

1. Maintenance of new plantings shall consist of pruning, watering, cultivating, weeding, mulching, tightening and repairing guys, re-setting plants to proper grades or upright position, restoration of earth berm saucer, and furnishing, supplying, and applying such sprays as necessary to keep plantings free of insects and disease. If planting is performed after lawn areas have been prepared or installed, proper protection to these areas shall be provided. Any and all damage resulting from planting operations shall be promptly repaired.
2. Maintenance shall begin immediately after each plant is planted and shall be provided until the work is accepted by the Landscape Architect and Owner upon completion of all work under the Contract.
3. Planting areas and plants shall be protected at all times against trespassing and damage of any kind for the duration of the maintenance period. If any plants become damaged or injured, they shall be treated or replaced as directed by the Landscape Architect at no additional cost to the Owner.
4. The root system of all plants shall be watered at such intervals as will keep the surrounding soil in the best condition for promotion of root growth and plant life.
5. All planting and plant materials required by this Contract shall be in a satisfactory and acceptable condition when the Contractor requests payment.

3.02 FINAL INSPECTION FOR ACCEPTANCE AT COMPLETION

A. A final inspection for acceptance will be made by the Landscape Architect within seven (7) days of written notification by the Contractor that in their opinion the work is 98% complete. If the Landscape Architect determines that the work is complete and acceptable, notification of the date of acceptance will be sent to the Contractor. This date shall coincide with the date of Substantial Completion.

B. Upon acceptance the Contractor's responsibility for maintenance is ended, and adequate maintenance (including watering) becomes the sole responsibility of the Owner.

3.03 GUARANTEE, INSPECTION, AND REPLACEMENT

A. The Contractor's guarantee period begins the date of final acceptance by the Landscape Architect and the Owner.

B. Guarantee Period: All plant materials, lawn areas and construction covered by the Contract shall be guaranteed by the Contractor for a period of one (1) year from the date of final acceptance.

C. The Contractor shall furnish the Owner with a written detailed maintenance schedule for weeding, pruning, fertilizing, watering, etc. in order to ensure the Owner of the continued success of the planting. This schedule shall include sufficient instructions or each item so that the Owner will have a clear maintenance concept.

D. During the Guarantee Period the Contractor shall make frequent inspections of the project to satisfy themselves that the maintenance by the Owner is adequate. Any methods or products they deem not normal or detrimental to good plant growth shall be reported to the Owner in writing. Should the Contractor fail to inspect and report deficiencies to the Owner, in writing, the Contractor shall be held responsible for any and all necessary replacements and repairs.

3.04 INSPECTION AT THE TERMINATION OF THE GUARANTEE PERIOD

A. At the end of the guarantee period, inspection of the plant material will be made by the Landscape Architect upon written notice requesting such inspection submitted by the Contractor at least ten (10) calendar days prior to the Termination Date of the Guarantee Period. The Guarantee Period does not end until the Contractor contacts the Landscape Architect for this inspection.

B. The Contractor shall replace, without cost to the Owner, and as soon as the weather conditions permit, all dead plants not in vigorous thriving condition, as determined by the Landscape Architect during and at the end of one (1) year Guarantee Period. Replacements shall closely match adjacent specimens of the same species, and shall be subject to the selection in the field by the Landscape Architect prior to digging. Replacements shall be subject to the requirements stated in these specifications.

C. Replacement material shall be guaranteed for a period of one (1) year from the date of replacement.

D. The Contractor shall make all necessary repairs to grades, lawn areas, and paving required because of plant replacements. Such repairs shall be done at no cost to the Owner.

END OF SECTION 32 94 00

SECTION 33 10 00

SITE UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers complete installations of outside utilities except storm and sanitary sewers.

B. Related Work Specified Elsewhere:
1. Refer to Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
2. Refer to Section 31 23 00, EXCAVATING AND BACKFILLING.
3. Refer to Section 31 25 00, EROSION, SEDIMENTATION AND POLLUTION CONTROL.
4. Refer to Section 33 10 00, SITE UTILITES
5. Refer to Section 33 40 00, STORM AND SANITARY SYSTEMS
6. Refer to Section 03 30 00, CAST-IN-PLACE CONCRETE, for concrete work.
7. Refer to Section 22 00 00, PLUMBING SYSTEMS AND EQUIPMENT.

C. The work here implied and indicated shall be performed by a Contractor qualified to perform such work as described in the City of Monroe and licensed by the State of Georgia.

