Project Manual

NEW CONSTRUCTION
OF
ASCENSION PARISH
FIRE DISTRICT 3 STATION #34

Bluff Rd, Prairieville, LA

Construction Documents Set

October 9, 2015

Project No. C15-0029

DOMAIN APAC
ARCHITECTURE

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Parish of Ascension

www.ascensionparish.net

TOMMY MARTINEZ
ASCENSION PARISH PRESIDENT

ADVERTISEMENT FOR BIDS
Division 0 – Article 1
Invitation

Sealed bids will be received by the Ascension Parish Purchasing Department, 615 East Worthey Street, Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707), on January 14, 2016, until 10:00 am and then at said office publicly opened and read aloud for construction of the project described as follows:

Ascension Parish Fire District 3
Station 34

STATEMENT OF WORK:
A new 6,515 sf wood framed and cmu construction Fire Station and associated site and utility work.

All Bids must be in accordance with the Contract Documents on file at the Ascension Parish Government Purchasing Department, 615 East Worthey Street, Gonzales, Louisiana.

Copies of Specifications, Bid Documents, Contract Documents and Construction Plans for use in preparing Bids may be obtained from Domain Architecture, Baton Rouge, LA 70806.

Where bids are to be received on forms furnished by the awarding authority, no contract documents shall be issued to anyone except a Licensed Contractor or his authorized Representatives. **In no event shall any documents for bidding be issued later than twenty-four 24 hours prior to the hour and date set for receiving bids.**

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his / her address, contractor's state license number and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Ascension Parish Purchasing Department, 615 East Worthey Street, Gonzales, Louisiana (P.O. Box 2392, Gonzales, Louisiana 70707), mailed certified mail and must be received no later than the bid opening.

Contractors desiring to bid shall submit to the Owner/Architect, with their request for Contract Documents, Contract Documents deposit and evidence that they hold State License of proper classification and in full force and effect.

Bid security in the amount of five percent (5%) of the total Bid must accompany each Bid, and shall be made payable to the Owner.

The Owner reserves the right to waive any informality or to reject any or all bids.

No bidder may withdraw his bid within forty-five (45) days after the actual date of opening thereof.

All contractors are required to attend a Mandatory Pre-Bid Conference which will be held at two (2) o'clock p.m. on December 22, 2015 at (14517 Hwy 73, Prairieville, LA 70769). The architect/owner reserves the right to reject the bid submitted by any contractor who fails to attend the Pre-Bid Conference.

In addition to paper bids, electronic bids and electronic bid bonds for the following project will be downloaded by the Ascension Parish Purchasing Department. Electronic bids and electronic bid bonds must be submitted through www.centralauctonhouse.com prior to the electronic bidding deadline. Beginning at 10:00 a.m. on January 14, 2016, all bids will be downloaded. No bids are accepted after 10:00 a.m.

All Addenda's, Amendments, Letters of Clarification, and Withdrawal Notices will be posted online in addition to paper copies being distributed. Construction proposal information may be accessed via the internet at www.centralauctionhouse.com . Users must click on Login and create a New User Registration to view and download plans. Once logged in, users must click on Ascension Parish Government to view current advertisement listings. This listing is titled "**Ascension Parish Fire District 3, Station 34** ". Registered users will have access to view Project Information, submit a question concerning the project, and view the plans. All project specific notices are found here. It will be the responsibility of the Bidder to check for updates. All submitted questions will be forwarded by email to the Project Manager and the Project Architect for a response.

The U.S. Department of Transportation (DOT) operates a toll free "Hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should call 1-800-424-9071. All information will be treated confidentially and caller anonymity will be respected.

The Ascension Parish Government shall not be responsible if the bidder cannot complete and submit a bid due to failure or incomplete delivery of the files submitted via the internet.

The Parish of Ascension reserves the right to disqualify any Bid , response to a Request for Qualifications, or Request for Proposals if it is determined that the submitting business entity is not in good standing with the Louisiana Secretary of State or is not authorized to do business in the State of Louisiana.

Ascension Parish Government reserves the right to reject any and all bids for just cause.

Ascension Parish Government
Tommy Martinez, Parish President

CHIEF -	Please publish 12/03/15, 12/10/15, 12/17/15
ADVOCATE -	Please publish 12/03/15, 12/10/15, 12/17/15
WEEKLY-	Please publish 12/03/15, 12/10/15, 12/17/15

INSTRUCTIONS TO BIDDERS

ARTICLE 1
DEFINITIONS AND INTRODUCTION

1.1 The Bidding Documents and the Contract Documents include the following:
Advertisement for Bids, Instructions to Bidders, Bid Form, General Conditions of the Contract for Construction, AIA Document A 201, 2007 Edition, Supplementary General Conditions, Contract Between Owner and Contractor, AIA Document A 101, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a STIPULATED SUM, Performance and Payment Bond(s), Drawings, and Addenda.

1.2 The Owner of the proposed work is

Ascension Parish Fire District 3 Station 34
Contact- Mark Stewart

1.3 The title of work will be as indicated in the Advertisement for Bids.

1.4 All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A 201 or in other Contract Documents are hereby made a part of the Instructions to Bidders.

1.5 **Addenda** are written or graphic instruments issued by the Architect prior to the opening of bids which modify or interpret the Bidding Documents by additions, deletions, clarifications, corrections and prior approvals.

1.6 A **Bid** is a complete and properly signed proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.

1.7 The **Base Bid** is the sum stated in the Bid for which the Bidder offers to perform the Work described as the Base Bid, to which Work may be added for sums stated in Alternate Bids.

1.8 An **Alternate Bid** (or Alternate) is an amount stated in the Bid to be added to the amount of the Base Bid if the corresponding change in the Work or change in materials or methods of construction described in the Bidding Documents is accepted.

1.9 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 that shall be utilized in determining change orders in the event that the estimated quantities of work required by the original documents are increased or decreased.

1.10 A **Bidder** is a person or entity who submits a Bid.

1.11 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.

1.12 **Architects and Engineers**: The Architect of record or his authorized representative, and the consulting Engineer(s) whose seal(s) occur on the Construction Documents.

1.13 **Bid Forms** can be found immediately following these instructions to bidders.

ARTICLE 2
BIDDER'S REPRESENTATION

2.1 The Bidder by making his Bid represents that:

2.1.1 The Bidder has read and understands the Bidding Documents and his Bid is made in accordance therewith, and,

2.1.2 The Bidder has visited the site(s) and has familiarized himself with all of the 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. All factors affecting constructability shall be properly investigated and considered in the preparation of the bid, and,

2.1.3 The Bid is based upon the materials, systems, and equipment described in the Bidding Documents as advertised and as modified by Addenda, without exception, and,

2.1.4 The Bidder is fully qualified and licensed under all State Laws, and all local licensing laws for Contractors in effect at the time and at the location(s) of the Work before submitting his Bid, and that all of his Sub-bidders or prospective Sub-contractors are duly licensed in accordance with all laws, (if required).

2.1.5 His bid is not based on any verbal instructions contrary to the Contract Documents and addenda.

ARTICLE 3
BIDDING DOCUMENTS

3.1 COPIES

3.1.1 One set of Bidding Documents may be obtained directly from the Architect at the cost of the owner. Additional sets shall be purchased by the contractor at their own expense.

3.1.2 Cost of postage paid by bidders to receive plans will not be refunded. All costs of postage or delivery to return sets of documents to the Architect shall be paid for by the company which procured said sets.

3.1.3 Bidders shall use complete sets of Bidding Documents in preparing bids; neither the Owner nor the Architect assumes responsibility for errors, omissions, and misinterpretations resulting from the use of incomplete sets of Bidding Documents. Prior to bidding, verify all specification page numbers and Drawing sheet numbers with the specified index to insure receipt of all documents.

3.1.4 The Owner or Architect in making copies of the Bidding Documents available on the above terms, do so only for the purpose of obtaining bids on the Work and do not confer a license or grant permission for any other use 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 of separate contractors to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and all local conditions, and shall at once report to the Architect all ambiguities, inconsistencies, or errors discovered in the Bidding Documents or errors relating to the Project site.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect to reach him at least five (5) days prior to the date for receipt of Bids.

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

3.3 SUBSTITUTIONS- (PRIOR APPROVAL REQUIRED)

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 a complete written request for approval has been submitted by the proposer and has been received by the Architect at least five (5) days prior to the date for receipt of Bids.

3.3.3 All request shall include the name of the material or equipment for which it is to be substituted, the location, and a complete description of the proposed substitute including model numbers, colors, textures, drawings, cuts, performance and test data and all other detailed information necessary for a complete evaluation. A written statement setting forth all 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.

3.3.4 The burden of proof of the merit of the proposed substitution is upon the proposer. Incomplete product submittals not indicating meeting the standards specified, colors, textures, actual samples, sufficient dimensions, quality, and strength of materials, and other standards specified will not be reviewed and will not be added to the list of prior approvals specified by addendum.

3.3.5 The Architect's decision of approval or disapproval of a proposed substitution shall be final.

3.3.6 The Architect reserves the right to reject products for which incomplete test data, samples, telephone numbers of users of products and information has been submitted. All test data and information shall meet or exceed standards specified. Manufacturers are responsible for submitting all information and all additional information requested by the Architect prior to the date specified above. Substitutions which require substantial revision of the Contract Documents will not be considered. The Architect reserves the right to reject materials and equipment proposed for this Project.

3.3.7 The Contractor shall have the option to use prior approval substitutions. No extra payment by Change Order will be approved for additional Work, materials, and equipment required to incorporate prior approved substitutions.

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

3.3.9 The Architect reserves the right to reject materials and equipment at a later date after opening of bids if it is detected by the Architect that incomplete or false information was submitted prior to bidding.

3.4 ADDENDA

3.4.1 Addenda will be attempted to be mailed by the Architect to all who are known by the Architect to have received a complete set of Bidding Documents. Because of errors in addresses, mistakes by mail carriers, and other human errors, all addenda are not always delivered to all bidders on time, all of the time.

3.4.2 All bidders who have received or who have reviewed bidding documents shall be responsible for verifying whether or not they have received all Addenda. Do not rely solely on mail, published reports, printed journals, published reports, or other delivery or information systems to verify receiving all Addenda.

3.4.3 All bidders shall be responsible for calling the Architect's Office within 72 hours prior to the date and time of opening of Bids to verify receipt of all Addenda issued by the Architect. All Bidders shall be responsible for picking up all Addenda not yet received from the Architect's office.

3.4.4 Copies of Addenda will be attempted to be made available for inspection wherever Bidding Documents are on file for that purpose, however, call the Architect to verify Addenda receipt.

3.4.5 Addenda shall normally not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening bids except an Addendum withdrawing the specified request for Bids, or one which includes postponement of the date for receipt of Bids. If it is necessary to issue an addendum within the seventy-two (72) hour period prior to receipt of bids, the owner reserves the right to extend the receipt of such bids up to 30 days without the requirement of re-advertising. The Owner shall be consulted prior to issuance of such an addendum, and shall approve such issuance.

3.4.6 All Bidders shall ascertain prior to submitting Bids that they have received all Addenda issued by the Architect, and all Bidders shall acknowledge said receipt in the space indicated on the Bid Form.

3.4.7 Failure to acknowledge receipt of all Addenda issued for this Project in the space(s) specified on the Bid Form will render the proposal informal and will cause its rejection.

3.4.8 All addenda shall become part of the Contract Documents. All Bidders shall be bound by all Addenda whether or not received by said Bidders.

3.4.9 The Owner shall have the right to extend the bid date by up to (30) days. Any such extensions shall be made by addendum issued by the Architect.

ARTICLE 4
BIDDING PROCEDURE

4.1 FORM AND STYLE OF BIDS

4.1.1 Bids shall be submitted on to the bid form included with the Bidding Documents, or as modified by Addenda. Legible copies of the bid form are acceptable.

4.1.2 All blanks on the bid form shall be filled in by typewriter or manually in ink.

4.1.3 Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

4.1.4 Interlineations, alterations, and erasures of the filled in information shall be initialed by the signer of the Bid, or his duly authorized representative.

4.1.5 Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the Proposal informal and will cause its rejection. If no change in the Base Bid is required by the Alternate, enter "No Change" for the Alternate(s), (if any).

4.1.6 The Bidder shall make no additional stipulations on the bid form nor qualify his Bid in any other manner.

4.1.7 The Bid shall include the legal name of Bidder and a statement that the Bidder is a sole proprietor, a partnership, a corporation, or other legal entity where indicated on the bid form. The Bid shall be signed by the person or persons legally authorized to bind the Bidder to the specified Contract. A Bid by a legal entity shall have filed in the Secretary of State's office a resolution indicating the names of all parties authorized to submit public bids for public contracts if required by State law, or a bid by a legal entity shall have a corporate resolution attached to the bid if required by State law, and shall give the state of incorporation. A Bid by a corporation shall have the person signing the Bid who is an officer of the corporation. A Bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Bidder.

4.1.8 On any bid in excess of twenty-five thousand dollars ($25,000.00), the Contractor shall certify that he is licensed per the state requirements.

4.2 SUBMISSION OF BIDS

4.2.1 Bids and all other additional required information, (if any, and if specified), shall be enclosed and sealed in an opaque bid envelope.

4.2.2 The outside of the bid envelope shall be addressed to the Owner, shall identify the **name of the Project**, shall include the **Contractor's name, address, and state license number of the Bidder** as outlined in the advertisement for bids.

4.2.3 Sealed Bids will be received by the Owner until the time and date, and at the location specified in the Advertisement for Bids.

4.2.4 Bidders submitting bids to the Owner's bid receipt location shall assume full responsibility for the timely delivery and Owner's receipt of bids at the specified location prior to the time and date specified for receipt of Bids.

4.2.5 Bids mailed and delivered by United States Mail, Express Mail, Priority Mail, UPS, Federal Express, and all other similar types of carrier delivery, shall have the specified sealed bid envelope, (with all of the required information enclosed on the inside and all of the required information written on the outside), enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" and the "Project Name" on the face thereof, with the Owner's name and mailing address as outlined on the advertisement for bids.

4.2.6 Owner's receipt of a bid for any reason after the date and time stipulated on the Advertisement for Bids, including but not limited to late delivery by carrier service, late mail, late hand delivery by anyone, leaving bid(s) with someone not specifically designated by the Owner to receive bid(s) prior to bid receipt, incorrect addresses, misunderstood information, misunderstood directions, or all other types of late delivery, and excuses shall disqualify the bid.

4.2.7 Thoroughly review Bid Form early to insure having all of the required information on time.

4.2.8 Bids received after the time and date specified for the receipt of bids will be returned unopened.

4.2.9 Oral, telephonic, or telegraphic Bids or modifications to bids are invalid and will not receive consideration. The Owner will not consider notations written on the outside of the Bid Envelope which have the effect of the Bidder trying to amend the Bid. Faxed bids shall be accepted, but it is the responsibility of the contractor to ensure that they are received before the deadline by calling the office of the architect to verify receipt.

4.2.10 Bids will be accepted only from Contractors that attend the Pre-Bid Conference. Date, time and location of the Pre-Bid Conference is indicated in the Advertisement for Bids.

4.2.11 All taxes that are lawfully assessed against Owner or Contractor in connection with the Work shall be paid by Contractor. The bid prices shall include all such taxes and the costs of all required permits.

4.2.12 BID SECURITY. The amount of bid security is stated in the Invitation. The required security must be in the form of a certified or bank cashier’s check or a bid bond. The bid bond must be executed buy a surety meeting the requirements set forth in the General Conditions and Supplementary Conditions. Bid bond must have attached appropriate and satisfactory Power of Attorney. The bond shall also be countersigned by a person who is under contract with the Surety Company or Bond Issuer as a Licensed Agent in this State and who is residing in the State. Refer to R.S. 38:22:18

The bid security shall be made payable without condition to the Owner. The bid security may be retained by and shall be forfeited to the Owner as liquidated damages if the Bid is accepted and a contract based

thereon is awarded and the Bidder should fail to enter into a contract in the form prescribed, with legally responsible sureties, within fifteen (15) days after such award is made by Owner.

4.2.13 RETURN OF BID SECURITY. The bid security of the successful Bidder will be retained until he has executed the Agreement and furnished the required Contract Security, whereupon checks furnished as bid security will be returned; if he fails to execute and deliver the Agreement and furnish the required Contract Security within fifteen (15) days of the Notice of Award, Owner may annul the Notice of Award and the bid security of that Bidder will be forfeited. The bid security of any Bidder whom Owner believes 'to have a reasonable chance of receiving the award' may be retained by Owner until the seventh day after the executed Agreement is delivered by Owner to Contractor and the required Contract Security is furnished but not to exceed thirty (30) days after the Bid opening. Checks furnished as bid security by other bidders will be returned within five (5) days of the Bid opening.

4.2.14 In addition to paper bids, electronic bids and electronic bid bonds for the project will be downloaded by the Ascension Parish Purchasing Department. Electronic bids and electronic bid bonds must be submitted through www.centralauctionhouse.com prior to the electronic bidding deadline. Beginning at 10:00 am on January 14, 2016 all bids will be downloaded. No bids are accepted after 10:00 am.

4.3 MODIFICATION OR WITHDRAWAL OF BID

4.3.1 A bid may not be modified, withdrawn or cancelled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and the Bidder so agrees in submitting his Bid, except in accordance with Act 111 of 1983 which states, in part, "Bids containing patently obvious mechanical, clerical, or mathematical errors may be withdrawn by the Contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity or Owner within forty-eight hours of the bid opening excluding Saturdays, Sundays and legal holidays".

4.3.2 Prior to the time and date designated for receipt of Bids, Bids submitted early may be modified or withdrawn only by notice to the party receiving Bids at the place and prior to the time designated for receipt of Bids. A change shall be so worded as not to reveal the amount of the original bid.

4.3.3 Withdrawn bids may be changed, re-sealed, and resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders and all of the Bidding Documents and Contract Documents.

ARTICLE 5
CONSIDERATION OF BIDS

5.1 RECEIPT OF BIDS

5.1.1 All properly identified Bids received on time will be opened publically and compiled into one spreadsheet.

5.2 REJECTION OF BIDS

5.2.1 The Owner will have the right to reject any or all Bids and in particular to reject a Bid not accompanied by data or information required by the Bidding Documents or reject a Bid which is in any way incomplete, irregular, or not in compliance with the Contract Documents.

5.3 ACCEPTANCE OF BID (AWARD)

5.3.1 Owner reserves the right to consider all factors when reviewing bids and selecting contractor.

ARTICLE 6
POST-BID INFORMATION

6.1 CONTRACTOR'S QUALIFICATION STATEMENT

6.1.1 Upon request by the Architect or the Owner, Bidders may be required to submit properly executed AIA Document A 305, Contractor's Qualification Statements. In addition, any bidder may be required, at the discretion of the Owner, to furnish evidence satisfactory to the Owner that his proposed subcontractors have sufficient means and experience in the types of work called for to assure completion of the contract in a satisfactory manner.

6.2 At the Pre-Construction Conference, the contractor shall submit the following information to the Architect.

6.2.1 A designation of the work to be performed by the Contractor with his own forces.

6.2.2 A breakdown of the contract cost attributable to each item listed in the Schedule of Values Form (attached). No payments will be made to the Contractor until this is received.

6.2.3 A list of names and business domiciles of all Subcontractors, manufacturers, suppliers or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the work. It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana and Ascension Parish Subcontractors, manufacturers, suppliers and labor.

ARTICLE 7
PERFORMANCE AND PAYMENT BOND AND INSURANCE

7.1 BOND REQUIREMENTS

7.1.1 The Contractor shall furnish and pay for a performance and payment bond written by a company licensed to do business in Louisiana, and shall be countersigned by a person who is contracted with the surety company or bond issuer as an agent of the company or issuer, and who is licensed as an insurance agent in this state, and who is residing in Louisiana, in an amount equal to the 100% of the Contract amount to guarantee delivery of completed work under contract and payment for labor and materials. These bonds shall be written on A.I.A. Document included in the specifications. No company, regardless of size or financial rating, will be allowed to write its own bonds. The Surety Company shall have an A.M. Best Company minimum rating with a minimum financial size in accordance with the General Conditions. Bonds must be accompanied by letter stating bonding company's current rating for verification prior to acceptance by the Owner and execution of the formal Owner/Contractor agreement.

7.2 TIME OF DELIVERY

7.2.1 The Bidder shall hand deliver the specified required bond(s) to the Owner prior to the Owner's signing of the Contract. The Bidder shall be responsible for picking up a copy of the Contract from the Architect and delivering same to the bonding agency, securing the required, signed bond(s) and delivering same to the Architect and Owner in a very timely manner.

7.2.2 The bond(s) shall be dated on the date of commencement of Work indicated in the Contract.

7.2.3 The Bidder shall require the Attorney-in-Fact who executes the required bond(s) on behalf of the surety to affix thereto a certified and current copy of his power of Attorney.

7.2.4 Original insurance certificates, signed in ink, indicating amounts of insurance required, Louisiana Workmen's Compensation, and all other specified insurance shall be presented to the Owner with the bond(s). Copies of originals and "faxed" copies of certificates of insurance are not acceptable.

7.2.5 No actual physical on site work shall begin prior to securing specified insurance and bonds.

ARTICLE 8
FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 FORM TO BE USED

8.1.1 Unless otherwise specified, the form of the Contract to be used shall be AIA Document A101, Standard Form of Agreement between Owner and Contractor, 2007 Edition where the basis of payment is a Stipulated Sum. Executed bonds and insurance certificate must be submitted to the Owner by the Contractor within fifteen (15) days of the date of the Notice of Award.