1.02 QUALITY ASSURANCE

A. Testing Agency: Samples and tests, as required, are to be made by an independent testing laboratory provided by the Owner.

B. Allowable Tolerances: Allowable dimensional alignment for site utilities shall be as follows:

Vertical: +0.10 feet
Horizontal: +0.50 feet

C. All water system standards shall City of Monroe standards.

D. Georgia Department of Transportation Standards for Roads and Bridges, latest edition.

E. Factory Mutual (FM) Research Approval Guide

F. Underwriters Laboratory (UL) Approval Guide

1.03 SUBMITTALS

G. Shop Drawings: Shop Drawings shall include:
1. Water meter, double detector check, backflow preventer, water valves, water service pipes and fittings, fire hydrants, and water vault.
2. Certificates: Provide manufacturer's certificates of compliance and/or testing reports including UL/FM approval of pipe, valves, pumps, controls and castings.

B. Product Data for detectable warning tape at non-metallic pipes. Refer to Section 31 20 00 Excavating and Backfilling for requirements.

1.04 JOB CONDITIONS

A. Have all utilities marked, verify horizontal and vertical locations. Call Utility Protection Center at 811. Connect utilities to building services at a point 5 feet outside building unless otherwise indicated. Work shall be in conformance with local codes, ordinances and utility companies.

B. Protection of Existing Utilities Structures.
   1. Protect existing utilities indicated on Drawings, or locations of which are known prior to excavation, from damage during excavation and backfilling of trenches, and if damaged, repair them at no expense to the Owner. Any existing line or utility structure which is not indicated on Drawings or location of which is not made known in sufficient time to avoid damage, if inadvertently damaged, shall be repaired by the Contractor and adjustment in payment will be made in accordance with "GENERAL CONDITIONS." In any event, make repairs under supervision of the utility concerned.

C. Removal of Utilities.
   1. Utilities indicated to be removed or abandoned shall be removed or abandoned in accordance with regulations and requirements of governing utility or code authority.

D. Gas Service.
   1. General: Gas service system is intended for distribution of natural gas, and materials, appurtenances and workmanship used in system shall be suitable for accomplishment of this purpose.
   2. Gas Service: Service mains, gas regulators, gas meters, and tapping of existing mains shall be furnished and installed by local gas company.

PART 2 - PRODUCTS

2.01 MIXES

A. Concrete: All concrete shall have 3,000 PSI 28 days compressive strength, air entrained and conform to ASTM C 94.

2.02 FABRICATION AND MANUFACTURER

A. Domestic Water Service:

   1. All components of the water system shall comply with the requirements of the City of Monroe.
   2. Pipe and Fittings:
      a. Ductile Iron Pipe. Conform to AWWA standard C-151. Pipe and fittings shall be cement lined in accordance with AWWA standard C-104. Fittings shall conform to AWWA standard C-110, 350 PSI pressure rating, standard outside coating and cement mortar lining. Joints shall conform to AWWA standard C-111, mechanical or push-on joints.
      b. Copper Tubing shall conform to ASTM B 88, Type K. Fittings shall conform to ANSI B16.15 and AWWA C-800.
      c. Polyvinyl Chloride (PVC) Plastic Pipe; All PVC pipes located below pavement in the site shall be schedule 80.
   3. Valves.
      a. Gate valves shall have joint ends to fit the type of pipe used, and be opened by turning to the left. Valves to conform to AWWA C-509.

4. Fire Hydrants. Fire hydrants shall have a 6 inch connection to the main and shall have two 2-1/2 inch hose connections and one 4-1/2 inch pumper connection. The hose threads shall conform to the local standards. The contractor is responsible to secure the required thread specifications.
   a. The hydrants shall conform to AWWA C-502 and shall comply with all requirements of the City of Monroe. Design, material and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Paint hydrants one coat of primer and two finishing coats of paint of color required by City of Monroe. Hydrants shall have valve openings of not less than 5 inches. Hose nipples shall be bronze with connections compatible to those of local fire department.

PART 3 - EXECUTION

3.01 EXCAVATION

A. General: Perform excavation of every description and of whatever substances encountered, to depths indicated on Drawings. During excavation, deposit material suitable for backfill in an orderly manner a sufficient distance from excavation banks to avoid overloading and to prevent slides or cave-ins. Waste material unsuitable for backfill as directed by the Geotechnical Engineer. Grade as necessary to prevent surface water from flowing into trenches or other excavations, and remove water accumulating therein by pumping or by other acceptable method. Unless otherwise specified, excavation shall be by open cut. Keep banks of trenches and excavation for structures as nearly vertical as practicable and where required, properly sheet and brace. Fill unauthorized excess excavation below levels indicated for structures or pipe with sand, gravel or concrete.