8.2 AWARD

8.2.1 If awarded, the Contract will be let to the lowest responsible bidder whose base bid is within the project budget and is able to furnish satisfactory surety company bonds. Before award of the Contract, the successful bidder shall furnish to the Owner a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the bid to sign on behalf of the Contractor. Should all bids exceed the project budget, award will be made at option of the Owner to the lowest responsible bidder whose base bid is within funds available.

ARTICLE 9
COMPLETION TIME AND LIQUIDATED DAMAGES

9.1 The completion of the Contract shall be within the time stated on the Bid Form, subject to such extensions as may be granted in the General Conditions and the Supplementary Conditions, or the Contractor will be subject to pay to the Owner Liquidated Damages in the amount stated in the Bidding Documents.

ARTICLE 10
ENVIRONMENTAL CONSIDERATIONS

10.1 Inspection and Testing for Asbestos Content of Building Materials:

NOTICE!
Building materials which are scheduled to be incorporated into the work under the agreement shall first either be certified by the Manufacturer to be asbestos free or be inspected and tested by accredited parties and certified to be free of asbestos content in accordance with by EPA, AHERA, and 1982 School Rules.

"Asbestos" means the Asbestiform varieties of: Chrysotile (Serpentine), Crocidolite (Riebecrite), Ammosite (cummingtonitegrunerite), Anthophyllite, Tremolite and Actinolite.

Materials shall not be incorporated into the work prior to the receipt of either manufacturer certification or accredited laboratory test results indicating the building material is asbestos free. Copies of the test reports shall be furnished to the Owner and the Architect.

The Owner reserves the right to inspect and take samples at random at the job site. Materials containing asbestos shall be removed immediately at the Contractor's expense using current EPA protocol for the removal of asbestos containing materials.

ARTICLE 11
ADDITIONAL BIDDER INFORMATION

11.1 Bidding Documents may be obtained from the office of the Architect:

Attn: Michael K. Buturla, Architect, AIA, NCARB
Domain Architecture, A Professional Architectural Corporation
8316 Kelwood Ave
Baton Rouge, LA 70806
p. 225.216.3770 f. 225.216.3771

11.1.1 A plan deposit of $100.00 is required for each set of complete bidding documents requested. Partial sets will not be issued. Drawings are available for download from the project website; however, owner nor architect assumes no liability for incorrect drawings downloaded by the contractor.

11.1.2 If mailed sets are requested, add $25.00 non-refundable deposit for each set for postage and handling.

11.1.3 Deposits on the first set of documents issued to bonafide prime bidders (bidders submitting bids for the entire project on the specified project bid forms) will be fully refunded (100%) upon return of complete bound documents, received by the architect in good condition no later than five (5) days after the bid date as specified in the Advertisement for Bids. All other sets of documents will be refunded (50%) of the deposit upon return of complete bound documents, received by the architect in good condition no later than five (5) days after the bid date as specified in the Advertisement for Bids. Good condition means minimal markers / highlights, no missing sheets, and reusable by the awarded contractor.

End of Instructions to Bidders

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Ascension Parish Purchasing Department
120 East Railroad Street
Gonzales, Louisiana 70707

BID FOR: Ascension Parish Fire District 3 Station 34

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Domain Architecture and dated: October 9, 2015

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 (*Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER:_____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: Ascension Parish Purchasing Department
120 East Railroad Street
Gonzales, Louisiana 70707

BID FOR: Ascension Parish Fire District 3 – Station 34

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

Wording for "DESCRIPTION" is to be provided by the Owner.
All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner

00315 – CONTRACTOR INFORMATION FORM

IF BIDDER is:

An Individual

By: _____ (SEAL)
(Signature Individual)

Name: (typed or printed):

_____

Doing business as: _____

Business Address: _____

_____

Phone No.: _____ Fax: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of General Partner)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax: _____

A Corporation

Corporation Name:_____ (SEAL)

State of Incorporation: _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax:_____

** (A Corporate Resolution Must Be Attached)

IF BIDDER is:

A Limited Liability Company

Company Name: _____ (SEAL)

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Business Address: _____

_____

Phone No.: _____ Fax: _____

A Joint Venture

Joint Venture Name: _____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax: _____

Joint Venture Name:

_____ (SEAL)

By: _____
(Signature of Joint Venture Partner)

Name (typed or printed): _____

Address: _____

_____

Phone No.: _____ Fax: _____

Address, Phone Number, and Fax Number for receipt of official communications:

_____

_____

(Each Joint Venture Partner must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

00320 – RESOLUTION AUTHORIZING SUBMISSION OF BID, SIGNATURE OF BID AND SIGNATURE OF CONTRACT

BE IT RESOLVED by the Board of Directors of _____, a Corporation organized and existing under the laws of the State of _____, and domiciled in the City of _____; that _____President of the Corporation and / or _____of the Corporation, be, and are hereby authorized and empowered to submit bids and to execute any and all contractors of whatever kind on behalf of the Corporation and to do all things necessary in the premises.

CERTIFICATE

I, _____, Secretary of _____ do hereby certify that the foregoing resolution is a true and exact copy unanimously adopted by the Board of Directors of said corporation at a meeting thereof legally held on the _____ day of _____ 20_____; that said resolution is duly entered into the records of said corporation; that it has not been rescinded or modified; and that it is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto set my hand and the seal of said corporation this _____ day of _____, 20_____.

_____

(Secretary)

00340 – BIDDER'S NON-COLLUSION AFFIDAVIT
(FURNISH WITH BID PACKAGE)

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, personally came and appeared

_____ who after being by me first duly sworn, deposed and said that

he is the fully authorized _____ of _____

(Herein after referred to as "BIDDER") the party who submitted a bid for

_____

which bid was received by ASCENSION PARISH, LOUISIANA on

_____ and said affiant further said:

(1) That bidder and his firm employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for bidder; and

(2) That no part of the contract price to be received by bidder or his firm was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alternation, or demolition of the public building or project were in the regular course of their duties for the bidder.

(3) Said bidder is genuine and the bidder has not colluded, conspired or agreed directly or indirectly with any other bidder to offer a sham or collusive bid.

(4) Said bidder has not in any manner directly or indirectly agreed with any other person to fix the bid price of affiant or any other bidder, or to fix any overhead profit or cost element of said bid price, of that of any other bidder, or to induce any other person to refrain from bidding.

(5) Said bid is not intended to secure an unfair advantage of benefit from Ascension Parish, Louisiana or in favor of any persons interested in the proposed contract.

(6) All statement contained in said bid are true and correct.

(7) Neither affiant nor any member of his company has divulged information regarding said bid or any data relative thereto to any person, firm, or corporation.

By: _____
(Signature)

_____
(Type or Print Name)

_____
(Type or Print Title)

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____ DAY OF

_____, 20____

_____
NOTARY PUBLIC

Note: This form is to be removed and attached to the Bid Proposal Form.

_____	_____
Name of Project	**Project No.**

ATTESTATION CLAUSE REQUIRED BY LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

_____	_____
NAME OF BIDDER	**NAME OF AUTHORIZED SIGNATORY OF BIDDER**
_____	_____
DATE	**TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

_____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

00360 - BID BOND FORM

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as Principal, and_____, as Surety, are held and firmly bound unto _____ (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINCIPAL (BIDDER)	SURETY
BY: _____	BY:_____
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT(SEAL)

DRAFT

AIA® Document A105™ – 2007

Standard Form of Agreement Between Owner and Contractor for a Residential or Small Commercial Project

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)

« »« »
« »
« »
« »

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

« »« »
« »
« »
« »

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

« ~~Ascension Parish Fire District~~»
« »
« »

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

« »« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

State or local law may impose requirements on contracts for home improvements. If this document will be used for Work on the Owner's residence, the Owner should consult local authorities or an attorney to verify requirements applicable to this Agreement.

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User Notes: (1883328611)

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DRAFT

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contractor shall complete the Work described in the Contract Documents for the Project. The Contract Documents consist of

.1 this Agreement signed by the Owner and Contractor;

.2 the drawings and specifications prepared by the Architect, dated « » , and enumerated as follows:

Drawings:

Number	Title	Date

Specifications:

Section	Title	Pages

.3 addenda prepared by the Architect as follows:

Number	Date	Pages

.4 written orders for changes in the Work issued after execution of this Agreement; and

.5 other documents, if any, identified as follows:

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User Notes: (1883328611)

« »

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

The number of calendar days available to the Contractor to substantially complete the Work is the Contract Time. The date of commencement of the Work shall be the date of this Agreement unless otherwise indicated below. The Contractor shall substantially complete the Work, no later than « » (« ») calendar days from the date of commencement, subject to adjustment as provided in Article 10 and Article 11.
(Insert the date of commencement, if it differs from the date of this Agreement.)

« »

ARTICLE 3 CONTRACT SUM

§ 3.1 Subject to additions and deductions in accordance with Article 10, the Contract Sum is:

« » ($ « »)

§ 3.2 For purposes of payment, the Contract Sum includes the following values related to portions of the Work:
(Itemize the Contract Sum among the major portions of the Work.)

Portion of Work	Value

§ 3.3 Unit prices, if any, are as follows:
(Identify and state the unit price; state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 3.4 Allowances included in the Contract Sum, if any, are as follows:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

§ 3.5 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 3.6 The Contract Sum shall include all items and services necessary for the proper execution and completion of the Work.

ARTICLE 4 PAYMENT

§ 4.1 Based on Contractor's Applications for Payment certified by the Architect, the Owner shall pay the Contractor, in accordance with Article 12, as follows:
(Insert below timing for payments and provisions for withholding retainage, if any.)

« »

§ 4.2 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate below, or in the absence thereof, at the legal rate prevailing at the place of the Project.

« » % « »

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User Notes: (1883328611)

ARTICLE 5 INSURANCE

§ 5.1 The Contractor shall provide Contractor's general liability and other insurance as follows:
(Insert specific insurance requirements and limits.)

Type of insurance	Limit of liability ($0.00)

§ 5.2 The Owner shall provide property insurance to cover the value of the Owner's property, including any Work provided under this Agreement. The Contractor is entitled to receive an increase in the Contract Sum equal to the insurance proceeds related to a loss for damage to the Work covered by the Owner's property insurance.

§ 5.3 The Contractor shall obtain an endorsement to its general liability insurance policy to cover the Contractor's obligations under Section 8.12.

§ 5.4 Each party shall provide certificates of insurance showing their respective coverages prior to commencement of the Work.

§ 5.5 Unless specifically precluded by the Owner's property insurance policy, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, suppliers, agents and employees, each of the other; and (2) the Architect, Architect's consultants and any of their agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance or other insurance applicable to the Work.

ARTICLE 6 GENERAL PROVISIONS

§ 6.1 THE CONTRACT

The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written modification in accordance with Article 10.

§ 6.2 THE WORK

The term "Work" means the construction and services required by the Contract Documents, and includes all other labor, materials, equipment and services provided, or to be provided, by the Contractor to fulfill the Contractor's obligations.

§ 6.3 INTENT

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.

§ 6.4 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

Documents prepared by the Architect are instruments of the Architect's service for use solely with respect to this Project. The Architect shall retain all common law, statutory and other reserved rights, including the copyright. The Contractor, subcontractors, sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the instruments of service solely and exclusively for execution of the Work. The instruments of service may not be used for other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Architect.

ARTICLE 7 OWNER

§ 7.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 7.1.1 If requested by the Contractor, the Owner shall furnish all necessary surveys and a legal description of the site.

§ 7.1.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, the Owner shall obtain and pay for other necessary approvals, easements, assessments and charges.

§ 7.2 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work until the correction is made.

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User Notes: (1883328611)

§ 7.3 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 seven 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, correct such deficiencies. In such case, the Contract Sum shall be adjusted to deduct the cost of correction from payments due the Contractor.

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

§ 7.4.1 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.

§ 7.4.2 The Contractor shall coordinate and cooperate with the Owner's own forces and separate contractors employed by the Owner.

§ 7.4.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

ARTICLE 8 CONTRACTOR

§ 8.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 8.1.2 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner. Before commencing activities, the Contractor shall (1) take field measurements and verify field conditions; (2) carefully compare this and other information known to the Contractor with the Contract Documents; and (3) promptly report errors, inconsistencies or omissions discovered to the Architect.

§ 8.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

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.

§ 8.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 8.3.1 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.

§ 8.3.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of subcontractors or suppliers for each portion of the Work. The Contractor shall not contract with any subcontractor or supplier to whom the Owner or Architect have made a timely and reasonable objection.

§ 8.4 LABOR AND MATERIALS

§ 8.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work.

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

§ 8.5 WARRANTY

The Contractor warrants to the Owner and Architect that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents.

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§ 8.6 TAXES
The Contractor shall pay sales, consumer, use and similar taxes that are legally required when the Contract is executed.

§ 8.7 PERMITS, FEES AND NOTICES
§ 8.7.1 The Contractor shall obtain and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work.

§ 8.7.2 The Contractor shall comply with and give notices required by agencies having jurisdiction over the Work. 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 full responsibility for such Work and shall bear the attributable costs. The Contractor shall promptly notify the Architect in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules and regulations.

§ 8.8 SUBMITTALS
The Contractor shall promptly review, approve in writing and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 8.9 USE OF SITE
The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents and the Owner.

§ 8.10 CUTTING AND PATCHING
The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 8.11 CLEANING UP
The Contractor shall keep the premises and surrounding area free from accumulation of debris and trash related to the Work. At the completion of the Work, the Contractor shall remove its tools, construction equipment, machinery and surplus material; and shall properly dispose of waste materials.

§ 8.12 INDEMNIFICATION
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 party indemnified hereunder.

ARTICLE 9 ARCHITECT
§ 9.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 9.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the Work.

§ 9.3 The Architect will not have control over or charge of, and will not be responsible for, construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

§ 9.4 Based on the Architect's observations and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor.

§ 9.5 The Architect has authority to reject Work that does not conform to the Contract Documents.

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§ 9.6 The Architect will promptly review and approve or take appropriate action upon Contractor's submittals, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 9.7 The Architect will promptly interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request from either the Owner or Contractor.

§ 9.8 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.

§ 9.9 The Architect's duties, responsibilities and limits of authority as described in the Contract Documents shall not be changed without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

ARTICLE 10 CHANGES IN THE WORK

§ 10.1 The Owner, without invalidating the Contract, may 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 in writing. If the Owner and Contractor can not agree to a change in the Contract Sum, the Owner shall pay the Contractor its actual cost plus reasonable overhead and profit.

§ 10.2 The Architect will have authority to order minor changes in the Work not involving changes in the Contract Sum or the Contract Time and not inconsistent with the intent of the Contract Documents. Such orders shall be in writing and shall be binding on the Owner and Contractor. The Contractor shall carry out such orders promptly.

§ 10.3 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be subject to equitable adjustment.

ARTICLE 11 TIME

§ 11.1 Time limits stated in the Contract Documents are of the essence of the Contract.

§ 11.2 If the Contractor is delayed at any time in progress of the Work 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, the Contract Time shall be subject to equitable adjustment.

ARTICLE 12 PAYMENTS AND COMPLETION

§ 12.1 CONTRACT SUM

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

§ 12.2 APPLICATIONS FOR PAYMENT

§ 12.2.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for Work completed in accordance with the values stated in the Agreement. Such Application shall be supported by data substantiating the Contractor's right to payment as the Owner or Architect may reasonably require. 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 stored, and protected from damage, off the site at a location agreed upon in writing.

§ 12.2.2 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 other encumbrances adverse to the Owner's interests.

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§ 12.3 CERTIFICATES FOR PAYMENT
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.

§ 12.4 PROGRESS PAYMENTS
§ 12.4.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract Documents.

§ 12.4.2 The Contractor shall promptly pay each subcontractor and supplier, upon receipt of payment from the Owner, an amount determined in accordance with the terms of the applicable subcontracts and purchase orders.

§ 12.4.3 Neither the Owner nor the Architect shall have responsibility for payments to a subcontractor or supplier.

§ 12.4.4 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 requirements of the Contract Documents.

§ 12.5 SUBSTANTIAL COMPLETION
§ 12.5.1 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 the Owner can occupy or utilize the Work for its intended use.

§ 12.5.2 When the Work or designated portion thereof is substantially complete, the Architect will make an inspection to determine whether the Work is substantially complete. When the Architect determines that the Work is substantially complete the Architect shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish the responsibilities of the Owner and Contractor, 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.

§ 12.6 FINAL COMPLETION AND FINAL PAYMENT
§ 12.6.1 Upon receipt of a final Application for Payment, the Architect will inspect the Work. When the Architect finds the Work acceptable and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment.

§ 12.6.2 Final payment shall not become due until the Contractor submits to the Architect releases and waivers of liens, and data establishing payment or satisfaction of obligations, such as receipts, claims, security interests or encumbrances arising out of the Contract.

§ 12.6.3 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 13 PROTECTION OF PERSONS AND PROPERTY
The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall take reasonable precautions to prevent damage, injury or loss to employees on the Work, the Work and materials and equipment to be incorporated therein, and other property at the site or adjacent thereto. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, or by anyone for whose acts the Contractor may be liable.

ARTICLE 14 CORRECTION OF WORK
§ 14.1 The Contractor shall promptly correct Work rejected by the Architect as failing to conform to the requirements of the Contract Documents. The Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement and additional testing.

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§ 14.2 In addition to the Contractor's other obligations including warranties under the Contract, the Contractor shall, for a period of one year after Substantial Completion, correct work not conforming to the requirements of the Contract Documents.

§ 14.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 7.3.

ARTICLE 15 MISCELLANEOUS PROVISIONS

§ 15.1 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

§ 15.2 TESTS AND INSPECTIONS

§ 15.2.1 At the appropriate times, the Contractor shall arrange and bear cost of tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities.

§ 15.2.2 If the Architect requires additional testing, the Contractor shall perform those tests.

§ 15.2.3 The Owner shall bear cost of tests, inspections or approvals that do not become requirements until after the Contract is executed.

§ 15.3 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

ARTICLE 16 TERMINATION OF THE CONTRACT

§ 16.1 TERMINATION BY THE CONTRACTOR

If the Architect fails to certify payment as provided in Section 12.3 for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 12.4.1 for a period of 30 days, the Contractor may, upon seven additional 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, and costs incurred by reason of such termination.

§ 16.2 TERMINATION BY THE OWNER FOR CAUSE

§ 16.2.1 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 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
.4 is otherwise guilty of substantial breach of a provision of the Contract Documents.

§ 16.2.2 When any of the above reasons exist, the Owner, after consultation with the Architect, 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

.1 take possession of the site and of all materials thereon owned by the Contractor, and
.2 finish the Work by whatever reasonable method the Owner may deem expedient.

§ 16.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 16.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 16.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

§ 16.3 TERMINATION BY THE OWNER FOR CONVENIENCE

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. 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 17 OTHER TERMS AND CONDITIONS
(Insert any other terms or conditions below.)

« »

This Agreement entered into as of the day and year first written above.
(If required by law, insert cancellation period, disclosures or other warning statements above the signatures.)

« »

OWNER *(Signature)*	CONTRACTOR *(Signature)*
« »« » « »	« »« » « »
(Printed name, title and address)	*(Printed name, title and address)* LICENSE NO.: JURISDICTION:

DRAFT

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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)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

«Ascension Parish Fire District»
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

SURETY
Company: *(Corporate Seal)*

Signature: _____
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:)

« »
« »
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ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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.

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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.

§ 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

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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.

§ 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.

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§ 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:	« »

DRAFT

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User Notes: (2035050601)

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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)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

«Ascension Parish Fire District»
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

SURETY
Company: *(Corporate Seal)*

Signature: _____
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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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.

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User Notes: (1648456559)

§ 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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00550 – HOLD HARMLESS AGREEMENT

OWNER: PARISH OF ASCENSION
P. O. Box 1659
GONZALES, LOUISIANA 70707-1659

ARCHITECT: Ascension Parish Fire District 3
14517 Hwy 73
Prairieville, LA 70769

The Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense: (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom: and (b) is caused in whole or in part by any negligent act or omission of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not is caused in part by a party indemnified hereunder.

In any and all claims against the Owner or the Architects, or any of their agents or employees by any employee of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may liable, the indemnification obligation under this Agreement shall not be limited in any way by any limitation on the mount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workman's Compensation acts, disability benefit acts or other employee benefit acts.

The obligations of the Contractor under this Agreement shall not extend to the liability of the Architects, their agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change orders, designs or specifications: or (2) the giving of or the failure to give directions or instructions by the Architects, their agents or employees provided such giving or failure to give its primary cause of the injury or damage.

CONTRACTOR: _____

BY: _____

WITNESS:

_____

_____

00600 – NOTICE OF AWARD

Date of Award: _____

TO: _____

ADDRESS: _____

_____

PROJECT: _____

Owner's Contract No.: _____

Architect's Project No.: _____

Contract For: _____

_____

_____

You are notified that your Bid dated _____ for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a Contract for:

_____

The Contract Price of your Contract is: _____

_____

_____ Copies of each of the proposed Contracts accompany this Notice of Award.

_____ Sets of the complete Contract Documents, including Drawings, will be delivered separate during the Pre-Construction Conference or otherwise made available to you immediately.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, this

by: _____

1. You must deliver to the Owner four (4) fully executed counterparts of the proposed Contract, including the Agreement. Each copy of the Contract must bear your signature on all signatory lines within the Agreement.

2. You must deliver with the executed Agreement, the contract Security (Bonds) as specified in the Instructions to Bidders (Section 1.8) and General Conditions (Section 5.01).

3. You must deliver with the executed Agreement, Certificate of Insurance including certificates verifying additional insurers as required in General Conditions (Section 5.03).

00600 – NOTICE OF AWARD (Continued)

Failure to comply with these conditions within the time specified will entitle the Owner to consider your bid in default, to annul this Notice of Award and to declare you Bid Security forfeited.

Within ten (10) days after you comply with the above conditions, the Owner will return to you one (1) fully signed counterpart of the Agreement with the Contract Documents attached.

_____
(Owner)

By: _____
(Authorized Signature)

_____
(Title)

ACCEPTANCE OF AWARD

_____
(Contractor)

By: _____
(Authorized Signature)

_____
(Title)

_____
(Date)

00610 – NOTICE TO PROCEED

Date: _____

TO: _____
ADDRESS: _____
_____
PROJECT: _____

Owner's Contract No.: _____
Architect's Project No.: _____
Contract For: _____
_____
_____

You are notified that the Contract Times under the above Contract will commence to run on _____, by that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement, the dates of Substantial Completion and completion and readiness for Final Payment are:

_____ and _____

Before you may start any Work at the site, Article 2.01 of the General Conditions provides that you and the Owner must each deliver to the other (with copies to the Architect and other identified additional insurers) certificates of insurance which each is required to purchase and maintain in accordance with Contract Documents.

Also, before you may start any Work at the site you must notify Owner / Architect of Start Date.

_____
(Owner)

By: _____
(Authorized Signature)

_____
(Title)

ACKNOWLEDGED:

_____
(Contractor)

By: _____
(Authorized Signature)

_____
(Title)

_____
(Date)

AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:		PROJECT:	Ascension Parish Fire District	APPLICATION NO:	001
				PERIOD TO:	
				CONTRACT FOR:	General Construction
FROM CONTRACTOR:		VIA ARCHITECT:		CONTRACT DATE:	
				PROJECT NOS:	/ /

Distribution to:
OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
: ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, 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)= $0.00
   b. 0 % of Stored Material
   (Column F on G703: $0.00)= $0.00

Total Retainage (Lines 5a + 5b or Total in Column I of G703)…… $0.00

6. TOTAL EARNED LESS RETAINAGE…….. $0.00
   (Line 4 Less Line 5 Total)
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT…….. $0.00
   (Line 6 from prior Certificate)
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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AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:	CHANGE ORDER NUMBER: 001 DATE:	OWNER: ☐ ARCHITECT: ☐
TO CONTRACTOR *(Name and address)*:	ARCHITECT'S PROJECT NUMBER: CONTRACT DATE: CONTRACT FOR: General Construction	CONTRACTOR: ☐ FIELD: ☐ OTHER: ☐

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously 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 date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which 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)*
ADDRESS	ADDRESS	ADDRESS
BY *(Signature)*	BY *(Signature)*	BY *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	DATE	DATE

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AIA® Document G709™ – 2001

Work Changes Proposal Request

PROJECT *(Name and address)*:

OWNER *(Name and address)*:

FROM ARCHITECT *(Name and address)*:

TO CONTRACTOR *(Name and address)*:

PROPOSAL REQUEST NUMBER: 001

DATE OF ISSUANCE:

CONTRACT FOR: General Construction

CONTRACT DATE:

ARCHITECT'S PROJECT NUMBER:

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

Please submit an itemized proposal for changes in the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. Within Zero (0) days, the Contractor must submit this proposal or notify the Architect, in writing, of the date on which proposal submission is anticipated.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

DESCRIPTION *(Insert a written description of the Work)*:

ATTACHMENTS *(List attached documents that support description)*:

REQUESTED BY THE ARCHITECT:

(Signature) *(Printed name and title)*

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AIA® Document G704™ – 2000

Certificate of Substantial Completion

PROJECT:
(Name and address)

PROJECT NUMBER: /
CONTRACT FOR: General Construction
CONTRACT DATE:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

TO OWNER:
(Name and address)

TO CONTRACTOR:
(Name and address)

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract 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 above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty	Date of Commencement

ARCHITECT	BY	DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. 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.

Cost estimate of Work that is incomplete or defective: $0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR	BY	DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

OWNER	BY	DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Work phases.
3. Work under other contracts.
4. Use of premises.
5. Owner's occupancy requirements.
6. Specification formats and conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: New Construction of Ascension Parish Fire District 3 Station #34

1. Project Location: 18345 Bluff Road, Prairieville, LA 70769

B. Owner: Fire District #3

1. Owner's Representative: Fire Chief Mark Stewart

C. Architect: Domain Architecture

D. The Work consists of the following:

1. New fire station and truck bay with associated site work and utilities.

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

1.3 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine constructions operations to areas indicated on drawings. (Do not disturb any wetlands area)

1.4 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 33-division format and CSI/CSC's "Master Format" numbering system.

1. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

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

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

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

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

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

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

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: T.B.D.

END OF SECTION 012300

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. See Division 01 Section "Unit Prices" for administrative requirements for using unit prices.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 PROPOSAL REQUESTS

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

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

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

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets, Submittals Schedule, and Contractor's Construction Schedule.
2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

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

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

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

B. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.

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

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

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

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Schedule of unit prices.
5. Submittals Schedule (preliminary if not final).
6. List of Contractor's staff assignments.

7. List of Contractor's principal consultants.
8. Copies of building permits.
9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
10. Initial progress report.
11. Report of preconstruction conference.
12. Certificates of insurance and insurance policies.
13. Performance and payment bonds.
14. Data needed to acquire owner’s insurance.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

GENERAL

1.1 SUMMARY

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

1. Coordination Drawings.
2. Project meetings.
3. Requests for Interpretation (RFIs).

1.2 DEFINITIONS

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

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

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

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

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

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.

7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

1.4 SUBMITTALS

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

    a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    b. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (750 by 1000 mm).
3. Number of Copies: Submit two opaque copies of each submittal. Architect will return one copy.
4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

1.5 PROJECT MEETINGS

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

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

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

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, prepare the meeting agenda
3. Minutes: Record and distribute meeting minutes.

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

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

D. Progress Meetings: Conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.

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

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

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

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

1.6 REQUESTS FOR INTERPRETATION (RFIs)

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

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.

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

C. Hard-Copy RFIs:

1. Identify each page of attachments with the RFI number and sequential page number.

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

1. The following RFIs will be returned without action:

a. Requests for approval of submittals.
b. Requests for approval of substitutions.
c. Requests for coordination information already indicated in the Contract Documents.
d. Requests for adjustments in the Contract Time or the Contract Sum.
e. Requests for interpretation of Architect's actions on submittals.
f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modifications."

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

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

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.

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

PRODUCTS (Not Used)

EXECUTION (Not Used)

PART 2 - END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. Contractor's Construction Schedule.
2. Daily construction reports.
3. Field condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

E. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

F. Major Area: A story of construction, a separate building, or a similar significant construction element.

1.3 SUBMITTALS

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

1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.

B. Daily Construction Reports: Submit copies at monthly intervals.

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

1.4 COORDINATION

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

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

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

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

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

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

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include necessary days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.

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

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. Equipment at Project site.
3. Material deliveries.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Stoppages, delays, shortages, and losses.
7. Meter readings and similar recordings.
8. Orders and requests of authorities having jurisdiction.
9. Services connected and disconnected.
10. Equipment or system tests and startups.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule at each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

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

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

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

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

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

1.3 SUBMITTAL PROCEDURES

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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

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

1. Initial Review: Allow **15 days** for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the work to permit processing.

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

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 6 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

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

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

    1. Transmittal Form: Use AIA Document G810 or similar form approved by Architect.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

    1. Note date and content of previous submittal.
    2. Note date and content of revision in label or title block and clearly indicate extent of revision.
    3. Resubmit submittals until they are marked "Approved" or "Approved as noted."

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating action taken by Architect.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

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

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Standard Color Charts.
e. Wiring diagrams showing factory-installed wiring.
f. Testing by recognized testing agency.

4. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

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

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.
k. Relationship to adjoining construction clearly indicated.
l. Seal and signature of professional engineer if specified.
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (750 by 1000 mm).
3. Number of Copies: Submit two opaque (bond) copies of each submittal. Architect will return one copy.

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

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

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

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

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.

1. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect will return two copies.

F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design.

2.2 INFORMATIONAL SUBMITTALS

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

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be

signed by an officer or other individual authorized to sign documents on behalf of that entity.

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

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

C. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

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

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

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

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

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

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

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

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

M. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

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

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

2.3 DELEGATED DESIGN

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

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

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

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

3.2 ARCHITECT'S ACTION

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

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

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

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

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

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

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. See Divisions 02 through 49 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

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

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

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

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

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

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

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

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

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

J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

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

K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.

9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

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

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

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

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

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

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

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

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

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

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of

manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

J. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 49.

1.6 QUALITY CONTROL

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

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including

service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

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

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Does not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

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

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

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

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

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

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

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

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

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

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

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

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

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

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

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

1.2 INDUSTRY STANDARDS

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

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

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

C. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA)
CFR	Code of Federal Regulations
CRD	Handbook for Concrete and Cement
DOD	Department of Defense Military Specifications and Standards
DSCC	Defense Supply Center Columbus (See FS)
FED-STD	Federal Standard (See FS)
FS	Federal Specification
FTMS	Federal Test Method Standard (See FS)
ICC-ES	ICC Evaluation Service, Inc.
MIL	(See MILSPEC)
MIL-STD	(See MILSPEC)
MILSPEC	Military Specification and Standards
NES	National Evaluation Service (See ICC-ES)
UFAS	Uniform Federal Accessibility Standards

1.3 ABBREVIATIONS AND ACRONYMS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

B. See Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

C. See Division 31 Section "Dewatering" for disposal of ground water at Project site.

1.2 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

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

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pavement: Comply with Division 32, pavement Sections.

B. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.

C. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete galvanized steel bases for supporting posts.

D. Lumber and Plywood: Comply with requirements in Division 06 Section “Rough Carpentry.”

E. Gypsum Board: Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

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

2.2 TEMPORARY FACILITIES

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

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

2.3 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

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

3.2 TEMPORARY UTILITY INSTALLATION

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

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

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

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

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

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

F. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.

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

1. Install electric power service overhead, unless otherwise indicated.
2. Connect temporary service to Owner's existing power source, as directed by Owner.

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

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

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

J. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail in field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

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

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

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

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

D. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

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

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

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

G. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate..

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

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

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

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

G. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

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

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
2. Construct dustproof partitions with 2 layers of 3-mil (0.07-mm) polyethylene sheet on each side. Cover floor with 2 layers of 3-mil (0.07-mm) polyethylene sheet, extending

sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant plywood.

a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.

3. Insulate partitions to provide noise protection to occupied areas.
4. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
5. Protect air-handling equipment.
6. Weather strip openings.
7. Provide walk-off mats at each entrance through temporary partition.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking on campus completely.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

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

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

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

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. See Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.

C. See Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

D. Substitution Requests shall only be accepted during bidding and shall be required to obtain prior approval status.

1.2 DEFINITIONS

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.3 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. Substitutions shall not be allowed after Bidding.

1. Substitution Request Form: Use CSI Form 13.1A.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified material or product cannot be provided.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution.

B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:
1. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
3. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
5. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, and textures" or a similar phrase, select a product that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or

texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution if received within 7 days that bids are due. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. See Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 SUBMITTALS

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

B. Certified Surveys: Submit two copies signed by professional engineer.

C. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before submitting a bid & constructions, verify the location and points of connection of utility services. Additional fees shall not be considered for lack of visiting the site prior to bidding.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

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

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

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

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

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

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

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

C. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

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

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

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

GENERAL

1.1 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

C. See Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.2 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

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

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

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

1.4 WARRANTY

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

PRODUCTS

1.5 MATERIALS

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

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

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

EXECUTION

1.6 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

1.7 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

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

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

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

1.8 PERFORMANCE

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

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

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

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

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

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

PART 2 - END OF SECTION 017329

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. See Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

C. See Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

D. See Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

E. See Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.

F. See Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.

10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

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

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
g. Sweep concrete floors broom clean in unoccupied spaces.
h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Replace parts subject to unusual operating conditions.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Emergency manuals.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

B. See Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

A. Manual: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component for fire, flood, gas leak, water leak, power failure, water outage, equipment failure, and chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures,

maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:

D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions and demonstration and training videotape if available, that detail essential maintenance procedures:

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. See Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

C. See Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.2 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up Record Prints.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

   a. Project name.
   b. Date.
   c. Designation "PROJECT RECORD DRAWINGS."
   d. Name of Architect.
   e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Order, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

B. See Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1.3 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Preinstruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training.

D. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish an instructor to describe Owner's operational philosophy.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner through Architect, with at least seven days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral demonstration performance-based test.

END OF SECTION 017900

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 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.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

C. 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.

2.3 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. Supplement with the following:

   a. Fly Ash: ASTM C 618, Class F.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 1-1/2 nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating.

G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.8 CONCRETE MIXTURES

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. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 5 inches , plus or minus 1 inch (25 mm).
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.

2.9 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 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.

3.5 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.

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 (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 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. 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. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. 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.

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.

3.8 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. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. 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.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in 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. Maintain continuity of coating and repair damage during curing period.
4. 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.

3.10 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.

3.11 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. 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 one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. , but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units (CMUs).

B. See Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.

C. See Division 07 Section "Sheet Metal Flashing and Trim" for furnishing manufactured reglets installed in masonry joints for metal flashing.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.

C. Samples for each type and color of exposed masonry units and colored mortars.

D. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards.

1. For masonry units include material test reports substantiating compliance with requirements.

1.3 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.

1. Build sample panels for a typical exterior brick/block wall at transitions in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high.

1.4 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified.
   2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

B. Concrete Masonry Units: ASTM C 90.

   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (13.1 MPa)
   2. Weight Classification: Normal weight.
   3. Pattern and Texture for Decorative Units:

      a. Standard pattern, standard finish – 12” and 8”
      b. Scoured vertically, standard finish – 4”

2.2 MASONRY LINTELS

A. General: Provide either concrete or masonry lintels, at Contractor's option, complying with requirements below.

B. Masonry Lintels: Made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout.

2.3 BRICK

A. General: Provide shapes indicated and as follows:

   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: ASTM C 216, Grade SW, Type FBS.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi (20.7 MPa) 4400 psi (30.3 MPa) 5500 psi (37.9 MPa) 6400 psi (44.1 MPa) 8000 psi (55.2 MPa) 8400 psi (57.9 MPa).
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Size (Actual Dimensions): 3-5/8 inches (92 mm) wide by 2-1/4 inches (57 mm) high by 7-5/8 inches (194 mm) long.

C. Basis of Design:

1. Color/Manufacturer/Distribution: Charleston; Columbus Britain Canopy; Economy Brick
2. Approved Equals: Mosstown; Cherokee Brick and Tile; Economy
   Loredo; Boral Brick; Economy Brick
   Kenans Mill; Henry Brick; Cocreham Brick and Stone, Inc.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C 207, Type S.

C. Colored Cement Product: Packaged blend made from portland cement and lime (at brick locations only) and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
2. Available Products:

   a. Colored Portland Cement-Lime Mix:

      1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
      2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      3) Lafarge North America Inc.; Eaglebond.
      4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

D. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products:

a. Addiment Incorporated; Mortar Kick.
b. Euclid Chemical Company (The); Accelguard 80.
c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
d. Sonneborn, Div. of ChemRex; Trimix-NCA.

F. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Masonry Joint Reinforcement: ASTM A 951; mill galvanized, carbon-steel wire for interior walls and hot-dip galvanized, carbon-steel wire for exterior walls.

1. Wire Size for Side Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
2. Wire Size for Cross Rods: W1.7 or 0.148-inch (3.8-mm) diameter.
3. Wire Size for Veneer Ties: W1.7 or 0.148-inch (3.8-mm) diameter.
4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
5. Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.
6. Multiwythe Masonry:
   a. Adjustable (two-piece) type, with one side rod at each face shell of backing wythe and with ties that extend into facing wythe. Ties engage eyes or slots in reinforcement and extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous wire in the facing wythe.

2.6 TIES AND ANCHORS

A. Materials:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

1. Wire: Fabricate from [3/16-inch- (4.8-mm-)] [1/4-inch- (6.4-mm-)] diameter, hot-dip galvanized steel wire.

D. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.4-mm-) diameter, hot-dip galvanized steel wire.

2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.25-inch- (6.4-mm-) diameter, hot-dip galvanized steel wire.
3. Connector Section for Concrete: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from [0.053-inch- (1.3-mm-)] [0.097-inch- (2.5-mm-)] thick, steel sheet, galvanized after fabrication.

E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm) thick by 24 inches (600 mm) long, with ends turned up 2 inches (50 mm) or with cross pins.

1. Corrosion Protection: Epoxy coating 0.020 inch (0.51 mm) thick.

F. Adjustable Masonry-Veneer Anchors

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).

2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, and slotted holes for inserting wire tie.
b. Fabricate sheet metal anchor sections from [0.067-inch- (1.7-mm-)] [0.097-inch- (2.5-mm-)] thick, steel sheet, galvanized after fabrication.
c. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch- (4.8-mm-) diameter, hot-dip galvanized steel wire.

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing**,** where flashing is exposed or partly exposed and where indicated, complying with Division 07 Section "Sheet Metal Flashing and Trim."

1. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
2. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
3. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.

B. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth.

a. Products:

1) Advanced Building Products Inc.; Copper Fabric Flashing.

2) AFCO Products Inc.; Copper Fabric.
3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
5) Polytite Manufacturing Corp.; Copper Fabric Flashing.
6) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
7) York Manufacturing, Inc.; York Copper Fabric Flashing.

C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.9 INSULATION (Fill all open CMU cavities)

A. Loose-Granular Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

B. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.

1. Products:

a. Concrete Block Insulating Systems; Korfil.
b. Shelter Enterprises Inc.; Omni Core.

2.10 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains from new masonry without damaging masonry. Use product approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Available Manufacturers:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.11 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.
3. For mortar parge coats, use Type S.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
5. For interior non-load-bearing partitions, Type O may be used instead of Type N.

C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Pigments shall not exceed 5 percent of masonry cement by weight.

D. Grout for Unit Masonry: Comply with ASTM C 476; UBC Standard 21-19.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602; Table 21-C in the Uniform Building Code for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

D. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

D. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

E. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.4 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. (0.42 sq. m) of wall area spaced not to exceed 24 inches (610 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

    a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
    b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
    c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Parge cavity face of backup wythe in a single coat approximately 3/8 inch (10 mm) thick. Trowel face of parge coat smooth.

D. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

E. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit insulation between wall ties and other confining obstructions, with edges butted tightly. Press units firmly against inside wythe of masonry.

3.5 MASONRY-CELL INSULATION (All open CMU cells)

A. Pour granular insulation into cavities to fill void spaces. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of insulation to 1 story in height, but not more than 20 feet (6 m).

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

B. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch (25 mm) in width between masonry and structural member, unless otherwise indicated.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.8 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners.
2. Embed tie sections and connector sections and continuous wire in masonry joints. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 16 inches (406 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally with not less than 1 anchor for each 3.5 sq. ft. (0.33 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 36 inches (914 mm), around perimeter.

3.9 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows, unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing as recommended by flashing manufacturer.
2. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.

C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use open head joints to form weep holes.
2. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm)

3.11 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch (19 mm) with a steel-trowel finish. Form a wash at top of parging and a cove at bottom. Damp-cure parging for at least 24 hours and protect parging until cured.

3.12 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Protect adjacent surfaces from contact with cleaner.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
2. Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. K-series steel joist substitutes.
3. Joist Girders
4. Joist accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Manufacturer certificates.

C. Mill Certificates: For each type of bolt.

D. Comprehensive engineering analysis of special joists

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

PART 2 - PRODUCTS

2.1 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.2 JOIST GIRDERS

A. Manufacture joist girders according to "Standard Specifications for Joist Girders" in SJI's "Specifications," with steel-angle top- and bottom-chord members; with end and top-chord arrangements as indicated.

2.3 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

B. Primer: Provide shop primer that complies with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.

C. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

D. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Apply one coat of shop primer.

C. Shop priming of joists and joist accessories is specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connection's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.

END OF SECTION 05 21 00

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

   1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product certificates.

C. Evaluation reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ASC Profiles, Inc.; a Blue Scope Steel company.
2. Canam United States; Canam Group Inc.
3. CMC Joist & Deck.
4. Consolidated Systems, Inc.; Metal Dek Group.
5. Cordeck.
6. DACS, Inc.
7. Epic Metals Corporation.
8. Marlyn Steel Decks, Inc.
9. New Millennium Building Systems, LLC.
10. Nucor Corp.; Vulcraft Group.
11. Roof Deck, Inc.
12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
13. Verco Manufacturing Co.
14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.
2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

G. Galvanizing Repair Paint: ASTM A 780

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

F. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

G. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weldat each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld.

H. Pour Stops and Girder Fillers: Weld steel-sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

I. Floor-Deck Closures: Weld steel-sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION 05 31 00

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Miscellaneous steel framing and supports.
2. Shelf angles.
3. Steel weld plates and angles.
4. Miscellaneous steel trim.
5. Metal bollards.
6. Loose steel lintels.