B. Trench Excavation: Excavate true to line to elevation at least 2 feet above top of pipe to provide clear space of not less than 6 inches nor more than 8 inches on either side of pipe. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length, except for portions of pipe sections where it is necessary to excavate for proper sealing of pipe joints. Bell holes and depressions for joints dug after trench bottom has been graded, and in order that pipe rest upon prepared bottom for as nearly its full length as practicable, to be only of such length, depth and width as required for properly making particular type of joint. Replace material excavated beneath pipe entering and leaving manholes with concrete and extend such concrete fill to center of pipe for distance of at least 3 feet from face of manhole and terminate at a joint.

C. Rock Excavation: Where rock is encountered, carry excavation to depth of at least 6 inches below bottom of pipe. No part of trench excavations shall be carried more than 12 inches below bottom of pipe. Backfill trench with selected loose, moist earth and compact to provide proper bedding for pipe. Rippable weathered rock encountered is part of the work and shall not be considered for additional payment.

D. Unsuitable Material: Where bottom of trench is found to be unstable or to include ashes, cinders, refuse, vegetable or other organic material, or large pieces of fragments of inorganic material, which in judgment of the Geotechnical Engineer, should be removed, excavate and remove such unsuitable material to minimum depth of 6 inches below pipe. Backfill trench with selected bedding material and compact to provide uniform and continuous bearing for pipe. Dispose of unsuitable material.

E. Shoring Requirements: Perform shoring and sheeting that is required to protect excavation and to safeguard employees. Widen excavation to provide for space occupied by shoring and sheeting.

F. Tunnel Excavation: Perform tunneling and/or jacking methods of excavation at locations indicated on Drawings. Operations in connection with tunnel excavation shall be responsibility of the Contractor. Special care shall be taken to protect pipe, existing structures above or below ground

and employees. Repair damage promptly. Reference City of Monroe "Sewer Main Standards" for Jack and Bore specifications, which are made a part of these specifications by reference.

G. Open Cut: Open cuts of pavement in the right of way shall conform to City of Monroe requirements. All fees for performing open cuts in the right of way shall be paid for by the contractor prior to receiving the permit to perform work in the right of way. These fees may be refundable if repair work meets City of Monroe requirements.

3.02 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Domestic Water Service
   1. Pipe: Install ductile-iron pipe in accordance with all applicable requirements of AWWA standard C-600. Install copper tubing with brass fittings in accordance with manufacturer's recommendations. Install PVC pipe in accordance with AWWA C-900 and as recommended by the manufacturer. Pipe under and to 4 feet outside of paved areas shall be Schedule 80 PVC sleeved in Schedule 40 PVC.
   2. Setting Hydrants, Valves and Valve Boxes: Install hydrants, valves and valve boxes in the lines, plumb, and centered with valve boxes placed directly over the valves. Carefully tamp earth fill around the valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet. Clean hydrant and valve interiors before installation. Inspect the hydrant or valve in opened and closed positions. Set hydrants at such elevations that the connecting pipe will have the same depth of cover as the distributing mains and with the nozzles at least 18 inches above the ground. The back of the hydrant shall be firmly wedged against the vertical face of the trench. If the character of the soil is such that the hydrant cannot be securely wedged, use bridle rods and rod collars, which shall be not less than 3/4 inch stock and shall be protected by a coat of acid around the base of the hydrant to insure drainage with at least 6 inches of broken stone above the drainage outlet on the hydrant. Connect all hydrants to the main with 6 inch pipe and have a 6 inch valve installed between the main and the hydrant unless otherwise noted. Thoroughly compact the entire backfill around the hydrant.
   3. Thrust Restraint: Install concrete thrust blocks at tees and elbows in water service lines to prevent fittings from being blown off lines when under pressure. Same can be accomplished by using metal restraining tie rods or using restrained joints for pipes. For details see NFPA Standard 24, Outside Protection, Appendix B.
   4. Water Service Sterilization: Each unit of completed water service must be sterilized in accordance with AWWA C-651.