B. See Division 05 Section "Decorative Metal" for ornamental metal items.

C. See Division 05 Section "Decorative Metal Railings" for ornamental metal railings.

1.2 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

B. Ferrous Metals:
1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Stainless-Steel Bars and Shapes: ASTM A 276, Type [**304**] [**316L**].
3. Steel Tubing: ASTM A 500, cold-formed steel tubing.
4. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

C. Nonferrous Metals:

1. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T6.
2. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, alloy 6061-T6.
3. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.3 FASTENERS

A. General: Type **304** stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI #79.

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

1. Available Products:

a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
b. Carboline Company; Carbozinc 621.
c. ICI Devoe Coatings; Catha-Coat 313.
d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
g. Tnemec Company, Inc.; Tneme-Zinc 90-97.

C. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

E. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless otherwise indicated.

2.5 FABRICATION

A. General: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

2. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
4. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
5. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches (600 mm) o.c.

B. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work. Fabricate units from steel shapes, plates, and bars of welded construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate steel girders for wood frame construction from continuous steel shapes. Where wood nailers are attached to girders with bolts or lag screws, drill holes at 24 inches (600 mm) o.c.
2. Fabricate steel pipe columns for supporting wood frame construction with steel baseplates and top plates welded to pipe with fillet welds the same size as pipe wall thickness.

C. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

1. Lintels in Exterior Walls: Galvanize

D. Shelf Angles: Fabricate shelf angles of sizes indicated and for attachment to framing. Fabricate with horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c.

1. Shelf Angles in Exterior Walls: Galvanize
2. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

B. Steel and Iron Finishes:

1. Hot-dip galvanize items as indicated to comply with ASTM A 123/A 123M or ASTM A 153/A 153M as applicable.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below for environmental exposure conditions of installed metal fabrications:

   a. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   b. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

3. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Fit exposed connections accurately together. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication.
2. Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
3. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

B. Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack solidly with nonshrink, nonmetallic grout.

C. Bollards:
1. Anchor bollards in place with concrete footings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
2. Fill bollards solidly with concrete, mounding top surface to shed water.

D. Touch up surfaces and finishes after erection.

1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Wood blocking and nailers.
4. Wood furring and grounds.
5. Plywood backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

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 published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2, 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 containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.

C. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2 grade and any of the following species:
1. Southern pine; SPIB.
2. Mixed southern pine; SPIB.

D. Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,500,000 psi (10 350 MPa) and an extreme fiber stress in bending of at least 1000 psi (6.9 MPa) for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

E. Exposed Exterior Framing Indicated to Receive a Stained or Natural Finish: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
1. As noted on the Drawings

2.4 ENGINEERED WOOD PRODUCTS

A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

1. Extreme Fiber Stress in Bending, Edgewise: 3100 psi (21.3 MPa) for 12-inch nominal-(286-mm actual-) depth members.
2. Modulus of Elasticity, Edgewise: 2,000,000 psi (13 700 MPa).

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Cants.
4. Furring.
5. Grounds.

B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 15 percent maximum moisture content and the following species and grades:

1. Mixed southern pine, No. 3 grade; SPIB.

2.6 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners[with hot-dip zinc coating complying with ASTM A 153/A 153M] [of Type 304 stainless steel].

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

2.8 METAL FRAMING ANCHORS

A. Basis-of-Design Products: Subject to compliance with requirements, provide products by Simpson Strong Tie Co., Inc., or comparable products by one of the following:
1. Alpine Engineering Products, Inc,
2. KC Metals Products, Inc.
3. USP Structural Coneectors

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

2.9 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

E. Do not splice structural members between supports, unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wall sheathing.
2. Roof sheathing.
3. Building paper.
4. Flexible flashing at openings in sheathing.
5. Exterior fluid applied air infiltration/waterproofing barrier.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

B. Research/Evaluation Reports: For the following:

1. Preservative-treated plywood.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 1

2.2 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA C9.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood, unless otherwise indicated

2.3 WALL SHEATHING

A. Plywood Wall Sheathing: Exterior, Structural I sheathing.

2.4 ROOF SHEATHING

A. Plywood Roof Sheathing: Exterior, Structural I sheathing.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated.

1. For wall and roof sheathing panels, provide fasteners with corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.6 WEATHER-RESISTANT ROOF COVERING

A. Basis of Design: Self adhering roofing underlayment: Ice & Water Shield by Grace; or comparable product by Carlisle or Tamko.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's "Uniform Building Code."
4. Table 2305.2, "Fastening Schedule," in BOCA's "BOCA National Building Code."
5. Table 2306.1, "Fastening Schedule," in SBCCI's "Standard Building Code."

6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's "International One- and Two-Family Dwelling Code."

B. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that exclude exterior moisture.

C. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."

1. Comply with "Code Plus" installation provisions in guide referenced in paragraph above.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

a. Glue and nail to wood framing.
b. Screw to cold-formed metal framing.

2. Wall and Roof Sheathing:

a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
b. Screw to cold-formed metal framing.

3.3 WEATHER-RESISTANT SHEATHING-PAPER INSTALLATION

A. General: Cover sheathing with weather-resistant sheathing paper as follows:

1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap, unless otherwise indicated.

B. Building Paper: Apply horizontally with a 2-inch (50-mm) overlap and a 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails.

C. Building Wrap: Comply with manufacturer's written instructions.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

3.4 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturers written instructions.

1. Lap seams and junctures with other materials at least 4 inches (100 mm), except that at flashing flanges of other construction, laps need not exceed flange width.
2. Lap flashing over weather-resistant building paper at bottom and sides of openings.
3. Lap weather-resistant building paper over flashing at heads of openings.
4. After flashing has been applied, roll surfaces with a hard rubber or metal roller.

3.5 PROTECTION

A. Paper-Surfaced Gypsum Sheathing: Protect sheathing by covering exposed exterior surface of sheathing with weather-resistant sheathing paper securely fastened to framing. Apply covering immediately after sheathing is installed.

END OF SECTION 061600

SECTION 061800 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes framing using structural glued-laminated timber.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm.

1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that will not be exposed in the completed Work.

B. Quality Standard: Comply with AITC A190.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with provisions in AITC 111.

B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER

A. General: Provide structural glued-laminated timber that complies with AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.

1. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.
2. Adhesive shall not contain urea-formaldehyde resins.

3. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Certified Wood: Glulams shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

C. Species and Grades for Structural Glued-Laminated Timber: Southern pine that complies with structural properties indicated.

D. Species and Grades for Beams:

1. Species and Beam Stress Classification: Southern pine, 24F-1.8E.
2. Lay-up: Either balanced or unbalanced.

E. Appearance Grade: Industrial or Framing, complying with AITC 110.

F. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.

G. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

H. Sealers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 TIMBER CONNECTORS

A. General: Unless otherwise indicated, fabricate from the following materials:

1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
2. Round steel bars complying with ASTM A 575, Grade M 1020.
3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.

B. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil (0.05-mm) dry film thickness.

1. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.

2.3 FABRICATION

A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.

B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.

C. End-Cut Sealing: Immediately after end cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.

D. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Erect structural glued-laminated timber true and plumb, and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

1. Lift with padded slings and protect corners with wood blocking.

B. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing.

1. Predrill for fasteners using timber connectors as templates.
2. Dress exposed surfaces as needed to remove planing and surfacing marks.
3. Coat cross cuts with end sealer.

C. Cutting: Avoid cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

D. Repair damaged surfaces after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

E. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades.

1. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 061800

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior standing and running trim.
2. Plastic-laminate cabinets.
3. Plastic-laminate countertops.
4. Solid surfacing material countertops (Alternate).

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

A. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

B. Samples:

1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
2. Plastic-laminates, for each type, color, pattern, and surface finish.
3. Thermoset decorative panels, for each type, color, pattern, and surface finish.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of woodwork.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

A. Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by one of the following:

2.2 MATERIALS

A. Wood Products:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

B. Thermoset Decorative Panels: Particleboard or medium-density fiberboard 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.

D. Solid Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Corian.
b. Avonite, Inc.
c. Formica Corporation.
d. Swan Corporation (The).

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening.

C. Back-Mounted Pulls: BHMA A156.9, B02011
1. Wire Pulls: Back mounted, solid metal, 5 inches (127 mm) long, 2 1/2 inches (63.5 mm) deep, and 5/16 inch (8 mm) in diameter.

D. Drawer Slides: BHMA A156.9, B05091.
1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
2. Box Drawer Slides: Grade 1; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
3. File Drawer Slides: Grade 1HD-100; for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
4. Pencil Drawer Slides: Grade 2; for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.

E. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

F. Door Locks: BHMA A156.11, E07121.

G. Drawer Locks: BHMA A156.11, E07041.

H. 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.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

2.5 FABRICATION

A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

   1. Interior Woodwork Grade: Economy.
   2. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.
   3. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

B. Interior Standing and Running Trim:
   1. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
   2. Assemble casings in plant except where limitations of access to place of installation require field assembly.

C. Plastic-Laminate Cabinets:

   1. AWI Type of Cabinet Construction: Reveal overlay on face frame
   2. Reveal Dimension: 1/2 inch (13 mm).
   3. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate as follows:

      a. Horizontal Surfaces Other Than Tops: Grade HGS.
      b. Postformed Surfaces: Grade HGP.
      c. Vertical Surfaces: Grade HGS.
      d. Edges: Grade HGS.

   4. Materials for Semiexposed Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
   5. Drawer Sides and Backs: Thermoset decorative panels.
   6. Drawer Bottoms: Thermoset decorative panels.
   7. Colors, Patterns, and Finishes: See Drawings.

D. Plastic-Laminate Countertops:

   1. High-Pressure Decorative Laminate Grade: HGS.
   2. Colors, Patterns, and Finishes: RE: Drawings.
   3. Edge Treatment: Same as laminate cladding on horizontal surfaces.
   4. Core Material at Sinks: Particleboard made with exterior glue.

E. Solid Surfacing Countertops (Alternate):
   1. Solid Surfacing Material Thickness: 3/4 inch (19 mm).

2. Colors, Patterns, and Finishes: As indicated by manufacturer's designations
3. Fabricate tops in one piece with loose backsplashes field application. Comply with solid-surfacing material manufacturer's written recommendations for adhesives, sealers, fabrication and finishing.

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 backpriming.

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 anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails 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 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 if finished.

G. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim.

H. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

1. 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

I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

END OF SECTION 064023

SECTION 072100 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Concealed building insulation.
2. Exposed building insulation.
3. Loose-fill building insulation.
4. Sound attenuation insulation.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: Full-size units for each type of exposed insulation indicated.

C. Product test reports.

1.3 QUALITY ASSURANCE

A. Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods indicated with product, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 GLASS-FIBER BLANKET INSULATION

A. Available Manufacturers:

1. CertainTeed Corporation.
2. Guardian Fiberglass, Inc.
3. Johns Manville.
4. Knauf Fiber Glass.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

C. Where glass-fiber blanket insulation is located in walls of the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated (fill wall cavity completely):

1. 3-1/2 inches (89 mm) thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F (1.9 K x sq. m/W at 24 deg C).
2. 3-5/8 inches (92 mm) thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F (1.9 K x sq. m/W at 24 deg C).
3. 5-1/2 inches (140 mm) thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F (3.7 K x sq. m/W at 24 deg C).
4. 10 inches (254 mm) thick with a thermal resistance of 30 deg F x h x sq. ft./Btu at 75 deg F (5.2 K x sq. m/W at 24 deg C).
5. All roof insulation shall be 10” thick continuous with R value of 30.

2.3 LOOSE-FILL INSULATION

A. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739, chemically treated for flame-resistance, processing, and handling characteristics.

B. Glass-Fiber Loose-Fill Insulation: ASTM C 764, Type I for pneumatic application or Type II for poured application; with maximum flame-spread and smoke-developed indexes of 5.

2.4 AUXILIARY INSULATING MATERIALS

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

2.5 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate or Angle formed from perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square, welded to

projecting copper-coated steel spindle 0.105 inch (2.67 mm) in diameter and of length capable of holding insulation of thickness indicated securely in position with 1-1/2-inch- (38-mm-) square or diameter self-locking washers complying with the following requirements:

1. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness.
2. Where anchors are located in ceiling plenums and attic spaces, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

B. Chicken wire can be used to anchor insulation along the roof line of the wood framed structure.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, 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. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
6. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

D. Place loose-fill insulation into spaces indicated, either by pouring or by machine blowing, to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

1. For cellulosic-fiber loose-fill insulation, comply with the Cellulose Insulation Manufacturers Association's Special Report #3, "Standard Practice for Installing Cellulose Insulation."

E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.3 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

A. Install 3-inch- (76-mm-) thick, unfaced glass-fiber blanket insulation over suspended ceilings at partitions in a width that extends insulation 48 inches (1219 mm) on either side of partition.

END OF SECTION 072100

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Fluid-applied membrane air barrier, vapor permeable.

1.2 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1. Include details of interfaces with other materials that form part of air barrier.

C. Product certificates.

D. Qualification data.

E. Product test reports.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of air barrier, build mockups of exterior wall assembly 150 sq. ft. (14 sq. m),

C. incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

1. Allow 24 hours for architect inspection and revision of mock-up before proceeding with air barrier work.

D. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FLUID-APPLIED MEMBRANE AIR BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.

1. Products: Subject to compliance with requirements, provide one of the following:

a. W.R. Grace, Perm-a-Barrier VP

b. Henry Company, Air-Bloc 31-MR

2. Physical and Performance Properties:

a. Membrane Air Permeance: Not to exceed 0.004 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
b. Membrane Vapor Permeance: 10 to 20 perms; ASTM E 96. (Note: the products specified are vapor permeable).

2.2 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.

C. Butyl Strip: Vapor-retarding, 30- to 40-mil- (0.76- to 1.0-mm-) thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.

D. Modified Bituminous Strip: Vapor-retarding, 40-mil- (1.0-mm-) thick, smooth-surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.

E. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.

F. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

G. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft (24 to 32 kg/cu. m) density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

H. Modified Bituminous Transition Strip: Vapor-retarding, 40-mil- (1.0-mm-) thick, smooth-surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.

I. Adhesive-Coated Transition Strip: Vapor-permeable, 17-mil- (0.43-mm-) thick, self-adhering strip consisting of an adhesive coating over a permeable laminate with a permeance of 37 perms (2145 ng/Pa x s x sq. m).

J. Elastomeric Flashing Sheet: ASTM D 2000, 2BC415 to 3BC620, minimum 50- to 65-mil- (1.3- to 1.6-mm-) thick, cured sheet neoprene with manufacturer's recommended contact adhesives and lap sealant with stainless-steel termination bars and fasteners.

K. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

L. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions.

B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C 1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

3.2 TRANSITION STRIP INSTALLATION

A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.

B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window

systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials [as indicated].

D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply manufacturer's approved transition strip/flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.

H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.3 AIR BARRIER MEMBRANE INSTALLATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

C. Apply air barrier membrane within manufacturer's recommended application temperature ranges.

D. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

E. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties. Per manufacturer's recommendations:

1. Perm-a-Barrier: 90 mils wet thickness

2. Air-Bloc 31-MR: 120-200 mils wet thickness

F. Apply strip and transition strip a minimum of 1 inch (25 mm) onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches (75 mm) onto each surface according to air barrier manufacturer's written instructions.

G. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

H. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.4 PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 30 days.

END OF SECTION 072726

SECTION 074113 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standing-seam metal roof panels.

B. Related Sections:

1. Division 07 Section "Sheet Metal Roofing" for custom-fabricated and on-site, roll-formed sheet metal roofing.

1.2 PERFORMANCE REQUIREMENTS

A. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

B. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

C. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

   a. Uniform pressure indicated on drawings.
2. Deflection Limits: Metal roof panel assemblies shall withstand wind and snow loads with vertical deflections no greater than 1/240 of the span.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

C. Samples: For each type of exposed finish required.

D. Coordination Drawings: Roof plans, drawn to scale, based on input from installers of the items involved.

E. Manufacturer Certificates: Signed by manufacturer certifying that roof panels comply with energy performance requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

F. Product test reports.

G. Maintenance data.

H. Warranties: Samples of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Provide a manufacturer’s 20 year watertight roofing warranty, with a no dollar limit clause.

1. Roofing contractor shall provide written documentation to the architect within 30 days of notice to proceed stating that they have been approved by the manufacturer to provide this special 20 year warranty.

2. Manufacturer shall be required to inspect the roof and certify that it meets their design and installation requirements.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
2. Surface: Smooth, flat finish.
3. Exposed Coil-Coated Finish:

a. 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

4. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; as recommended in writing by metal roof panel manufacturer.

2.2 FIELD-INSTALLED THERMAL INSULATION

A. Refer to Division 07 Section "Thermal Insulation."

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: 30 to 40 mils (0.76 to 1.0 mm) thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
3. Products: Subject to compliance with requirements, provide the following:

a. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.
b. Grace Construction Products; a unit of Grace, W. R. & Co.; Ultra.
c. Henry Company; Blueskin PE200 HT.
d. Owens Corning; WeatherLock Metal High Temperature Underlayment.

B. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts.

C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.4 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 STANDING-SEAM METAL ROOF PANELS

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 weathertight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Architectural Building Components.
    b. Berridge Manufacturing Company.
    c. Butler Manufacturing; a BlueScope Steel company.
    d. CENTRIA Architectural Systems.
    e. Englert, Inc.
    f. MBCI; a division of NCI Building Systems, L. P.
    g. Merchant & Evans.
    h. Metal Sales Manufacturing Corporation.

3. Profile: Vertical-rib, seamed-joint, as indicated on Drawings.

    a. Basis-of-Design: Zee-lock, 2” high; By Berridge
    b. Color: As selected by Architect from manufacturer's full range.

4. Material: Aluminum-zinc alloy-coated steel sheet, 0.028-inch (0.71-mm).

    a. Exterior Finish: 2-coat fluoropolymer.
    b. Color: As selected by Architect from manufacturer's full range

5. Clips: Fixed.

    a. Material: Stainless steel.

6. Joint Type: Double folded.
7. Panel Coverage: 16”.
8. Panel Height: 2”

2.6 ACCESSORIES

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

B. Flashing and Trim: Formed from same material as roof panels, prepainted with coil coating, minimum 0.018 inch (0.45 mm) thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

C. Roof Curbs: Fabricated from same material as roof panels, minimum [0.048 inch (1.2 mm)] <Insert thickness> thick; with bottom of skirt profiled to match roof panel profiles, and welded top box and integral full-length cricket. Fabricate curb subframing of minimum 0.0598-inch- (1.5-mm-) thick, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads, of size and height indicated. Finish roof curbs to match metal roof panels.

1. Insulate roof curb with 1-inch- (25-mm-) thick, rigid insulation.

2.7 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Substrate Board: Install substrate boards over roof [**deck**] [**sheathing**] on entire roof surface. Attach with substrate-board fasteners.

1. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
2. Comply with UL requirements for fire-rated construction.

B. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.

B. Felt Underlayment: Apply at locations indicated on Drawings, in shingle fashion to shed water, and with lapped joints of not less than 2 inches (50 mm).

C. Apply slip sheet over underlayment before installing metal roof panels.

D. Install flashings to cover underlayment to comply with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.3 METAL ROOF PANEL INSTALLATION

A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

3.4 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
3. Provide elbows at base of downspouts to direct water away from building.

3.5 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074113

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Formed roof drainage system.
2. Formed low-slope roof flashing and trim.
3. Formed steep-slope roof flashing and trim.
4. Formed wall flashing and trim.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Show layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, and anchoring sheet metal flashing and trim.

C. Samples: For each type of sheet metal flashing and trim.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METALS

A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.

2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
3. Exposed Finishes: Apply the following coil coating:

    a. High-Performance Organic Finish: Two -coat thermocured system containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified for below:

        1) Humidity and Salt Spray Resistance: 2000 hours.
        2) Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

C. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.

E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.

2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.

1. Accessories: Continuous removable leaf screen with sheet metal frame and hardware cloth screen.
2. Fabricate from the following material:

   a. Prepainted, Metallic-Coated Steel: 0.0276 inch (0.7 mm) thick.

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Manufactured Hanger Style:
2. Fabricate downspouts from the following material:

   a. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following material:

1. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

B. Valley Flashing: Fabricate from the following material:

1. Prepainted, Metallic-Coated Steel: 0.0276 inch (0.7 mm) thick.

C. Drip Edges: Fabricate from the following material:

1. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

D. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following material:

1. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

E. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, seal, and solder or weld watertight.

1. Fabricate copings from the following material:

a. Prepainted, Metallic-Coated Steel: 0.0396 inch (1.0 mm) thick.

2.7 WALL SHEET METAL FABRICATIONS

A. Openings Flashing in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high end dams. Fabricate from the following material:

1. Prepainted, Metallic-Coated Steel: 0.0217 inch (0.55 mm) thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
2. Aluminum: Use aluminum or stainless-steel fasteners.
3. Copper: Use copper, hardware bronze, or stainless-steel fasteners.
4. Stainless Steel: Use stainless-steel fasteners.

H. Seal joints with elastomeric sealant as required for watertight construction.

I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pretinned surface would show in finished Work.

1. Do not solder prepainted, metallic-coated steel and aluminum sheet.

3.2 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets or straps spaced not more than 36 inches (900 mm) apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.24 m) apart. Install expansion joint caps.
2. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.

1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch (400-mm) centers.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.

1. Interlock exterior bottom edge of coping with continuous cleats anchored to substrate at 16-inch (400-mm) centers.
2. Interlock interior bottom edge of coping with continuous cleats anchored to substrate at 16-inch (400-mm) centers.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Secure in a waterproof manner. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
2. Exterior joints in horizontal traffic surfaces.
3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
4. Interior joints in horizontal traffic surfaces.

B. See Division 2 Section "Pavement Joint Sealants" for sealing joints in pavements, walkways, and curbing.

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Compatibility and adhesion test reports.

D. Product test reports.

1.4 QUALITY ASSURANCE

A. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact or affect joint sealants to joint-sealant manufacturers for testing according to manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates according to the method in ASTM C 1193 that is appropriate for the types of Project joints.

C. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

1.5 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Single-Component Pourable Neutral-Curing Silicone Sealant ES-1:

1. Products:

   a. Dow Corning Corporation; 890-SL.
   b. Pecora Corporation; 300 Pavement Sealant (Self Leveling).
   c. Dow Corning Corporation; SL Parking Structure Sealant.

2. Type and Grade: S (single component) and P (pourable).
3. Class: 100/50.
4. Uses Related to Exposure: NT and T (traffic).
5. Uses Related to Joint Substrates: O, as applicable to joint substrates indicated.

D. Single-Component Neutral-Curing Silicone Sealant ES-2:

1. Products:

   a. Dow Corning Corporation; 790.
   b. GE Silicones; SilPruf LM SCS2700.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 100/50.
4. Use Related to Exposure: NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

2.4 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints AS-1: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products:

   a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

2.5 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) O (open-cell material) B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size

and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

2. Remove laitance and form-release agents from concrete.

a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

G. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application JS-1: Exterior horizontal nontraffic and traffic isolation and contraction joints in cast-in-place concrete slabs.

1. Joint Sealant: Single-component pourable neutral-curing silicone sealant ES-1.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

B. Joint-Sealant Application JS-2: Exterior vertical control and expansion joints in stucco.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

C. Joint-Sealant Application JS-3: Exterior butt joints between metal panels.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range..

D. Joint-Sealant Application JS-4: Exterior vertical joints between different materials listed above.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

E. Joint-Sealant Application JS-5: Exterior perimeter joints between stucco and frames of doors windows and louvers.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

F. Joint-Sealant Application JS-6: Vertical control and expansion joints on exposed interior surfaces of exterior walls.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

G. Joint-Sealant Application JS-7: Interior perimeter joints of exterior openings.

1. Joint Sealant: Single-component neutral-curing silicone sealant ES-2.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

H. Joint-Sealant Application JS-8: Interior joints between plumbing fixtures and adjoining walls, floors, and counters.

1. Joint Sealant: Single-component mildew-resistant neutral -curing silicone sealant ES-2.
2. Joint-Sealant Color: White.

I. Joint-Sealant Application JS-9 Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.

1. Joint Sealant: Latex sealant AS-1.
2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.

C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.3 QUALITY ASSURANCE

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure NFPA 252.

B. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Deansteel Manufacturing Company, Inc.
5. Firedoor Corporation.
6. Fleming Door Products Ltd.; an Assa Abloy Group company.
7. Habersham Metal Products Company.
8. Kewanee Corporation (The).
9. Mesker Door Inc.
10. Pioneer Industries, Inc.
11. Security Metal Products Corp.
12. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.

C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

F. Mineral-Fiber Insulation: ASTM C 665, Type I.

G. Glazing: Division 08 Section "Glazing."

H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), [Model 1 (Full Flush).

C. Hardware Reinforcement: ANSI/SDI A250.6.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames as knocked down or face welded unless otherwise indicated.
3. Frames for Level 1 Steel Doors: 0.042-inch- (1.0-mm-) thick steel sheet.
4. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
5. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
6. Frames for Level 4 Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as knocked down or face welded unless otherwise indicated.
3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
4. Frames for Level 1 Steel Doors: 0.042-inch- (1.0-mm-) thick steel sheet.
5. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
6. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
7. Frames for Level 4 Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.
8. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.

D. Hardware Reinforcement: ANSI/SDI A250.6.

2.5 FRAME ANCHORS

A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.6 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, same material as door face sheet.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, same material as frames.

D. Terminated Stops: Where indicated, terminate stops 6 inches (152 mm) above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

2.7 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- (6.4-mm-thick by 25.4-mm-) wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

2.8 FABRICATION

A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

B. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:

   a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

      1) Three anchors per jamb up to 60 inches (1524 mm) high.
      2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
      5) Two anchors per head for frames more than 42 inches (1066 mm) wide and mounted in metal-stud partitions.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.

   a. Single-Door Frames: Three door silencers.
   b. Double-Door Frames: Two door silencers.

D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical Sections.

E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.9 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: ANSI/SDI A250.10.

2. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

   a. At fire-protection-rated openings, install frames according to NFPA 80.
   b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
   c. Install frames with removable glazing stops located on secure side of opening.
   d. Install door silencers in frames before grouting.
   e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
   g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

B. 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 (3 mm) plus or minus 1/16 inch (1.6 mm).
   b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
   c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
   d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

3.2 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. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections:

1. Division 08 Section "Glazing" for glass view panels in flush wood doors.
2. Division 13 Section "Radiation Protection" for lead-lined flush wood doors.

1.2 SUBMITTALS

A. Product Data: For each type of door indicated. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples: For factory-finished doors.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Marshfield Doors; Red Oak Bombay 6402

B. Equal Manufacturers:

1. Algoma Hardwoods, Inc.
2. Buell Door Company Inc.
3. Chappell Door Co.
4. Eagle Plywood & Door Manufacturing, Inc.
5. Eggers Industries.
6. Graham; an Assa Abloy Group company.
7. Mohawk Flush Doors, Inc.; a Masonite company.
8. Oshkosh Architectural Door Company.

2.2 DOOR CONSTRUCTION, GENERAL

A. WDMA I.S.1-A Performance Grade:

1. Heavy Duty unless otherwise indicated.
2. Extra Heavy Duty: Classrooms, public toilets, janitor's closets, assembly spaces, exits, and where indicated.

B. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1 or Grade LD-2.
2. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

C. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.

a. Screw Withdrawal, Face: 700 lbf (3100 N).
b. Screw Withdrawal, Edge: 400 lbf (1780 N).

D. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.

3.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Red oak.
3. Cut: Quarter sliced.
4. Match between Veneer Leaves: Pleasing match.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Core: Either glued wood stave or structural composite lumber.
8. Construction: Seven plies, either bonded or nonbonded construction.

2.4 LOUVERS AND LIGHT FRAMES

A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI conversion varnish system.
3. Staining: As selected by Architect from manufacturer's full range. (See drawing)
4. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.

a. Comply with NFPA 80 for fire-rated doors.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes access doors and frames for **walls and ceilings**.

1.2 SUBMITTALS

A. Product Data: For each type of access door and frame indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 QUALITY ASSURANCE

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

NFPA 252 or UL 10B for vertical access doors and frames.

1. ASTM E 119 or UL 263 for horizontal access doors and frames.

1.4 COORDINATION

A. If retaining this Article, also retain "Schedule" Paragraph in "Submittals" Article.

B. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

C. Submit shop drawing at beginning of project showing all locations and sizes of access panels for architect review and approval.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Steel Sheet: electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 (ZF180) zinc-iron-alloy (galvannealed) coating or G60 (Z180) mill-phosphatized zinc coating.

D. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Factory-Primed Finish: Manufacturer's standard shop primer.
2. Baked-Enamel Finish: Minimum dry film thickness of 2 mils (0.05 mm).
3. Powder-Coat Finish: Thickness not less than 1.5 mils (0.04 mm).

E. Drywall Beads: 0.0299-inch (0.76-mm) zinc-coated steel sheet to receive joint compound.

F. Plaster Beads: 0.0299-inch (0.76-mm) zinc-coated steel sheet with flange of expanded metal lath.

G. Manufacturer's standard finish.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Acudor Products, Inc.
2. Babcock-Davis; A Cierra Products Co.
3. Bar-Co, Inc. Div.; Alfab, Inc.
4. Cendrex Inc.
5. Dur-Red Products.
6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
7. Jensen Industries.
8. J. L. Industries, Inc.
9. Karp Associates, Inc.
10. Larsen's Manufacturing Company.
11. MIFAB, Inc.
12. Milcor Inc.
13. Nystrom, Inc.
14. Williams Bros. Corporation of America (The).

B. Recessed Access Doors and Trimless Frames: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal in the form of a pan recessed 5/8 inch (16 mm) for gypsum board infill.
3. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with drywall bead.
4. Hinges: Spring-loaded, concealed-pin type.
5. Latch: Cam latch with interior release.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view, provide materials with smooth, flat surfaces without blemishes.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder lock, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Exterior aluminum-framed storefronts.

   a. Glazing is retained mechanically with gaskets on four sides typically and by structural sealant at vertical edges and mechanically with gaskets at horizontal edges at clearstory windows.

2. Exterior manual-swing aluminum doors.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Failure includes the following:

   a. Deflection exceeding specified limits.
   b. Thermal stresses transferred to building structure.
   c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
   d. Glazing-to-glazing contact.
   e. Noise or vibration created by wind and thermal and structural movements.
   f. Loosening or weakening of fasteners, attachments, and other components.
   g. Sealant failure.
   h. Failure of operating units to function properly.

B. Structural-Sealant Joints: Designed to produce tensile or shear stress in structural-sealant joints of less than 20 psi (138 kPa).

C. Structural Loads:

1. Wind Loads: As required for project location.
2. Seismic Loads: AS required for project location.

D. Deflection of Framing Members Normal to Wall Plane: Limited to [1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m) or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.

E. Structural-Test Performance: Systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity but not less than 10 seconds.

F. Temperature Change (Range): Systems accommodate 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

G. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of systems of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).

H. Water Penetration Under Static Pressure: Systems do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

I. Average Thermal Conductance: Fixed glazing and framing areas of systems have average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K) when tested according to AAMA 1503.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples: For each exposed finish.

D. Preconstruction Sealant Test Reports: For structural-sealant-glazed systems.

E. Product test reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Acceptable to manufacturer and capable of preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Preconstruction Sealant Testing: For structural-sealant-glazed systems, perform sealant manufacturer's standard tests for compatibility and adhesion of sealants with each material that will come in contact with sealants and each condition required by aluminum-framed systems.

1. Determine corrective measures required to prepare each material to ensure compatibility with and adhesion of sealants, including, but not limited to, specially formulated primers.

C. Structural-Sealant Glazing: Comply with recommendations in ASTM C 1401, "Guide for Structural Sealant Glazing."

1.5 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
d. Adhesive or cohesive sealant failures.
e. Water leakage through fixed glazing and framing areas.
f. Failure of operating components to function properly.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Non Sloped Store Front: Manufacturers Subject to compliance with requirements, provide products by one of the following:
1. Kawneer; Trifab VersaGlaze 451T
2. Vistawall Architectural Products; Series Fg-3000

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Division 8 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type and as follows:

1. Structural Sealant: ASTM C 1184, neutral-curing silicone formulation compatible with system components with which it comes in contact.

a. Color: As selected by Architect from manufacturer's full range of colors.

2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; neutral-curing silicone formulation compatible with structural sealant and other system components with which it comes in contact.

    a. Color: Matching structural sealant.

2.5 DOORS

A. Doors: Manufacturer's standard glazed doors, for manual swing operation.

1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch-(3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.

2. Door Design: As indicated .

    a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.

3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

2.6 ACCESSORY MATERIALS

A. Insulating Materials: As specified in Division 7 Section "Building Insulation."

B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."

C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.7 FABRICATION

A. Form aluminum shapes before finishing.

B. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or panels.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

C. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

D. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device (dutchman) to retain glazing in place while structural sealant cures.

E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Doors: Reinforce doors as required for installing hardware.

1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: Class I , clear anodic coating complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Fit joints to produce hairline joints free of burrs and distortion.
2. Rigidly secure nonmovement joints.
3. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
4. Seal joints watertight, unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, without warp or rack.

F. Install glazing as specified in Division 8 Section "Glazing."

1. Structural-Sealant Glazing:

a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.
b. Install weatherseal sealant according to Division 7 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrances: Install to produce smooth operation and tight fit at contact points.

1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install insulation materials as specified in Division 7 Section "Building Insulation."

I. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

J. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

3. Diagonal Measurements: Limit difference between diagonal measurement to 1/8 inch (3 mm).

END OF SECTION 084113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Any door shown on the drawings and not specifically referenced in the hardware sets shall be provided with identical hardware as specified on other similar openings and shall be included in the finish hardware suppliers bid.

B. All doors that are fire rated shall be provided with fire rated hardware to comply with the local code requirements whether specified that way or not as a part of the hardware supplier's base bid.

C. Hardware supplier shall notify the Architect in writing of any discrepancies no less than five (5) working days prior to the bid date that could result in hardware being supplied that is non-functional, that will not meet local codes, or any door that is not covered in this specification.

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 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:

    a. Swinging doors.
    b. Other doors to the extent indicated.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
2. Division 8 Section "Flush Wood Doors" for astragals provided as part of a fire-rated labeled assembly.

1.4 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, 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.

    a. 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. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

        1) Sequence of Operation: Include description of component functions including, but not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions.

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: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who has completed both standard and electrified builders hardware and integrated access control installations 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. Source Limitations: Obtain each type and variety of aluminum, steel and wood door hardware from the same single source manufacturer and supplier, unless otherwise indicated.

C. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:

a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
b. Door Closers: Comply with the following maximum opening-force requirements indicated:

1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

2. NFPA 101: Comply with the following for means of egress doors:

a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
b. Thresholds: Not more than 1/2 inch high.

3. International Building Code (2006).

D. Keying Conference: Conduct conference to comply with requirements in Division 1 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 system.
4. Installation of permanent keys and cylinder cores.
5. Address and requirements for delivery of keys.

E. Prior to Substantial Completion, the hardware supplier and general contractor shall perform an on site survey of the hardware installation. All hardware found to be loose, out of proper alignment, or installed incorrectly (including incorrect fasteners) shall be adjusted or reinstalled by the general contractor for proper function and operation. The hardware supplier and general contractor shall submit a written report certifying that all hardware is properly installed and operation correctly.

1.6 DELIVERY, STORAGE, AND HANDLING

A. One complete shipment of door hardware as detailed in approved Door Hardware Schedule Shop Drawings to be inventoried on site and, upon receipt of material, be secure in lock-up room provided with shelving for door hardware.

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.

1.7 COORDINATION

A. Templates: Door Hardware Supplier to provide and distribute to the parties involved for templating for doors, frames, and other work specified to be factory prepared for installing standard, electrified and access control door hardware. Check Shop Drawings of other work to

confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

1.8 WARRANTY

A. Warranty Period: All finish hardware shall be supplied with a One (1) year warranty by the manufacturer against defects in materials and workmanship from date of Substantial Completion, unless otherwise indicated below.

B. Special Warranty Periods:
1. Seven (7) years for mortise locksets.
2. Five (5) years for exit devices.
3. Ten (10) years for manual door closers.

PART 2 - PRODUCTS

1.9 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section and the Door Hardware Schedule at the end of Part 3.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated for named products listed in Hardware Sets.
2. Sequence of Operation: Provide electrified and access control hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule 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 quality standards of utility and performance. Unless otherwise approved provide only the specified product.

2. Architect and Owner reserve the right to approve all substitutions proposed for this specification. All requests for substitution to be make prior to bid in accordance with Division 1. All requests for substitution to be made four (4) days prior to bid in accordance with Division 1, by use of formal CSI format pre-bid substitution request forms with literature and testing information provided to prove compliance and equality to specifications.

1.10 HINGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hinges:

a. Hager Companies (HA).
b. McKinney Products (MC).

c. PBB (PB)

B. Standards: BHMA Certified products complying with the following:

1. Butts and Hinges: BHMA A156.1.
2. Template Hinge Dimensions: BHMA A156.7.

C. Quantity (Butt Hinges): Provide the following, unless otherwise indicated:

1. Two Hinges: For doors with heights up to 60 inches.
2. Three Hinges: For doors with heights 61 to 90 inches.
3. Four Hinges: For doors with heights 91 to 120 inches.
4. 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.

D. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

PART 2 -	PART 3 -	PART 4 - Metal Thickness (inches)	
PART 5 - Maximum Door Size (inches)	PART 6 - Hinge Height (inches)	PART 7 - Standard Weight	PART 8 - Heavy Weight
36-in by 86-in by 1-3/4	4-1/2	0.134	0.180
< 36-in by 120-in by 1-3/4	5	0.146	0.190

A. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

1. Exterior Doors: Heavy weight, non-ferrous, ball bearing hinges.
2. Interior Doors: Heavy weight, ball bearing hinges unless Hardware Sets indicate standard weight.

B. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:

1. 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 following applications:

   a. Out-swinging exterior doors.
   b. Out-swinging access controlled doors.

8.2 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Electrified Locking Devices: BHMA A156.25.

D. Lock Trim:

1. Levers: Basis of Design: Yale 5400LN or equal by approved manufacturer
2. Dummy Trim: Match lever lock trim and escutcheons.

E. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.

F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

G. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

8.3 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:

1. Bored Locks: BHMA A156.2.
2. Mortise Locks: BHMA A156.13.
3. Interconnected Locks: BHMA A156.12.

B. Bored Locks: BHMA A156.2, Grade 1; Series 4000.

1. Manufacturers:

a. Corbin Russwin Architectural Hardware;
b. SARGENT Manufacturing Company;
c. Yale Commercial Locks and Hardware;

8.4 CYLINDERS AND KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into master key system.

1. Conduct keying meeting with End User to define and document keying system instructions and requirements.

B. Keys: Nickel silver; permanently inscribed with a visual key control number and including the notation "DO NOT DUPLICATE."

1. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five master keys.

C. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.
2. Key Control System: BHMA A156.5.

8.5 EXIT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Exit Devices:

    a. Yale 7100 Series with Squarebolt.
    b. Corbin Russwin ED5000 Series with Securebolt.
    c. Von Duprin 99XP Series.

B. Standard: BHMA A156.3.

C. Exit Devices: BHMA Certified Grade 1.

D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

E. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

F. Outside Trim: Match design for locksets and latchsets, unless otherwise indicated.

G. Through Bolt Installation: For exit devices and trim as required for fire rated wood doors.

8.6 CLOSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one the following:

1. Surface-Mounted Closers (Heavy Duty): BHMA Certified Grade 1.

    a. Corbin Russwin Hardware (CR) – DC6000 Series.
    b. Norton Door Controls (NO) - 7500 Series.
    c. Sargent Manufacturing (SA) - 351 Series.
    d. Yale Security Group (YA) - 4400 Series.

B. Standards: Comply with the following:

1. Closers: BHMA A156.4.

C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide non-handed, factory-sized closers adjustable to meet field conditions and requirements for opening force.

D. Closer Options: As indicated in hardware sets, provide door closer options including: delayed action, hold open arms, extra duty parallel arms, positive stop/hold open arms, compression stop/hold open arms, special mounting brackets, spacers and drop plates. Through bolt type mounting is required as indicated in the door hardware sets.

8.7 OPERATING and PROTECTIVE TRIM UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Protective Trim Units:

    a. Hager (HA).
    b. McKinney Products (MC).
    c. Rockwood Manufacturing (RO).
    d. Trimco Manufacturing (TR).

B. Standard: Comply with BHMA A156.6.

C. Materials: Fabricate protection plates from the following:

1. Brass/Bronze and Stainless Steel: .050 inches thick, beveled four sides (B4E) with countersunk screw holes.

D. Fasteners: Provide manufacturer's designated fastener type as indicated in door hardware sets.

E. Furnish protection plates sized 2 inches less than door width (LDW) on push side and 1 inch less door width on pull side by height specified in door hardware sets.

8.8 STOPS AND HOLDERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Stops and Holders:

    a. Hager (HA).
    b. McKinney Products (MC).
    c. Rockwood Manufacturing (RO).
    d. Trimco Manufacturing (TR).

B. Standards: Comply with the following:

1. Stops and Bumpers: BHMA A156.16.
2. Electromagnetic Door Holders: BHMA A156.15.
3. Combination Overhead Holders and Stops: BHMA A156.8.
4. Door Silencers: BHMA A156.16.

C. Stops and Bumpers: BHMA Certified Grade 1.

D. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.

1. Rixson Hardware (RX) - 980 Series.
2. Sargent Manufacturing (SA) - 1560 Series.

E. Combination Overhead Stops and Holders: Certified BHMA Grade 1.

1. Glynn-Johnson (GJ)
2. Rixson Hardware (RX)
3. Sargent Hardware (SA)

F. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch fabricated for drilled-in application to frame. Provide (3) per single door and (2) per paired door frame if applied gasketing is not specified in Hardware Sets.

8.9 DOOR THRESHOLDS, WEATHERSTRIPPING AND GASKETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Door Thresholds, Weatherstripping and Gasket Seals:

   a. Hager (HA).
   b. Pemko Manufacturing (PE).
   c. National Guard (NG).
   d. McKinney (MC).

B. Standard: Comply with BHMA A156.22.

C. General: Provide continuous weatherstrip seal on exterior doors and smoke, light, or sound gasketing on interior doors where specified. Provide non-corrosive fasteners for exterior applications.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Install header seal before mounting door closer arms.
2. Meeting Stile Astragals: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Sweep: Apply to bottom of door, forming seal with threshold when door is closed.

8.10 LOCK CYLINDERS

A. Standard Lock Cylinders: BHMA A156.5, Grade 1

B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six.
2. High-Security Grade: BHMA A156.5, Grade 1A, listed and labeled as complying with pick- and drill-resistant testing requirements in UL 437 (Suffix A).