3.03 BACKFILL

A. General. Do not backfill until required inspections are made and tests are performed. Backfill with excavated materials specified for backfilling, consisting of earth, loam, sandy clay, sand and gravel or other materials, free from large clods of earth or stones. Broken concrete shall not be used as backfill material. No backfilling shall take place in freezing weather, and no backfill shall be made with frozen material. Adjust moisture content of backfill material if required for proper compaction. Reopen any trenches improperly backfilled, or where settlement occurs, to depth required for proper compaction, refill and compact to specified density. Compact backfill for structures to specified density.

B. Around pipe. Deposit suitable backfill material under haunches of pipe in 6 inch layers and thoroughly compact backfill to at least 90 percent of maximum density at optimum moisture content determined by ASTM D 698 until pipe has minimum cover of 1 foot for water and gas mains. Moisture content of soil at time of compaction shall be not more than 3 percent above or 3 percent below optimum. Be careful not to disturb pipe. Carry backfilling on simultaneously on both sides of pipe to eliminate possibility of lateral displacement.

C. Remainder of Trench. Deposit remainder of suitable backfill material in layers not exceeding 12 inches in loose depth and thoroughly compact them to at least 95 percent of maximum density at optimum moisture content determined by ASTM D 698, except compact top 2 feet of backfill below paving base or subgrade in areas to be paved to at least 98 percent of maximum density at optimum moisture content determined by ASTM D 698. Moisture content of soil at time of compaction shall be not more than 4 percent above or 4 percent below optimum.

D. Crushed Rock Bedding. Where selected bedding material is required by Drawings or by Architect during construction to replace unsuitable foundation material, crushed rock bedding shall be used. Bedding material shall consist of crushed rock mechanically or naturally combined with screenings from crusher operations or other finely divided mineral matter having similar physical properties. Composite material to be free from organic or other objectionable matter and to consist of angular, sound and durable fragments, reasonably uniform in density and quality, and free from thin and elongated pieces. Minimum depth between bottom of trench and lowest point of pipe shall be 4 inches or one eighth of outside diameter of pipe, whichever is greater.

1. Crushed rock shall be well graded with maximum size of 2 inches. Not more than 20 percent by weight shall pass No. 4 sieve and shall not contain more than 3 percent by weight of particles smaller than 20 micrometer grain size as determined by ASTM Standard D 422.

E. Improved bedding where required by Drawings shall consist of granular material (sand, crushed rock, etc.) or concrete cradle as indicated. Granular material shall be free from organic or other objectionable material and shall conform to grading requirements for either fine or coarse aggregate as set out in Section 03 30 00, CAST-IN-PLACE CONCRETE.

3.04 FIELD QUALITY CONTROL

A. Testing and Inspection.

1. Water Lines.
   a. Pressure Test. After pipe is laid, joints completed, and trench partially backfilled, leaving joints exposed for examination, newly laid pipe or any valved section of piping shall, unless otherwise specified, be subjected to pressure test of 50 percent in excess of expected operating static pressure at points of reading. Perform pressure test in accordance with requirements of AWWA Standard C-600.
   b. Leakage Test. Perform leakage test in accordance with requirements of AWWA Standard C-600.
   c. Manufacturer's certificate of compliance or certified analysis will be required for each shipment of material used. Perform tests in accordance with the requirements of ANSI A21.6 or A21.8.
2. Backfill.
   a. Maximum Density Determination. Make tests on two separate samples to determine maximum density at optimum moisture content. Samples to be taken where directed by the Geotechnical Engineer. Findings of these tests to be filed with the Architect in triplicate.
   b. Compaction Tests. Take compaction or in-place density tests at location and time requested by the Geotechnical Engineer. Backfill not meeting requirements specified shall be removed, replaced, recompacted and retested for compaction at expense of Contractor. Findings of these tests shall be filed with Geotechnical Engineer in triplicate.

END OF SECTION 33 10 00

SECTION 33 40 00

STORM AND SANITARY SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers the complete installation of all storm and sanitary septic systems.

1. All storm and sanitary septic systems shall be constructed to the locations indicated on the Drawings.
2. All Work shall be in conformance with the requirement of local codes and ordinances.

B. Related Work Specified Elsewhere:

1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
2. Refer to Section 31 23 00, EXCAVATING AND BACKFILLING.
3. Refer to Section 31 25 00, EROSION, SEDIMENTATION AND POLLUTION CONTROL.
4. Refer to Section 33 10 00, SITE UTILITIES, for other exterior utilities.
5. Refer to Section 03 30 00, CAST-IN-PLACE CONCRETE, for concrete specifications.
6. Refer to Drawing P2.1 for Lint Interceptor coordination.

1.02 QUALITY ASSURANCE

A. Testing Agency: Samples and tests, as required, are to be made by an independent testing laboratory provided by the Owner.

B. Allowable Tolerances: The allowable dimensional alignment for gravity sewers shall be:

1. Minimum 1% slope, unless otherwise indicated on the Drawings.

1.03 SUBMITTALS

A. Shop Drawings: Shop Drawings for manholes, oil water separator and outlet control structure (plans, elevations, sections, details and frames and covers).

B. Product Data:

1. Storm sewer pipe and fittings.
2. Sanitary sewer pipe and fittings.
3. Manholes and oil water separator.
4. Outlet control structure.

C. Certificates: Manufacturer's certified analysis or certificate of compliance shall be furnished for all shipments of pipe, cast iron frames, grates and covers, valves and other miscellaneous material required under this Section of the Specifications.

D. Sanitary Sewer Record Drawings - Reference Part 3, Paragraph 3.05 of this section.

E. Coordination Drawings as required where multiple utilities leave buildings.

1.04 JOB CONDITIONS

A. Connect sewers to the building service at a point five (5) feet outside the building with the exception of roof drains and unless otherwise indicated. All Work shall be in conformance with the requirement of local codes, ordinances, and utility companies.

B. Protection of Existing Utilities Structures:

1. Have all utilities marked, verify horizontal and vertical locations. Call Utility Protection Center at 811. Protect the existing utilities indicated on the Drawings or the locations of which are known prior to excavation, from damage during excavation and backfilling of trenches, and if damaged, repair them at no expense to the Owner. Any existing line or utility structure which is not indicated on the Drawings or the location of which is not made known in sufficient time to avoid damage, if inadvertently damaged, shall be repaired by the Contractor. In any event, make repairs under the supervision of the utility concerned.

C. Removal of Utilities:

1. All utilities indicated to be removed or abandoned shall be removed or abandoned in accordance with the regulations and requirements of the governing utility or code authority.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Brick. Brick for manholes shall conform to ASTM C 32, Grade SS or SM.

B. Concrete. All cast-in-place concrete shall have 3,000 psi at 28 days compressive strength; air entrained and shall conform to ASTM C 94 for ready mixed concrete.

C. Cement. Cement for sanitary sewer manholes shall be Type II, conforming to ASTM C 150.

D. Mortar and Plaster. Mortar and plaster for masonry manholes shall consist of one part Portland cement and two parts fine sand. Lime may be added to the mortar in the amount of not more than 25 percent of the volume of cement.

2.02 FABRICATION AND MANUFACTURE

A. Sanitary Sewer:

1. Pipe:
   a. Ductile Iron Pipe. Conform to the provisions of AWWA C151 with the standard coating and a cement mortar lining in accordance with AWWA C104 and City of Monroe standards.
   b. Type PSM poly (vinyl chloride) (PVC) sewer pipe and fitting conform to ASTM D 3034, SDR 35 and City of Monroe standards.
2. Pipe Joint:
   a. Ductile Iron Pipe Joints. Conform to AWWA C111 and City of Monroe standards.
   b. PVC Sewer Pipe and Fittings. Use elastomeric gasket joints, the assembly of which shall be in accordance with ASTM D 3212 and City of Monroe standards.

B. Storm Sewer:

1. Pipe:
   a. Corrugated Metal Pipe (CMP) conforming to AASHTO standard M36. Refer to Drawings for more information.

b. PVC pipe at connection to roof drain at building including cleanout. Refer to Drawing A1.2A.
c. HDPE pipe for roof drain downstream from cleanout conforming to ASTM F2648. Refer to Drawing A1.2A.

2. Pipe Joints:
a. Corrugated metal pipe joints shall be made with connecting bands conforming to AASHTO standard M36.
b. PVC pipe joints shall be made with plain ends for solvent-cemented joints with socket-type fittings.
c. HDPE pipe joints shall be made with single wall fittings.

C. Reinforcing steel. Reinforcing steel to be deformed bars except where otherwise noted on plans and conform to ASTM A 615, Grade 40.

D. Manhole and inlet steps. Where required, provide manholes and inlets with steps equal to M.A. Ind. Inc., #PS-1 or #PS-1-PF as approved by City of Monroe not less than 10 inches in width built into and thoroughly anchored in the walls and spaced uniformly approximately 12 inches apart. Steps will not be required unless the depth from cover of manhole or inlet to invert of main sewer exceeds 4 feet.