C. Permanent Cores: Manufacturer's standard; finish face to match lockset; with removable cores.

D. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
2. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

   a. Furnish permanent cores to Owner for installation.

E. Manufacturer: Same manufacturer as for locks and latches.

8.11 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.

8.12 FINISHES

A. Standard: Comply with BHMA A156.18.

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.

D. BHMA Designations: Comply with base material and finish requirements indicated by the following:

1. BHMA 600: Primed for painting, over steel base metal.
2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
3. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
4. BHMA 630: Satin stainless steel, over stainless-steel base metal.
5. BHMA 651: Bright chromium plated over nickel, over steel base metal.
6. BHMA 652: Satin chromium plated over nickel, over steel base metal.
7. BHMA 689: Aluminum painted, over any base metal.

PART 3 - EXECUTION

8.13 EXAMINATION

A. Examine doors and frames, 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. Examine roughing-in for electrical source power to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. 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.

8.14 PREPARATION

A. Steel Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

C. Electrified Openings: Provide steel doors and frames and wood doors prepared to receive electrified hardware connections specified in Door Hardware Sets without additional modification.

8.15 INSTALLATION

A. 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. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's 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.

C. Provide and coordinate concealed wood blocking for wall mount stops as detailed in Door Hardware Schedule.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

8.16 FIELD QUALITY CONTROL

A. The Contractor shall comply with AIA A201 1997 section 3.3.1 which reads as follows: “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.”

8.17 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.

1. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

8.18 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

8.19 DOOR HARDWARE SETS

A. The hardware sets listed below 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.

SET #1 - Ext Entrance Door

Doors: 101-1

3	Hvy Wgt BB Hinges SS NRP	BB1199 4 1/2 X 4 1/2 NRP	US32D	HA
1	Rim Exit Device - SB	7250	630	YA
1	Exit Device Trim - Cyl Only	121F x K300	626	YA
1	Offset Door Pull	23Q	US32D	HA
1	Drip Cap	810S x Length Required	MIL	HA
1	Closer - Stop Arm	4420 TBGN x Drop Plate	689	YA
1	Set Weatherstrip	891S V (Head and Jambs)	MIL	HA
1	Door Sweep with Drip	770S V x Length Required	MIL	HA
1	Panic Threshold	520S V x Width Required	MIL	HA

SET #2 - Exterior Door

Doors: 115-2

3	Hvy Wgt BB Hinges SS NRP	BB1199 4 1/2 X 4 1/2 NRP	US32D	HA
1	Punch Key Entry Lock	Trilogy T@: Dl2700	26D	TRI
1	PA Closer - HD Arm - HO	PR4410 TBGN	689	YA
1	Drip Cap	810S x Length Required	MIL	HA
1	Set Weatherstrip	891S V (Head and Jambs)	MIL	HA
1	Door Sweep with Drip	770S V x Length Required	MIL	HA
1	Panic Threshold	520S V x Width Required	MIL	HA
1	Doorscope (Aluminum, Silver)	DOORSCOPE (ALUMINUM, SILVER)		
DSCP				

SET #3 - Exterior Door

Doors: 113-1, 114-1

3	Hvy Wgt BB Hinges SS NRP	BB1199 4 1/2 X 4 1/2 NRP	US32D	HA
1	Entry Latchset	Yale 5404LN x Augusta AU	626	YA
1	Drip Cap	810S x Length Required	MIL	HA
1	Closer - Stop Arm	4420 TBGN	689	YA
1	Set Weatherstrip	891S V (Head and Jambs)	MIL	HA
1	Door Sweep with Drip	770S V x Length Required	MIL	HA
1	Panic Threshold	520S V x Width Required	MIL	HA
1	Doorscope (Aluminum, Silver)	DOORSCOPE (ALUMINUM, SILVER)		
DSCP				

SET #4 - Passage Door

Doors: 108-1

3 PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1 Passage Lock	Yale 5401LN x Augusta AU	626	YA
1 Convex Wall Stop	230W	US26D	HA
3 Door Silencer	307D	GREY	HA

SET #5 - Toilet

Doors: 102-1

3 PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1 Privacy Set	Yale 5402LN x Augusta AU	626	YA
1 Convex Wall Stop	230W	US26D	HA
1 Closer - Stop Arm	4420 TBGN x Drop Plate	689	YA
3 Door Silencer	307D	GREY	HA

SET #5a - Toilet

Doors: 110-1

3 PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1 Privacy Set	Yale 5402LN x Augusta AU	626	YA
1 Convex Wall Stop	230W	US26D	HA
1 Closer - Stop Arm	4420 TBGN x Drop Plate	689	YA
3 Door Silencer	307D	GREY	HA
1 Smoke Seal	726 (Head and Jambs)	S	HA

SET #6 - Door to Truck Bay - Fire Rated

Doors: 101-2, 107-1, 108-2, 109-1, 115-1

3 PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1 Passage Lock	Yale 5401LN x Augusta AU	626	YA
1 Convex Wall Stop	230W	US26D	HA
1 Closer - Stop Arm	4420	689	YA
1 Smoke Seal	726 (Head and Jambs)	S	HA
3 Door Silencer	307D	GREY	HA
1 Panic Threshold	520S V x Width Required	MIL	HA

SET #7 - Bathroom

Doors: 106-1

3 PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1 Passage Lock	Yale 5401LN x Augusta AU	626	YA
1 Convex Wall Stop	230W	US26D	HA
3 Door Silencer	307D	GREY	HA
1 Closer - Stop Arm	4420	689	YA

SET #7a - Bunkroom

Doors: 112-1, 112-2

3	PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1	Passage Lock	Yale 5401LN x Augusta AU	626	YA
1	Convex Wall Stop	230W	US26D	HA
3	Door Silencer	307D	GREY	HA
1	Closer - Stop Arm	4420	689	YA
1	Smoke Seal	726 (Head and Jambs)	S	HA

SET #8 - Office

Doors: 111-1

3	PB Hinges	1279 4 1/2 X 4 1/2	US26D	HA
1	Entry Lock	Yale 5404LN x Augusta AU	626	YA
1	Convex Wall Stop	230W	US26D	HA
3	Door Silencer	307D	GREY	HA
1	Closer - Stop Arm	4420 TBGN x Drop Plate	689	YA
1	Smoke Seal	726 (Head and Jambs)	S	HA

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.
2. Glazed entrances.
3. Interior borrowed lites.
4. Storefront framing.

1.2 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

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 written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

D. Deterioration of Laminated 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 laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (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; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than

thicknesses and in strengths (annealed or heat treated) required 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. Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 m) above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
    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. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.
    d. Minimum Glass Thickness for Exterior Lites: Not less than 1/4 -inch- (6mm).
    e. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

    1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

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 1/4-inch- (6.0 mm) thick.
    2. For laminated-glass lites, properties are based on products of construction indicated.
    3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite 1/4-inch- (6.0 mm) thick and a nominal 1/2-inch- (12.7-mm-) wide interspace.
    4. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:

        a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
        b. Solar Heat Gain Coefficient: NFRC 200.
        c. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Samples: 12-inch- (300-mm-) square, for each type of glass product indicated, other than monolithic clear float glass.

C. Glazing Schedule: Use same designations indicated on Drawings.

D. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.5 QUALITY ASSURANCE

A. Preconstruction Adhesion and Compatibility Testing: Submit to elastomeric glazing sealant manufacturers, for testing according to ASTM C 1087, samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that will contact or affect elastomeric glazing sealants:

B. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and 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 NFPA 257.

C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council or Associated Laboratories, Inc.

F. Fire Protection Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer’s name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance-rating in minutes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

B. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
3. Sealing System: Dual seal.
4. Spacer Specifications: Manufacturer's standard spacer material and construction.
5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

   a. Spacer Material: Aluminum with mill or clear anodic finish.
   b. Corner Construction: Manufacturer's standard corner construction.

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. EPDM, ASTM C 864.
2. Silicone, ASTM C 1115.
3. Thermoplastic polyolefin rubber, ASTM C 1115.
4. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

2.4 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.6 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

B. Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch (8-mm) total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials.

1. Products: Subject to compliance with requirements, provide the following:

a. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite Plus.
b. Schott North America, Inc.; Laminated Pyran Crystal.
c. Vetrotech Saint-Gobain; SGG Keralite FR-L.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.9 MONOLITHIC FLOAT-GLASS UNITS

A. Uncoated Clear Float-Glass Units: Class 1 (clear) Kind FT (fully tempered) float glass.

1. Thickness: 1/4-inch(6.0 mm).

B. Uncoated Tinted Float-Glass Units: Class 2 (tinted) Kind FT (fully tempered) float glass.

1. Products:

a. PPG Architectural glass

2. Thickness: 1/4-inch (6.0 mm) .
3. Tint Color: As selected by Architect from PPG Azuria; Solexia; Solargray; Solarbronze.
4. Visible Light Transmittance: .69 minimum.
5. Solar Heat Gain Coefficient: .49 maximum.

2.10 INSULATING-GLASS UNITS

A. Tinted Insulating-Glass Units:

1. Products:

    a. PPG Architectural Glass

2. Overall Unit Thickness and Thickness of Each Lite: 1” and 1/4-inch- (5 and 6.0 mm).
3. Interspace Content: Air.
4. Outdoor Lite: Class 2 (tinted) float glass.

    a. Tint Color: As selected by Architect from PPG Azuria; Solexia; Solargray; or Solarbronze.
    b. Kind FT (fully tempered).

5. Indoor Lite: Class 1 clear float glass.

    a. Kind FT (fully tempered).

6. Visible Light Transmittance: .69 minimum.
7. Solar Heat Gain Coefficient: .49 maximum.

PART 3 - EXECUTION

3.1 GLAZING

A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

1. 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.
2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
6. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
7. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

2. 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.
3. 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.
4. Apply cap bead of elastomeric sealant over exposed edge of tape.

C. Gasket Glazing (Dry): Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
2. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
3. Install gaskets so they protrude past face of glazing stops.

D. Sealant Glazing (Wet): Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.2 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. 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 substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 092400 - PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Exterior portland cement plasterwork (stucco) on metal lath and solid plaster bases.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type of colored and textured finish coat indicated; 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For portland cement plaster assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. Mockups: Before plastering, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for each type of finish indicated.
2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Exterior Plasterwork: Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 NONSTRUCTURAL STEEL FRAMING MEMBERS, GENERAL

A. Components, General: Comply with ASTM C 1063. For steel sheet components not included in ASTM C 1063, comply with ASTM C 645 requirements for metal, unless otherwise indicated.

B. Cold-Rolled Channels: Base metal thickness of 0.0538 inch (1.37 mm) with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.

C. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter, unless otherwise indicated.

2.3 METAL LATH

A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.

1. Diamond-Mesh Lath: Self-furring (vertical surfaces); flat (horizontal surfaces).

a. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m).

2.4 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Zinc and Zinc-Coated (Galvanized) Accessories:
1. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.
2. Cornerbeads: Fabricated from zinc-coated (galvanized) steel.

a. Small-noseBull-nose style; use unless otherwise indicated.

3. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
4. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
5. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
6. Two-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4-to-5/8-inch (6.34-to-16-mm) wide; with perforated flanges.

2.5 MISCELLANEOUS MATERIALS

A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Bonding Compound: ASTM C 932.

C. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of not fewer than three exposed threads.

D. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.

E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing), produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

F. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

G. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products:

a. OSI Sealants, Inc.; Pro-Series, SC 175 Acoustical Sound Sealant Non-Flammable - Latex.
b. Pecora Corporation; AC-20 + Silicone.
c. Tremco Incorporated; Tremflex 834.
d. United States Gypsum Co.; SHEETROCK Acoustical Sealant.

H. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

1. Products:

a. OSI Sealants, Inc.; Pro-Series SC 170 Acoustical Sound Sealant - Solvent.
b. Pecora Corporation; BA-98.
c. Tremco, Inc.; Tremco Acoustical Sealant.

2.6 PLASTER MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Color for Finish Coats: white.

B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

C. Sand Aggregate: ASTM C 897.

D. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems, formulated with colorfast mineral pigments and fine aggregates; for use over portland cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.

1. Products:

a. Bonsal, W. R. Co.;
b. ChemRex, SonoWall Stucco Systems;
c. Dryvit Systems, Inc.;
d. Parex Incorporated;

2. Color: As selected by Architect from manufacturer's full range.

2.7 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.

B. Portland Cement Base-Coat Mixes:

1. Over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).
b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material (sum of separate volumes of each component material).

c. For cementitious material, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material (sum of separate volumes of each component material).

C. Factory-Prepared Finish-Coat Mixes: For acrylic-based finish coatings, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare solid-plaster bases that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.2 INSTALLATION, GENERAL

A. Sound Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

B. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.

3.3 INSTALLING NONSTRUCTURAL STEEL FRAMING, GENERAL

A. General: Comply with requirements in ASTM C 1063 for applications indicated.

1. Comply with ASTM C 754 for installation of items not addressed in ASTM C 1063.

B. Install supplementary framing, blocking, and bracing at terminations in plaster assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.

D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

E. Soffits: Unless otherwise detailed on Drawings, install furred or suspended soffits to comply with requirements for ceiling installation; install framed soffits to comply with requirements for partition installation.

3.4 INSTALLING METAL LATH

A. Expanded-Metal Lath: Install according to ASTM C 1063.

1. Partition Framing and Vertical Furring: Install self furring diamond-mesh lath.
2. Flat-Ceiling and Horizontal Framing: Install flat diamond-mesh lath.
3. Curved-Ceiling Framing: Install flat diamond-mesh lath.
4. On Solid Surfaces, Not Otherwise Furred: Install self-furring diamond-mesh lath.

3.5 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.

B. Reinforcement for External Corners:

1. Install lath-type external-corner reinforcement at exterior locations.
2. Install cornerbead at interior locations.

C. Control Joints: Install control joints in specific locations approved by Architect for visual effect as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
b. Horizontal and other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).

2. At distances between control joints of not greater than 18 feet (5.5 m) o.c.

3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.
5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

A. General: Comply with ASTM C 926.

B. Bonding Compound: Apply on unit masonry plaster bases.

C. Plaster Finish Coats: Apply to provide float finish to match Architect's sample; interior stucco to match existing finish.

D. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.

3.7 CUTTING AND PATCHING

A. Cut, patch, replace, and repair plaster as necessary to accommodate other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, crazing (check cracking), dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

END OF SECTION 092400

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.
2. Tile backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

   a. Each level of gypsum board finish indicated for use in exposed locations.
   b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

1.5 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying to rapidly.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. General: Complying 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.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. G-P Gypsum.
      b. National Gypsum Company.
      c. Temple.
      d. USG Corporation.

B. Regular Type:

   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

C. Type X:

   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

D. Flexible Type: Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

   1. Thickness: 1/4 inch (6.4 mm).
   2. Long Edges: Tapered.

E. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.

   1. Thickness: 5/8" (15.9 mm).
   2. Long Edges: Tapered.

F. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.

   1. Core: 5/8 inch (15.9 mm), Type X.

2. Long Edges: Tapered.

2.2 TILE BACKING PANELS

A. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Gypsum Co.
   b. BPB America Inc.
   c. G-P Gypsum.
   d. Lafarge North America Inc.
   e. National Gypsum Company.
   f. PABCO Gypsum.
   g. Temple.
   h. USG Corporation.

2. Core: 5/8 inch (15.9 mm), Type X

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. L-Bead: L-shaped; exposed long flange receives joint compound.
   d. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Fry Reglet Corp.
   b. Gordon, Inc.
   c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified..

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping or drying-type, all-purpose compound.

   a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

3.2 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Type X: Vertical surfaces, unless otherwise indicated.
   2. Ceiling Type: Ceiling surfaces.
   3. Moisture- and Mold-Resistant Type: At janitors closets And unconditional spaces.

3.3 APPLYING EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

   1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
   2. Fasten with corrosion-resistant screws.

3.4 APPLYING TILE BACKING PANELS

A. Water-Resistant Gypsum Backing Board: Install at showers, tubs, and behind tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Areas Not Subject to Wetting: Install regular-type gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Interior Trim: Install in the following locations:

   1. Cornerbead: Use at outside corners, unless otherwise indicated].
   2. LC-Bead: Use at exposed panel edges
   3. Curved-Edge Cornerbead: Use at curved openings.

C. Exterior Trim: Install in the following locations:

   1. Cornerbead: Use at outside corners.
   2. LC-Bead: Use at exposed panel edges.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile
3. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

4. Level 5: Where indicated on Drawings.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.8 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.4 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Basis of Design: Subject to compliance with requirements of the product selected by Armstrong World Industries, Inc. as shown on the drawing shall be used, or a compatible product by one of the following:
   a. Flexco, Inc.
   b. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 861
   1. Material Requirement: Type TP (rubber thermoplastic)
   2. Manufacturing Method: Group I or Group II
   3. Style: Cove (base with toe)

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer’s standard length (4’ sections shall not be allowed)

F. Outside Corners: Premanufactured

G. Inside Corners: Job formed

H. Finish:

I. Colors and Patterns: As indicated by manufacturer’s designations or selected by architect from manufacturer’s full range if by other manufacturer.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.2 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. Scans shall be a minimum of 4’ from outside corners

G. Place seams at inside corners whenever possible to minimize seams exposure on a flat wall.

3.3 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

C. Maintenance data.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.4 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive floor tile.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 SOLID VINYL FLOOR TILE

A. Products: Basis-of-Design: Azrock; Cortina Grande

1. Approved alternate manufacturer listed in documents.

B. Tile Standard: ASTM F 1700.

1. Class: As indicated by product designations.
2. Type: Type A, smooth surface.

C. Thickness: 0.125 inch (3.2 mm).

D. Size: 16 by 16 inches.

E. Colors and Patterns: RE: Finish Schedule and from manufacturer full range.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by floor covering manufacturer and as follows. Proceed with installation only after substrates pass 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 relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum [75%] relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are same temperature as space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.2 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axisin pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern) in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

G. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.3 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.

B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply two or as possible required by manufacturer.

C. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 099113 - EXTERIOR PAINTS AND COATINGS

Part 1 GENERAL

1.1 SECTION INCLUDES

A. A Exterior paints and coatings systems including; paints, stains, transparent coatings, and opaque finishes.

1.2 RELATED SECTIONS

B. A Section 050513 - Shop Applied Coatings for Metal
C.
D. B Section 060140 - Architectural Woodwork Refinishing
E.
F. C Section 060583 - Shop Applied Wood Coatings
G.
H. D Section 071900 - Water Repellents.
I.
J. E Section 096700 - Fluid Applied Flooring for Concrete
K.
L. F Section 099300 - Stains and Transparent Finishes
M.
N. G Section 099600 - High-Performance Coatings

1.3 REFERENCES

A SSPC-SP 1 - Solvent Cleaning

B SSPC-SP 2 - Hand Tool Cleaning

C SSPC-SP 3 - Power Tool Cleaning

D SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete

E EPA-Method 24

F OTC-Regulation No. 41

1.4 SUBMITTALS

O. A. Submit under provisions of Section 013300, Submittal Procedures.
P.
Q. B. Product Data: Manufacturer's data sheets on each paint and coating product should include:

R. 1 ..... Product characteristics
S. 2 ..... Surface preparation instructions and recommendations
T. 3 ..... Primer requirements and finish specification
U. 4 ..... Storage and handling requirements and recommendations
V. 5 ..... Application methods
W. 6 ..... Cautions

X. C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacture's color samples available.
Y.

Z. D. Verification Samples: For each finish product specified, submit samples that represents actual product, color, and sheen.

1.5 MOCK-UP

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

AA. Finish surfaces for verification of products, colors, & sheens.
BB. Finish area designated by Architect.
CC. Provide samples that designate prime & finish coats.
DD. Do not proceed with remaining work until the Architect approves the mock-up samples.

1.6 DELIVERY, STORAGE, AND HANDLING

EE. A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer’s name, label, and the following list of information:
FF.
GG. 1
..... Product name, type (description)
HH. 2 ..... Application & use instructions
II. 3 ..... Surface preparation
JJ. 4 ..... VOC content
KK. 5 ..... Environmental issues
LL. 6 ..... Batch date
MM. 7
..... Color number
NN.
OO. B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
PP. Store materials in an area that is within the acceptable temperature range, per manufacturer’s instructions. Protect from freezing.
QQ.
RR. C. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.
SS.

Part 2 PRODUCTS

2.1 MANUFACTURERS

TT. A. Acceptable Manufacturer: Basis of design.
UU. ..... The Sherwin-Williams Company
VV. ..... 101 Prospect Avenue NW
WW. ..... Cleveland, OH 44115
XX. ..... Tel: (800) 321-8194
YY. ..... Fax: (216) 566-1392

ZZ. ..... www.sherwin-williams.com
AAA.
BBB. B. ..... Other acceptable manufacturers:
CCC. ..... Benjamin Moore ICI

DDD. C.Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 016000 Product Requirements.
EEE. When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

2.2 APPLICATIONS/SCOPE

FFF. AUse this article to define the scope of painting if not fully defined in a Finish Schedule or on the drawings. This article must be carefully edited to reflect the surfaces actually found on the project. In some cases, it may be enough to use the first paragraph that says, in effect, "paint everything" along with a list of items not to paint, without exhaustively defining all the different surfaces and items that must be painted.
GGG.
HHH. BIf the project involves repainting some but not all existing painted surfaces, be sure to indicate the extent of the repainting.
III.
JJJ.C The descriptions of each system can also be used to further refine the definition of what is to be painted, stained, or clear finished.