E. Manhole and cleanout frames and covers and inlet gratings. Provide cast iron conforming to ASTM A 48, Class 30. All castings to be true to pattern, in forms and dimensions, free from faults, sponginess, cracks, blowholes and other defects affecting their strength. Bearing surfaces between frames and covers to be machined, fitted together, and match-marked to prevent rocking.

F. Precast reinforced concrete manhole sections shall conform to ASTM C 478.

PART 3 - EXECUTION

3.01 EXCAVATION

A. General: Perform all excavation of every description and of whatever substances encountered, to the depths indicated on the Drawings. During excavation, deposit material suitable for backfill in an orderly manner a sufficient distance from the excavation banks to avoid overloading and to prevent slides or cave-ins. Waste material unsuitable for backfill as directed by the Engineer or County Inspector. Grade as necessary to prevent surface water from flowing into trenches or other excavations, and remove any water accumulating therein by pumping or by other acceptable method. Unless otherwise specified, all excavation shall be by open cut. Keep the banks of trenches and excavation for structures as nearly vertical as practicable and where required, properly sheet and brace. Fill any unauthorized excess excavation below the levels indicated for structures or pipe with sand, gravel or concrete.

B. Trench Excavation. Excavate true to line to an elevation a minimum of 3' above the top of pipe to provide a clear space of not less than 6 inches nor more than 8 inches on either side of the pipe. Grade the bottom of the trenches accurately to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for the proper sealing of pipe joints. Bell holes and depressions for joints dug after the trench bottom has been graded, and in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, to be only of such length, depth and width as required for properly making the particular type of joint. Replace any material excavated beneath pipe entering and leaving manholes and inlets with concrete and extend such concrete fill to the center of pipe for a distance of at least 3 feet from face of manhole and inlet and terminate at a joint.

C. Rock Excavation. Where rock is encountered, carry the excavation to a depth of at least 6 inches below the bottom of the pipe. No part of trench excavations shall be carried more than 12 inches below the bottom of the pipe. Backfill the trench with selected loose, moist earth and compact to provide proper bedding for the pipe. Rippable weathered rock removal is part of the work and shall not be considered for additional payment.

D. Unsuitable Material. Where the bottom of the trench is found to be unstable or to include ashes, cinders, all types of refuse, vegetable or other organic material, or large pieces or fragments of inorganic material, which in the judgment of the Geotechnical Engineer, should be removed, excavate and remove such unsuitable material to a minimum depth of 6 inches below the pipe. Backfill the trench with selected bedding material and compact to provide uniform and continuous bearing for the pipe. Dispose of the unsuitable material.

E. Shoring Requirements. Perform all shoring and sheeting that is required to protect the excavation and to safeguard employees. Widen excavation to provide for space occupied by shoring and sheeting.

3.02 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Pipe:

1. Laying Pipe: Shape the bottom of the trench by hand to give substantially uniform circumferential support to the lower fourth of each pipe. Where applicable, pipe laying shall proceed upgrade with the tongue or spigot ends pointing in the direction of the flow. Each pipe to be laid true to line and grade indicated on the Drawings and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line. As the work progresses, clean the interior of the sewer of all dirt and superfluous materials. Where cleaning after laying is difficult because of small pipe size, keep a suitable swab or drag in the pipe and pull forward past each joint immediately after the joining has been completed. If the maximum width of the trench at the top of the pipe as specified is exceeded, install, such concrete cradling, pipe encasement or other bedding as may be required by the Architect to support the added load of the backfill. Keep trenches for all sections of the sewer free from water until the pipe-jointing material has set and the trench backfilled. Do not lay pipe when the condition of the trench or the weather is unsuitable for such work. At times when the work is not in progress, keep open ends of pipes and fittings securely closed so that no trench water, earth or other substance will enter the pipe or fittings. When conditions are such that the pipe cannot be adequately supported on undisturbed earth or tamped backfill, encase the pipe in concrete or support it on a concrete cradle. Thermoplastic sewer pipes shall be installed in accordance with ASTM D 2321.
2. Pipe Joints:
    a. Corrugated metal pipe. Installation and joining or connecting shall be performed in accordance with the recommendations of the pipe manufacturer.
3. Connection to existing pipe: Make connections to existing pipe by the use of one of the joints described above where possible to do so. Where the end of the existing pipe is broken or a standard joint is otherwise impracticable, install a concrete collar to make the connection.
4. Connection to Existing Manholes: Make pipe connections to existing manholes in such a manner that the finished work will conform as nearly as practicable to the essential applicable requirements for new manholes, including all necessary concrete work, cutting and shaping.
5. Wye Branches: Install commercially manufactured wye branches where indicated on the plans. Cutting into the pipe for connections will not be permitted except in special cases reviewed by the Architect/Engineer.
    a. Pipe Plugs: Plug all open ends of wye branches with a manufactured stopper installed in accordance with provisions for jointing. Plug open ends of sewer pipe with a