2.3 MATERIALS - GENERAL REQUIREMENTS

KKK. A. .....Paints and Coatings - General:
LLL. 1
Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
MMM. ..... 2 For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

NNN. B. .....Primers:
OOO. 1
Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.4 ACCESSORIES:

PPP. A ..... Coating Application Accessories:
QQQ. 1
Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturer’s specifications.

Part 2 EXECUTION

3.1 EXAMINATION
RRR. ADo not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding
SSS.

TTT. BIf substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

UUU.

VVV. CProceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.2 SURFACE PREPARATION:

WWW. AProper product selection, surface preparation, and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.

XXX.

YYY. BSelection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.

ZZZ.

AAAA. CThe surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.

BBBB.

CCCC. DRemove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

DDDD.

E. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions. On large expanses of metal siding, the air, surface and material temperatures must be 50°F or higher to use low temperature products.

EEEE.

FFFF. F..... Methods:

GGGG.

HHHH. 1
..... Aluminum

IIII. Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

JJJJ. .....

KKKK. 2
..... Block (Cinder and Concrete)

LLLL. ..... Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F.The pH of the surface should be between 6 and 9,unless the products to be used are designed to be used in high pH environments such as Loxon. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

MMMM. .....

NNNN. 3
..... Concrete, SSPC-SP13 or NACE 6

OOOO. ..... This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.

The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

PPPP. .....

QQQQ. 4

..... Cement Composition Siding/Panels

RRRR. ..... Re

move all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9,unless the products to be used are designed to be used in high pH environments such as Loxon.

SSSS. .....

TTTT. 5

..... Exterior Composition Board (Hardboard)

UUUU. ..... So

me composition boards may exude a waxy material that must be removed with a solvent prior to coating. Whether factory primed or unprimed, exterior composition board siding (hardboard) must be cleaned thoroughly and primed with an alkyd primer.

VVVV. .....

WWWW. 6

..... Galvanized Metal

XXXX. ..... Cle

an per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

YYYY. .....

ZZZZ. 7

..... Steel: Structural, Plate, etc.

AAAAA. ..... Sho

uld be cleaned by one or more of the ten surface preparations described below. These methods were originally established by the Steel Structures Painting Council in 1952, and are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Steel Structures Painting Council; ask for SSPC-VIS 1-89. A brief description of these standards together with numbers by which they can be specified follow.

BBBBB. .....

CCCCC. 8

..... Solvent Cleaning, SSPC-SP1

DDDDD. ..... Sol

vent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.

EEEEE. .....

FFFFF. 9

..... Hand Tool Cleaning, SSPC-SP2

GGGGG. ..... Ha

nd Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process.

Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

HHHHH. .....

IIIII. 10 .....Power Tool Cleaning, SSPC-SP3

JJJJJ. ..... Po
wer Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

KKKKK. .....

LLLLL. 11
..... White Metal Blast Cleaning, SSPC-SP5 or NACE 1

MMMMM. ..... A
White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

NNNNN. .....

OOOOO. 12
..... Commercial Blast Cleaning, SSPC-SP6 or NACE 3

PPPPP. ..... A
Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

QQQQQ. .....

RRRRR. 13
..... Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4

SSSSS. ..... A
Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

TTTTT. .....

UUUUU. 14
..... Power Tool Cleaning to Bare Metal, SSPC-SP11

VVVVV. ..... Met
allic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.

WWWWW. .....

XXXXX. 15
..... Near-White Blast Cleaning, SSPC-SP10 or NACE 2

YYYYY. .....
Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor

discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

ZZZZZ. .....

AAAAAA. 16

..... High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials

BBBBBB. ..... SS

PC-SP12 or NACE 5

CCCCCC. ..... Thi

s standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

DDDDDD. .....

EEEEEE. 17

..... Water Blasting, NACE Standard RP-01-72

FFFFFF. ..... Re

moval of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

GGGGGG. .....

HHHHHH. 18

..... Stucco

IIIIII. ..... Mu

st be clean and free of any loose stucco. If recommended procedures for applying stucco are followed, and normal drying conditions prevail, the surface may be painted in 30 days. The pH of the surface should be between 6 and 9,unless the products to be used are designed to be used in high pH environments such as Loxon.

JJJJJJ. .....

KKKKKK. 19

..... Wood—Exterior

LLLLLL. ..... Mu

st be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

MMMMMM. .....

NNNNNN. 20

..... Vinyl Siding, Architectural Plastics, and Fiberglass

OOOOOO. ..... Cle

an thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause siding to warp.

PPPPPP. .....

3.3 INSTALLATION

QQQQQQ. .....

RRRRRR. ..... A Ap-

ply all coatings and materials with manufacture specifications in mind. Mix and thin coatings according to manufacture recommendation.

SSSSSS. .....

TTTTTT. ..... B Do

not apply to wet or damp surfaces.

UUUUUU. .....

VVVVVV. 1

Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.

WWWWWW. 2

..... Test new concrete for moisture content.

XXXXXX. 3
..... Wait until wood is fully dry after rain or morning fog or dew.
YYYYYY. .....
ZZZZZZ. ..... C Apply coatings using methods recommended by manufacturer.
AAAAAAA. .....
BBBBBBB. ..... D
Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

CCCCCCC. ..... E Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
DDDDDDD. .....
EEEEEEE. ..... F
Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
FFFFFFF. .....
GGGGGGG. ..... G Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.
HHHHHHH. .....
IIIIIII. HInspection: The coated surface must be inspected and approved by the architect or engineer just prior to each coat.

3.4 PROTECTION

JJJJJJJ. ..... A
Protect finished coatings from damage until completion of project.
KKKKKKK. .....
LLLLLLL. ..... B
Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

3.5 SCHEDULES

A. CEMENT (Stucco)
1st Coat: S-W Loxon® Block Surfacer, A24W00200, 16 mils wet, 8 mils dry.
2nd Coat: S-W Loxon® XP Exterior Waterproofing Systems, A24 Series, 14 – 18 mils wet, 6.4 – 8.3 mils dry.
3rd Coat: S-W Loxon® XP Exterior Waterproofing Systems, A24 Series, 14 – 18 mils wet, 6.4 – 8.3 mils dry.

B. MASONRY (Concrete Masonry Units Cinder or Concrete Block)
1st Coat: S-W Loxon® Block Surfacer, A24W00200, 16 mils wet, 8 mils dry.
2nd Coat: S-W Loxon® XP Exterior Waterproofing Systems, A24 Series, 14 – 18 mils wet, 6.4 – 8.3 mils dry.
3rd Coat: S-W Loxon® XP Exterior Waterproofing Systems, A24 Series, 14 – 18 mils wet, 6.4 – 8 mils dry.

C. CEMENT (Cementitious Siding/Wood)
1st Coat: S-W Loxon® Concrete & Masonry Primer, A24W8300.
2nd Coat: S-W A-100 Exterior Gloss.
3rd Coat: S-W A-100 Exterior Gloss.

D. METAL (Exposed Exterior Steel)
   1st Coat: S-W Pro Industrial Pro-Cryl Universal Metal Primer, B66W310.
   2nd Coat: S-W Pro Industrial Urethane Alkyd Enamel, B54W150.
   3rd Coat: S-W Pro Industrial Urethane Alkyd Enamel, B54W150.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTS AND COATINGS

Part 1 GENERAL

1.1 SECTION INCLUDES

A Interior paint and coatings systems including; paint, stains, transparent coatings, and opaque finishes.

1.2 RELATED SECTIONS

A Section 050513 - Shop Applied Coatings for Metal

B Section 060140 - Architectural Woodwork Refinishing

C Section 060583 - Shop Applied Wood Coatings

D Section 071900 - Water Repellents.

E Section 096700 - Fluid Applied Flooring for Concrete

F Section 099300 - Stains and Transparent Finishes

G Section 099600 - High-Performance Coatings

1.3 REFERENCES

A SSPC-SP 1 - Solvent Cleaning

B SSPC-SP 2 - Hand Tool Cleaning

C SSPC-SP 3 - Power Tool Cleaning

D SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete

E EPA-Method 24

1.4 SUBMITTALS

A Submit under provisions of Section 013300, Submittal Procedures.

B Product Data: Manufacturer's data sheets on each paint and coating product should include:

1 ..... Product characteristics
2 ..... Surface preparation instructions and recommendations
3 ..... Primer requirements and finish specification
4 ..... Storage and handling requirements and recommendations
5 ..... Application methods
6 ..... Cautions

C Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.

D Verification Samples: For each finish product specified, submit samples that represents actual product, color, and sheen.

1.5 MOCK-UP

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

A Finish surfaces for verification of products, colors, & sheens.
B Finish area designated by Architect.
C Provide samples that designate prime & finish coats.
D Do not proceed with remaining work until the Architect approves the mock-up samples.

1.6 DELIVERY, STORAGE, AND HANDLING

A Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufactures name, label, and the following list of information:

1 ..... Product name, type (description)
2 ..... Application & use instructions
3 ..... Surface preparation
4 ..... VOC content
5 ..... Environmental issues
6 ..... Batch date
7 ..... Color number

B Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

Store materials in an area that is within the acceptable temperature range, per manufacturer’s instructions. Protect from freezing.

C Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

Part 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Basis of design.

51 ..... The Sherwin-Williams Company
..... 101 Prospect Avenue NW
..... Cleveland, OH 44115
..... Tel: (800) 321-8194
..... Fax: (216) 566-1392
..... www.sherwin-williams.com

B. Other acceptable manufacturers

.....Benjamin Moore
..... ICI

C. Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 016000 Product Requirements.

When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

2.2 APPLICATIONS/SCOPE

A Use this article to define the scope of painting if not fully defined in a Finish Schedule or on the drawings. This article must be carefully edited to reflect the surfaces actually found on the project. In some cases, it may be enough to use the first paragraph that says, in effect, "paint everything" along with a list of items not to paint, without exhaustively defining all the different surfaces and items that must be painted.

B If the project involves repainting some but not all existing painted surfaces, be sure to indicated the extent of the repainting.

C The descriptions of each system can also be used to further refine the definition of what is to be painted, stained, or clear finished.

2.3 MATERIALS - GENERAL REQUIREMENTS

A Paints and Coatings - General:

1Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

2For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

B Primers:

1Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.4 ACCESSORIES

A Coating Application Accessories:

1Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturer’s specifications.

Part 3 EXECUTION

3.1 EXAMINATION

A Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding

B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.2 SURFACE PREPARATION:

A Proper product selection, surface preparation, and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.

B Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.

C The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.

D Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

E No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F unless the specified product is designed for the marginal conditions.

F Methods

1 ..... Aluminum

Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

2 ..... Block (Cinder and Concrete)

Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F.The pH of the surface should be between 6 and 9,unless the products to be used are designed to be used in high pH environments such as Loxon. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

3 ..... Concrete, SSPC-SP13 or NACE 6

This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

4 ..... Cement Composition Siding/Panels

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9,unless the products to be used are designed to be used in high pH environments such as Loxon.

5 ..... Copper and Stainless Steel

Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.

6 ..... Drywall—Interior

Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.

7 ..... Galvanized Metal

Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

8 ..... Plaster

Must be allowed to dry thoroughly for at least 30 days before painting. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

9 ..... Steel: Structural, Plate, etc.

Should be cleaned by one or more of the ten surface preparations described below. These methods were originally established by the Steel Structures Painting Council in 1952, and are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Steel Structures Painting Council; ask for SSPC-VIS 1-89. A brief description of these standards together with numbers by which they can be specified follow.

10 ..... Solvent Cleaning, SSPC-SP1

Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.

11 ..... Hand Tool Cleaning, SSPC-SP2

Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

12 ..... Power Tool Cleaning, SSPC-SP3

Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

13 ..... White Metal Blast Cleaning, SSPC-SP5 or NACE 1

A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

14 ..... Commercial Blast Cleaning, SSPC-SP6 or NACE 3

A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

15 ..... Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4

A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

16 ..... Power Tool Cleaning to Bare Metal, SSPC-SP11

Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.

17 ..... Near-White Blast Cleaning, SSPC-SP10 or NACE 2

A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

18 ..... High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials ..... SSPC-SP12 or NACE 5

This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.

19 ..... Water Blasting, NACE Standard RP-01-72

Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

20 ..... Vinyl Siding, Architectural Plastics, and Fiberglass

Clean thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause siding to warp.

21 ..... Wood

Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

A Apply all coatings and materials with manufacture specifications in mind. Mix and thin coatings according to manufacture recommendation.

B Do not apply to wet or damp surfaces.

1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.

2 .....Test new concrete for moisture content.

3 ..... Wait until wood is fully dry after rain , fog or dew.

C Apply coatings using methods recommended by manufacturer.

D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

E Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.

F Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.

G Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.

H Inspection: The coated surface must be inspected and approved by the architect or engineer just prior to each coat.

3.4 PROTECTION

A Protect finished coatings from damage until completion of project.

B Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

177.5.1 SCHEDULES

A. METAL (Exposed Steel Framing & Detailing)

1st Coat:	S-W Pro Industrial Pro-Cryl Universal Metal Primer, B66W310.
2nd Coat:	S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200.
3rd Coat:	S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200.

B. DRYWALL (Gypsum Board)

1st Coat:	S-W Pro Mar 200 Wall Primer, B28W8200.
2nd Coat:	S-W Pro Mar 200 Interior Latex, Eg-Shell, B20W2600.
3rd Coat:	S-W Pro Mar 200 Interior Latex, Eg-Shell, B20W2600.

C. WOOD TRIM

1st Coat:	S-W Promar 200, Primer
2nd Coat:	S-W Promar 200 Interior Latex, Gloss, B31W2600
3rd Coat:	S-W Promar 200 Interior Latex, Gloss, B31W2600

D. MASONRY (Concrete Masonry Units)

1st Coat:	S-W Loxon Block Surfacer, A24W00200, 16 mils wet, 8 mils dry.
2nd Coat:	S-W ProMar 200 Interior Latex, Semigloss, B31W2600.
3rd Coat:	S-W ProMar 200 Interior Latex, Semigloss, B31W2600.

END OF SECTION 099123

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Plaques.
2. Dimensional characters.

1.2 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements including tactile characters and Braille, and layout for each sign.

C. Samples: For each sign type and for each color and texture required.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and with code previsions as accepted by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.

B. Acrylic Sheet and cast acrylic Type II Braille: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

C. Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:

1. Impact Resistance: 16 ft-lbf/in. (854 J/m) per ASTM D 256, Method A.
2. Tensile Strength: 9000 lbf/sq. in. (62 MPa) per ASTM D 638.
3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. (2345 MPa) per ASTM D 790.
4. Heat Deflection: 265 deg F (129 deg C) at 264 lbf/sq. in. (1.82 MPa) per ASTM D 648.
5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.

2.2 PLAQUES

A. Basis-of-Design Product: Subject to compliance with requirements provide ImPressions by ASI Modulex or a comparable product by one of the following:

1. Advance Corporation; Braille-Tac Division.
2. A. R. K. Ramos.
3. Gemini Incorporated.
4. Matthews International Corporation; Bronze Division.
5. Metal Arts; Div. of L&H Mfg. Co.
6. Mills Manufacturing Company.
7. Nelson-Harkins Industries.
8. Southwell Company (The).

B. Plaques: Provide plaques free of pits, scale, sand holes, and other defects, as follows:

1. Plaque Material: Acrylic Sheet.
2. Colors and Graphics: Dark Gray
3. Edges and Raised Features: White
4. Mounting: Counter-sunk hole

2.3 DIMENSIONAL CHARACTERS

A. Basis-of-Design Product: Subject to compliance with requirements provide Cast Aluminum Letters by Gemini Incorporated or a comparable product by one of the following:

1. ACE Sign Systems, Inc.
2. Advance Corporation; Braille-Tac Division.
3. A. R. K. Ramos.
4. ASI-Modulex, Inc.
5. Bunting Graphics, Inc.
6. Charleston Industries, Inc.
7. Grimco, Inc.
8. Innerface Sign Systems, Inc.
9. Metal Arts; Div. of L&H Mfg. Co.
10. Mills Manufacturing Company.
11. Mohawk Sign Systems.
12. Nelson-Harkins Industries.
13. Signature Signs, Incorporated.
14. Southwell Company (The).

B. Cast Characters: Produce characters with smooth flat faces, sharp corners, and precisely formed lines and profiles, free of pits, scale, sand holes, and other defects. Cast lugs into back of characters and tap to receive threaded mounting studs. Alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated. Comply with the following requirements.

1. Character Material: Aluminum
2. Thickness: ¾”
3. Color(s): Black Anodized
4. Height: 9”
5. Font: Helvetica
6. Mounting: Concealed studs, noncorroding for substrates encountered.

2.4 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.5 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.6 ALUMINUM FINISHES

A. Color Anodic Finish: Manufacturer's standard Class 1 integrally colored or electrolytically deposited color anodic coating, 0.018 mm or thicker, in black applied over satin (directionally textured) mechanical finish, complying with AAMA 611.

2.7 ACRYLIC SHEET FINISHES

A. Colored Coatings for Acrylic Sheet: For copy, background and frame colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs and accessories as noted below or as required by local jurisdiction, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
3. Install plaque signs in the following locations and as required by local authorities having jurisdiction. Coordinate final location / height in field with architect.

    a. Restrooms / Toilet Rooms
    b. Laundry Room
    c. Building Egress Signs

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
2. Hook-and-Loop Tapes: Mount signs to smooth, nonporous surfaces.
3. Magnetic Tape: Mount signs to smooth, nonporous surfaces.
4. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
5. Shim Plate Mounting: Provide 1/8-inch- (3-mm-) thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other mounting methods are not practicable. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach panel signs to plate using method specified above.
6. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

C. Dimensional Characters: Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

1. Flush Mounting: Mount characters with backs in contact with wall surface.

3.2 SCHEDULE - SIGNS

A. Plaque Signs - provide shop drawings prior to fabrication

1. Utility and Other Rooms: 1 square plaque sign with 4 digit alpha-numeric characters for room identification and room name for each laundry, etc. Include Braille lettering.
2. Toilet Rooms: 1 square plaque sign picture symbol (Men or Women) sign for each toilet room, including access symbol. Provide message "Men" or "Women" as required, including Braille lettering
3. Building Egress Doors to Exterior: Code required "EXIT" panel signs with Braille for building exit doors to exterior. One sign per door.

END OF SECTION 101400

SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-polymer toilet compartments configured as toilet enclosures and urinal screens.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for each exposed product and for each color and texture specified.

D. Product certificates.

E. Maintenance data.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   1. Flame-Spread Index: 200 or less.

   2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" for toilet compartments designated as accessible.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.

   1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).

   2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvannealed.

B. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.2 SOLID-POLYMER UNITS

A. Basis-of-Design: Bradley Corporation; Mills Partitions

B. Manufacturers: Subject to compliance with requirements, alternate manufacturers as follows:

   1. Accurate Partitions Corporation.

2. General Partitions Mfg. Corp.

3. Santana Products, Inc.

C. Toilet-Enclosure Style: Overhead braced and Floor anchored.

D. Urinal-Screen Style: Wall hung and post to ceiling

E. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Polymer Panel Finish: One color and pattern in each room.

a. Color and Pattern: As selected by Architect from manufacturer's full range.

F. Pilaster Shoes and Sleeves Caps: Manufacturer's standard design; stainless steel.

G. Urinal-Screen Post: Manufacturer's standard post design of [material matching the thickness and construction of pilasters; with shoe and sleeve cap matching that on the pilaster.

H. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard continuous, cam type that swings to a closed or partially open position.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Overhead Bracing: Stainless steel with antigrip profile.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

C. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.

D. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

E. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at bottoms of posts. Provide shoes and sleeves caps at posts to conceal anchorage.

F. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Clearances: Maximum 1/2 inch (13 mm) between pilasters and panels; 1 inch (25 mm) between panels and walls.

C. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Underlavatory guards.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule:

1. Identify locations using room designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following (Basis-of-Design Listed):
1. Bobrick Washroom Equipment, Inc.
2. Bradley Corporation.

B. Toilet Tissue (Roll) Dispenser Bradley 5234:
1. Description: Double-roll dispenser.
2. Mounting: Surface mounted.
3. Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

C. Paper Towel (Folded) Dispenser Bobrick B-2620:
1. Mounting: Surface mounted.
2. Minimum Capacity: 400 C-fold or 525 multifold towels.
3. Material and Finish: Stainless steel, No. 4 finish (satin).
4. Lockset: None.

D. Liquid-Soap Dispenser Bradley 6563:
1. Description: Designed for dispensing soap in liquid form.
2. Mounting: Vertically oriented, surface mounted.
3. Capacity: 40 fl oz (1.2L)
4. Lockset: non lockable.
5. Refill Indicator: Window type.

E. Grab Bar Bradley 812:
   1. Mounting: Flanges with concealed fasteners.
   2. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
      a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
   3. Outside Diameter: 1-1/2 inches (38 mm).
   4. Configuration and Length: As indicated on Drawings.

F. Mirror Unit Bradley 781:
   1. Frame: Stainless-steel channel.
      a. Corners: Manufacturer's standard.
   2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
      a. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
   3. Size: As indicated on Drawings.

G. Floor Standing Waste Receptacle with Open Top Bobrick B-2280
   1. Minimum Capacity: 21 Gallons.
   2. Material and Finish: Stainless Steel, No. 4 finish (satin).

2.2 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Bobrick Washroom Equipment, Inc.
   2. Bradley Corporation.

B. Shower Curtain Rod:
   1. Description: 1-1/4-inch (32-mm) OD; fabricated from nominal 0.05-inch- (1.3-mm-) thick stainless steel.
   2. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
   3. Finish: No. 4 (satin).