manufactured stopper or concrete masonry. Concrete masonry plugs shall have a minimum thickness of 4 inches. Install all plugs in such a manner that the open end of the pipe is permanently sealed but can be removed for future extensions without damaging the pipe.

B. Manholes:

1. General. Construct manholes of precast concrete with cast iron frames and covers, and in accordance with the Drawings. Precast reinforced concrete manholes shall conform to ASTM C 478. The invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large radius as the size of the manhole will permit. Make changes in size and grade of the channels gradually and evenly. The invert channels may be formed directly in the concrete of the manhole base, or shall be built up with brick and mortar or may be half tile laid in concrete, or may be constructed by laying full-section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than 1 inch per foot nor more than 2 inches per foot. Any material excavated beneath pipe entering and leaving manholes and inlets shall be replaced with concrete. Such concrete fill shall extend to the center of pipe for a distance of at least 3 feet from face of manhole and inlet and shall terminate at a joint.
2. Jointing and Plastering. Fill mortar joints completely and make them smooth and free from surplus mortar on the inside of the manhole. Plaster brick manholes with half inch of mortar over the entire outside surface of walls. Lay brick radially with every sixth course laid as a stretcher course. When precast concrete manhole sections are used, set each section in a fresh bed of mortar to make a mortar joint with a minimum thickness of 1/8 inch. Point up all joints inside and out.
3. Frames and Covers. Set the cast iron manhole frame in a bed of mortar and carefully adjust to the elevations indicated on the Drawings.
4. Inspection manholes, branch connections and elbows on large diameter pipe shall be built to conform to details indicated on the Drawings.

C. Inlets and Junction Boxes: Construct inlets and junction boxes of the materials and to the exact dimensions and grades indicated on the Drawings. Finish surfaces smooth and true. Expansion joint filler shall be preformed bituminous treated fiberboard conforming to ASTM D 994, Type III.

D. Headwalls: Construct headwalls of the materials and to the exact dimensions and grades indicated on the Drawings. Finish surfaces smooth and true.

E. Rock Riprap: Place Riprap at the ends of pipe and in open ditches at the locations and to the lines and dimensions indicated on the Drawings. Place the riprap material on prepared areas by hand, to form a smooth surface. All pieces shall be in close contact and have a firm and even bearing on the soil and not wholly on the riprap material below. Fill the spaces between the larger stones with stones of suitable size so placed as to leave a surface capable of shedding water to the maximum degree practically obtainable.

F. Backfill:

1. General: Do not backfill until all required inspections are made and tests are performed. Backfill with the excavated materials specified for backfilling, consisting of earth, loam, sandy clay, sand and gravel or other materials, free from large clods or earth or stones. Broken concrete shall not be used as backfill material. No backfilling shall take place in freezing weather, and no backfill shall be made with frozen material. Adjust the moisture content of the backfill material if required for proper compaction. Reopen any trenches improperly backfilled, or where settlement occurs, to the depth required for proper compaction, refill and compact to specified density. Compact all backfill for structures to the

specified density.

2. Around Pipe: Deposit suitable backfill material under the haunches of the pipe in 6 inch layers and thoroughly compact. Backfill to at least 90 percent of maximum density at optimum moisture content determined by ASTM D 698 until the pipe has a minimum cover of 2 feet. The moisture content of the soil at time of compaction shall be not more than 3 percent above or 3 percent below the optimum. Be careful not to disturb the pipe. Carry backfilling on simultaneously on both sides of the pipe to eliminate the possibility of lateral displacement.
3. Remainder of Trench: Deposit the remainder of the suitable backfill material in layers not exceeding 12 inches in loose depth and thoroughly compact them to at least 95 percent of maximum density at optimum moisture content determined by ASTM D 698, except compact the top 12 inches of backfill below the paving base or subgrade in areas to be paved to at least 98 percent of maximum density at optimum moisture content determined by ASTM D 698. The moisture content of the soil at the time of compaction shall be not more than 4 percent above or 4 percent below the optimum.
4. Crushed Rock Bedding: Where selected bedding material is required by the Drawings or by the Architect/Engineer during construction to replace unsuitable foundation material, crushed rock bedding shall be used. The bedding material shall consist of crushed rock mechanically or naturally combined with screenings from crusher operations or other finely divided mineral matter having similar physical properties. The composite material to be free from organic or other objectionable matter and to consist of angular, sound and durable fragments, reasonably uniform in density and quality, and reasonably free from thin and elongated pieces. The minimum depth between the bottom of the trench and the lowest point of pipe shall be 4 inches or one eighth of the outside diameter of pipe, whichever is greater.
5. The crushed rock shall be well graded with a maximum size of 2 inches. Not more than 20 percent by weight shall pass a No. 4 sieve and shall not contain more than 3 percent by weight of particles smaller than 20 micrometer grain size as determined by ASTM Standard D 422.
6. Improved bedding where required by the Drawings shall consist of granular material (sand, crushed rock, etc.) or a concrete cradle as indicated by the Drawings. Granular material shall be free from organic or other objectionable material and shall conform to the grading requirements for either fine or coarse aggregate as set out in Section 03 30 00, CAST-IN-PLACE CONCRETE. Concrete shall conform to requirements of Section 03 30 00, CAST-IN-PLACE CONCRETE, except that the cement content may be reduced to 5 sacks per cubic yard and may be either Type I or Type II.

3.03 FIELD QUALITY CONTROL

A. Testing and Inspection

B. Storm Sewers:

1. Sanitary and Storm Sewers
   a. General: Inspect all sewer lines by checking each section between manholes for alignment. A full circle of light shall be seen by looking through the pipe at a light held at the opposite end of the Section of sewer line being inspected. Make any corrections required in line or grade. The Contractor shall furnish the material samples for testing. The following tests will be required:
   b. Concrete and materials for concrete shall be tested in accordance with the requirements of Section 03 30 00, CAST-IN-PLACE CONCRETE.
   c. Infiltration: Leakage into the sanitary sewers shall not exceed a rate of 10 gallons per day per inch of diameter per 100 feet of sewer for any section between successive manholes. If, in the opinion of the Architect/Engineer, infiltration appears excessive, the amount of leakage shall be measured by a suitable weir or other device as directed by the Architect/Engineer and at the Contractor's expense. When the infiltration exceeds the specified amount, correction shall be made to the satisfaction of the

Architect/Engineer. Sanitary lines shall be air tested and television inspected as required by the City of Monroe.

2. Backfill:
   a. Maximum Density Determination: Make tests on two separate samples to determine the maximum density of optimum moisture content. Samples shall be taken where directed by the Architect/Engineer/Geotechnical Engineer. Findings of these tests to be filed with the Architect in triplicate.
   b. Compaction Tests: Take compaction or in-place density tests at location and time requested by the Geotechnical Engineer. Backfill not meeting the requirements of Specification Section 31 23 00 Excavating and Backfilling shall be removed, replaced, recompacted and retested for compaction at the expense of the Contractor. Findings of these tests shall be filed with the Architect in triplicate.

3.04 ADJUSTMENT AND CLEANING

A. Pavement Repair:

1. Where necessary to cut pavements, drives, sidewalks or other permanent surfaces, the cuts shall be made with neat lines at least 1 foot wider than the trench. Cut material shall be disposed of by the Contractor.
   a. The surfaces that are cut shall be restored to a condition at least equivalent to the condition existing before the cut was made. The Contractor shall cooperate at all times to keep streets open for use and also shall cooperate to keep portions of driveways open for use.
2. Concrete for repair work shall be as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE. Concrete shall be finished to match surrounding surfaces as nearly as possible.
3. Asphaltic concrete for repair work shall be as specified in Section 32 12 16, BITUMINOUS PAVEMENT.

3.05 RECORD DRAWINGS (“AS-BUILTS”)

A. Sanitary Sewer System “As-Built” Drawings:

1. Contractor to employ the services of an engineering/surveying firm with Georgia Registered Engineers and Georgia Registered Land Surveyors to provide record drawings of the storm sanitary sewer water distribution and fire protection systems installed by the Contractor.
2. Said “as-built” or record drawing(s) shall show all horizontal and vertical locations of sanitary, storm sewer and all other utilities and shall conform to City of Monroe standards.
3. Approved “as-built” drawings are required prior to final payment.

END OF SECTION 33 40 00