C. Shower Curtain:
   1. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1828 mm) high.
   2. Material: Vinyl, minimum 0.006-inch- (0.15-mm-) thick, opaque, matte.
   3. Color: White.
   4. Grommets: Corrosion resistant at minimum 6 inches (152 mm) o.c. through top hem.
   5. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Folding Shower Seat:
   1. Configuration: L-shaped seat, designed for wheelchair access.
   2. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect
   3. Mounting Mechanism: Stainless steel, No. 4 finish (satin)

E. Towel/ Robe Hook
   1. Basis-of-Design Product: Ginger #2810Q and #2810D
      a. Finish: Satin Nickel.
      b. Shower 104: #2810Q, minimum 4 hooks.
      c. Bathroom 102: #2810D, minimum 2 hooks.
      d. Restroom 110: #2810D, minimum 2 hooks.
   2. Equal Manufacturer: Mockett #HK4B and #HK4C

2.3 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Plumberex Specialty Products, Inc.
   2. TCI Products.
   3. Truebro, Inc.

B. Underlavatory Guard:
   1. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.
   2. Material and Finish: Antimicrobial, molded-plastic, white.

2.4 FABRICATION

A. Keys: All fixtures are to be provided **WITHOUT** locking capability per Owner's request. All accessories shall be installed in the unlocked position with no key required for operation or opening.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire protection cabinets for fire extinguishers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 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. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

C. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209 (ASTM B 209M).
2. Extruded Shapes: ASTM B 221 (ASTM B 221M).

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

D. Copper-Alloy Brass Sheet: ASTM B 36/B 36M, alloy UNS No. C26000 (cartridge brass, 70 percent copper).

E. Copper-Alloy Bronze Sheet: ASTM B 36/B 36M, alloy UNS No. C28000 (muntz metal, 60 percent copper).

F. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3, 6 mm thick.

G. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

H. Acrylic Bubble: One piece.

2.2 FIRE PROTECTION CABINET FEC

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. J. L. Industries, Inc., a division of Activar Construction Products Group;
   b. Larsen's Manufacturing Company;
   c. Potter Roemer LLC;

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Steel sheet.

D. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
   1. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.

E. Cabinet Trim Material: Steel sheet.

F. Door Material: Steel sheet.

G. Door Style: Fully glazed, frameless, backless, acrylic panel.

H. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color: Clear transparent acrylic sheet.
2.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle (Non-lockable).
3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.

   a. Identify fire extinguisher in fire protection cabinet with the words FIRE EXTINGUISHER.

      1) Location: Applied to cabinet door.
      2) Application Process: Silk-screened or manufacturers standards.
      3) Lettering Color: White.

4) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:

a. Exterior of cabinet door and trim, except for those surfaces indicated to receive another finish.
b. Interior of cabinet and door.

2. Steel: Baked enamel or powder coat.

a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.

B. Install fire protection cabinets in locations and at mounting heights indicated[or, if not indicated, at heights acceptable to authorities having jurisdiction.

C. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

D. Identification: Apply vinyl lettering at locations indicated.

E. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

F. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Operation and maintenance data.

C. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

C. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Failure of hydrostatic test according to NFPA 10.
   b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
   b. Larsen's Manufacturing Company.
   c. Potter Roemer LLC.

2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type: UL-rated 10 lbs nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
   b. Larsen's Manufacturing Company.
   c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

   a. Orientation: Vertical

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 105030 - WALL MOUNTED TURNOUT GEAR LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Design, fabrication and installation of wall mounted turnout gear lockers as specified herein

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions.

B. Shop Drawings: Submit manufacturer's shop drawings for each individual run of lockers.

C. Samples: Submit manufacturer's full line of color samples.

D. Owner's Manual: Provide maintenance manual at closeout.

E. Warranty: Submit manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

A. Installer shall have experience in locker installation.

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers with labels identifying product and manufacturer's name.

B. Storage: Store materials in a clean dry area.

C. Handling: Protect materials and finish during installation and handling to prevent damage.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. BASIS OF DESIGN: Mid-Minnesota Wire (GearGrid Product Line), 670 SW 15th Street, Forest Lake, MN 55025. Toll-free 888-643-6694. Phone 651-464-4468. Fax 651-464-4780. Web site www.geargrid.com. Email sales@geargrid.com.

B. Equal Manufacturer: Groves Incorporated: Ready Rack Wall Mounted Rack

2.2 TURNOUT GEAR LOCKERS

A. Model: GEARGRID Wall Mounted Storage System

B. Locker Sizes:
   1. Jumbo 24” Opening: Overall dimension 79”H x 25.25”W x 20”D
   2. Clear Opening Width: 22.75”

C. Construction: Units shall be welded at all applicable joints. Forming of metal shall be completed by standard cold-forming operations. Use of fasteners will only be required to allow for knock-down shipping, securing units to mounting surface and on applicable accessories.

D. Vertical Dividers
   1. Outer Frames: 1.25” O.D. x 16 gauge wall thickness ASTM A513 steel tubing
   2. Inner Grid: .25” diameter ASTM 510 cold drawn steel wire resistance welded to a 3” square pattern

E. Back Panel:
   1. Grid: .25” diameter ASTM 510 cold drawn steel wire resistance welded to a 3” square pattern

F. Shelves: 1) Top, (1) Bottom. .25” diameter ASTM 510 cold drawn steel wire resistance welded and cold formed. Top shelf includes a 20 gauge steel bracket to accept a 2” x 16” name placard.

G. Apparel Hooks: (3) per opening. .25” diameter ASTM 510 cold drawn steel wire resistance welded and cold formed

2.3 ACCESSORIES

A. Door
   1. Frame: 1.25” O.D. x 16 gauge wall thickness ASTM A513 steel tubing.
   2. Inner Grid: .25” diameter ASTM 510 cold drawn steel wire resistance welded to a 3” square pattern.
   3. Top Cover: .25” diameter ASTM 510 cold drawn steel wire resistance welded to a 3” square pattern.
   4. Hinge: Single pin welded style with brass pivot bushing
   5. Placard Channel: 20 gauge steel to accept a 2” x 12” name placard
   6. Latch/Hasp: Self-latching with padlock hasp. Lock by owner

B. Horizontal Hanging Bar
   1. Tube: 1.25”O.D. x 16 gauge 304 stainless steel tubing.
   2. Brackets: Attach to side mesh, powder coated

2.4 FINISH

A. General: All system components excluding assembly and mounting hardware and stainless steel components are to receive the standard finish

B. Standard Finish: Components to be cleaned using a phosphatized bath, clear water rinse and electro-statically coated with a durable TGIC powder coating

C. Color to be selected by architect from manufacturers full line of colors

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lockers. Notify architect if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install lockers in accordance with manufacturer's instructions

B. Use manufacturer's hardware for assembly

C. Anchor to mounting surface with proper hardware

END OF SECTION 105030

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard metal lockers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.

C. Maintenance data.

D. Warranty: Sample of special warranty.

1.3 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.

1. Warranty Period for Knocked-Down Metal Lockers: two years from date of Substantial Completion.
2. Warranty Period for All-Welded Metal Lockers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Expanded Metal: ASTM F 1267, Type II (flattened), Class I, 3/4-inch (19-mm) steel mesh, with at least 70 percent open area.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

D. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.2 STANDARD METAL LOCKERS

A. Products: Subject to compliance with requirements, provide one of the following:
1. ASI Storage Solutions Inc.; Traditional Collection.
2. DeBourgh Mfg. Co.; Worley Lockers.
3. Hadrian Manufacturing Inc.; Emperor Lockers.
4. Lyon Workspace Products, LLC; Standard Lockers.
5. Penco Products, Inc.; vanguard Lockers.

B. Locker Arrangement: Double tier.

C. Material: cold rolled steel sheet.

D. Body and Shelves: Assembled by riveting or bolting body components together. Fabricate from unperforated 0.024-inch (0.61-mm) nominal-thickness steel sheet.

E. Frames: Channel formed; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral door strike full height on vertical main frames.

F. Doors: One piece; fabricated from 0.060-inch (1.52-mm) nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.

1. Doors less than 12 inches (305 mm) wide may be fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
2. Doors for box lockers less than 15 inches (381 mm) wide may be fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches (381 mm) wide; welded to inner face of doors.
4. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet; welded to inner face of doors.
5. Door Style: Louvered vents at top and bottom.

G. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
1. Continuous Hinges: Manufacturer's standard, steel, full height.
2.

H. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond face of door; pry and vandal resistant.

1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic latching and prelocking.

a. Latch Hooks: Equip doors 48 inches (1219 mm) and higher with three latch hooks and doors less than 48 inches (1219 mm) high with two latch hooks; fabricated from 0.105-inch (2.66-mm) nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.

b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated with vinyl or nylon to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.

I. Equipment: Equip each metal locker with identification plate and the following unless otherwise indicated:
1. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.

J. Accessories:

1. Continuous Zee Base: Fabricated from manufacturer's standard thickness, but not less than 0.060-inch (1.52-mm) nominal-thickness steel sheet.

a. Height: 4 inches (102 mm).

2. Continuous Sloping Tops: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch (0.91-mm) nominal-thickness steel sheet.

a. Closures: Vertical-end type.

3. Individual Sloping Tops: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet.
4. Recess Trim: Fabricated from 0.048-inch (1.21-mm) nominal-thickness steel sheet.
5. Filler Panels: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch (0.91-mm) nominal-thickness steel sheet.
6. Finished End Panels: Fabricated from 0.024-inch (0.61-mm) nominal-thickness steel sheet.

K. Finish: Baked enamel or powder coat.

1. Color(s): As selected by Architect from manufacturer's full range.

2.3 FABRICATION

A. Fabricate metal lockers square, rigid, and without warp and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.

C. Knocked-Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for preassembly at plant prior to shipping.

D. All-Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.

E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.

F. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch (9 mm) high.

G. Continuous Base: Formed into channel or zee profile for stiffness, and fabricated in lengths as long as practical to enclose base and base ends of metal lockers; finished to match lockers.

H. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

I. Recess Trim: Fabricated with minimum 2-1/2-inch (64-mm) face width and in lengths as long as practical; finished to match lockers.

J. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

K. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

1. Provide one-piece panels for double-row (back-to-back) locker ends.

L. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

2.4 STEEL SHEET FINISHES

A. Baked-Enamel Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.

B. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard, baked-polymer, thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install level, plumb, and true; shim as required, using concealed shims.

1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches (910 mm) o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
3. Anchor back-to-back metal lockers to floor.

B. Knocked-Down Metal Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.

C. All-Welded Metal Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.

D. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach hooks with at least two fasteners.
2. Attach door locks on doors using security-type fasteners.
3. Identification Plates: Identify metal lockers with identification indicated on Drawings.

    a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.

4. Attach recess trim to recessed metal lockers with concealed clips.
5. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
6. Attach sloping-top units to metal lockers, with closures at exposed ends.
7. Attach finished end panels with fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

END OF SECTION 105113

SECTION 107500 - FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes ground-mounted aluminum flagpoles.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to the following design criteria:
   1. Wind Loads: 110 mph according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles.".
   2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Delegated-Design Submittal: For flagpole assemblies indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the qualified professional engineer responsible for their preparation.

   1. Include loads, point reactions, and locations for attachment of flagpoles to building's structure.

C. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. American Flagpole; a Kearney-National Inc. company.
   2. Concord Industries, Inc.
   3. Eder Flag Manufacturing Company, Inc.
   4. U.S. Flag & Flagpole Supply, LP.
   5. USS Manufacturing Inc.

2.2 FLAGPOLES

A. Exposed Height: 30 feet (9 m).

B. Aluminum Flagpoles: Provide cone-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm).

C. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, not less than 0.064-inch- (1.6-mm-) nominal wall thickness. Provide with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges welded together. Galvanize steel after assembly. Provide loose hardwood wedges at top of foundation tube for plumbing pole. Provide flashing collar of same material and finish as flagpole.

D. Cast-Metal Shoe Base: For anchor-bolt mounting; provide with anchor bolts.

E. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter 6”. Fabricate from 0.063-inch (1.6-mm) spun aluminum, finished to match flagpole.

F. Internal Halyard, Cam Cleat System: 5/16-inch- (8-mm-) diameter, braided polypropylene halyard; cam cleat; and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

G. Halyard Flag Snaps: Provide two swivel snap hooks per halyard.

2.3 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

B. Sand: ASTM C 33, fine aggregate.

C. Elastomeric Joint Sealant: Joint sealant complying with requirements in Division 07 Section "Joint Sealants."

2.4 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.

B. Ground Set: Place foundation tube, center, and brace to prevent displacement during concreting. Install flagpole, plumb, in foundation tube. Place tube seated on bottom plate between steel centering wedges and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.

D. Mounting Brackets and Bases: Anchor brackets and bases securely through to structural support with fasteners as indicated on Shop Drawings.

END OF SECTION 107500

SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Cooking equipment including ranges and microwave ovens.
2. Ventilation range hoods.
3. Refrigerator/freezers.
4. Dishwashers.
5. Clothes washers and dryers.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each exposed finish.

C. Appliance Schedule: Use same designations indicated on Drawings.

D. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Gas-Burning Appliances: Comply with ANSI Z21 Series standards.

D. Residential Appliances: Comply with NAECA standards.

E. Energy Ratings: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

1. Electric Range: Five-year limited warranty for[in-home service on] surface-burner elements.

2. Microwave Oven: Five-year limited warranty for in-home service on defects in the magnetron tube.
3. Refrigerator/Freezer: Five-year limited warranty for in-home service on the sealed refrigeration system.
4. Dishwasher: 10-year warranty for in-home service against deterioration of tub and door liner.
5. Clothes Washer: 10-year limited warranty for in-home service on the inner wash basket and outer tub, and five-year limited warranty for in-home service on the balance suspension system and drive transmission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Basis-of-Design Product: The design for each residential appliance is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 COOKING APPLIANCES

A. Range: Freestanding, gas

1. Available Manufacturers:

   a. General Electric Company;
   b. KitchenAid;
   c. Whirlpool Corporation.

2. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

   a. General Electric Company
   b. KitchenAid
   c. Whirlpool Corporation

3. Type: Standard with gas oven(s).

4. Cooktop: Four gas burners

5. Ovens: One gas.

6. Finish: Stainless steel.

B. Microwave Oven MO-[#]:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

    a. General Electric Company
    b. KitchenAid

2. Oven Capacity: 1.5 cu. ft. (0.04 cu m).

C. Exhaust Hood:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

    a. General Electric Company
    b. KitchenAid
    c. Whirlpool Corporation

2. Type: 30-inch (762-mm) (match range width), wall-mounted, retractable-downdraft, undercabinet, slide-out, ventilating, nonvented, recirculating, convertible range hood.
3. Exhaust Fan: Two-speed fan, 550 cfm (260 L/s).
4. Finish: Stainless steel.

2.3 REFRIGERATION APPLIANCES

A. Refrigerator/Freezer:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

    a. General Electric Company
    b. KitchenAid
    c. Whirlpool Corporation

2. Type: Freestanding side-by-side refrigerator/freezer.
3. Storage Capacity:

    a. Volume: 26 cu. ft.

4. Front Panel: Stainless-steel door front and lower access panel.

B. Ice-making Machine
1. Basis-of-Design Product: Manitowoc Ice: QD-0273W or a comparable product by one of the following:
    a. Scotsman Ice
    b. Ice-O-Matic
    c. Hoshizaki America, Inc.
2. Description: Freestanding Unit.
    a. Production:Ice cubes, dice.
    b. Capacity: 290 lbs. per 24-hour period.
3. Options and Accessories:
    a. Storage Bin:
        1) Storage Capacity: 100 lbs.
    b. Stainless-steel stand and legs.
    c. Water filter.
4. Electrical Service: Equip unit for connection to service indicated on Drawings.

2.4 CLEANING APPLIANCES

A. Dishwasher:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

   a. General Electric Company
   b. KitchenAid
   c. Whirlpool Corporation

2. Type: Under the counter, 24 inches (610 mm) wide, operable at water pressures from 15 to 120 psi (100 to 825 kPa).
3. Front Panel: Stainless-steel door front and lower access panel.

B. Clothes Washer:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

   a. General Electric Company
   b. KitchenAid
   c. Whirlpool Corporation

2. Type: Freestanding, front loading; operable at water pressures from 15 to 120 psi (100 to 825 kPa).
3. Finish: Porcelain enamel on top and lid. Baked enamel on front and sides.

C. Clothes Dryer CD-[#]:

1. Basis-of-Design Product: Kenmore or a comparable product by one of the following:

   a. General Electric Company
   b. KitchenAid
   c. Whirlpool Corporation

2. Type: Freestanding, electric.
3. Finish: Porcelain enamel on top and lid. Baked enamel on front and sides.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

C. Utilities: Refer to Divisions 15 and 16 for plumbing and electrical requirements.

END OF SECTION 113100

SECTION 211300 - FIRE SUPPRESSION SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

A. Work under this Section shall include all labor, material, equipment, transportation, services and facilities necessary to complete the interior Fire Protection System for the building as shown on drawings and as specified herein without exception.

B. Applicable provisions of GENERAL AND SUPPLEMENTARY CONDITIONS shall apply to this Section as if written in full herein.

C. The work shall include but is not necessarily limited to the following:

1. Wet pipe sprinkler system for the building, in accordance with latest revisions of NFPA fire codes.

2. Fire suppression system for the residential kitchen hood.

3. Work under this section shall include all labor, materials, engineering, transportation, insurance, taxes and permits required for the complete installation of a wet pipe automatic fire protection system. All work to be in accordance with the requirements of the authority having jurisdiction.

D. Painting, unless otherwise specified is not included under this Section.

1.2 CODES AND STANDARDS

A. Final systems design, materials, workmanship and testing shall conform to the following Codes and Standards, when same have jurisdiction.

1. N.F.P.A. 13, 101, 24, 72, 96 and all applicable Codes.
2. Property Insurance Association of Louisiana.
3. State of Louisiana Fire Marshal.

1.3 QUALIFICATIONS OF FIRE PROTECTION CONTRACTOR

Contractor must be licensed in the State of Louisiana to perform sprinkler work, and must be regularly engaged in making such installation.

1.4 SHOP DRAWINGS AND DATA SHEETS

A. Contractor to provide Architect with shop drawings and calculations including flow and hydrant tests for Owner's approval prior to commencement of work. Comply with Division 1 Sections' submittal requirements. Work is not to be started until: 1) shop drawings have been corrected to conform to Owner's approval, 2) copies of corrected drawings shall be submitted to the Architect and State Fire Marshall, and 3) drawings have been returned from the State Fire Marshall with review comments. Contractor shall submit Owner's stamped approved drawings to the State Fire Marshall for his review. This Contractor shall pay for all review fees required by the State Fire Marshall.

B. The Contractor shall provide written verification as part of the State Fire Marshal submittal package stating that the proposed location of the fire department connection, the outlet diameters, fitting type and thread type comply with the requirements of the local fire department.

1.5 AS-BUILT DRAWINGS

A. Contractor shall maintain a set of drawings showing exact locations and sizes of all piping, valves and related items, which shall be corrected daily and shown every change from original contract drawings and specifications.

B. On completion of the work, Contractor shall provide a set of reproducible transparencies corrected to show all changes noted on "As-Build" Drawings, together with two (2) sets of Blue Prints, to the Architect for delivery to the Owner. The corrected transparencies shall bear the approval of the Underwriters, and Property Insurance Association of Louisiana. Refer to Division 1 Sections for record documents procedures.

1.6 CUTTING AND PATCHING

A. Contractor to provide all opening for proper installation of the work specified, in foundations, walls, floors, ceilings, partitions, stairways, etc., and do all patching and repairing required, except where otherwise noted on drawings.

B. Cutting structural members for the passageway of sprinkler piping or for pipe hanger fastenings will NOT be permitted.

C. Holes through walls, floors, and ceilings shall be large enough to accommodate pipe expansion. Suitable plates shall be provided at each hole to insure the effectiveness of the floor or wall as a fire stop.

1.7 INTERFERENCE

The Sprinkler Contractor shall coordinate with other trades so that interference between piping, conduit, ductwork, equipment, apparatus, architectural and structural work will be avoided. In case of interference developing, the Architect or his authorized representative shall decide which equipment, piping, ductwork, etc., must be relocated, regardless of which was first installed.

1.8 TAXES

Contractor shall include all taxes required.

1.9 PERMITS, FEES AND INSPECTION

This Contractor shall obtain and pay for all permits and shall pay all fees required in connection with this work, not covered by permits obtained by General Contractor.

1.10 CERTIFICATE OF APPROVAL

Upon completion of all work, this Contractor shall furnish the Owner a certificate of approval from such authorities as may have jurisdiction.

1.11 CLEANING UP

This Contractor shall at all times during construction keep the premises free from waste materials, or rubbish caused by his employees or work and at completion shall remove all surplus materials leaving the building in a clean swept condition.

PART 2 - PRODUCTS AND INSTALLATION

2.1 WATER CONNECTION

Connection to the city water main for the water supply to the fire protection systems shall be provided under this Contract. This Contractor shall make all arrangements and pay all costs for this connection. All work shall be in compliance with NFPA – 24.

2.2 MAIN CONTROL VALVE

O.S. & Y gate valve to be installed on the main riser. Provide contactor on valve compatible with fire alarm system to indicate when valve is closed, connection to fire alarm system shall be by fire alarm contractor.

2.3 MAIN DRAIN

Main drain valve and piping to properly drain each system shall be located at each system riser and piped to open air outside the building.

2.4 PIPE AND FITTINGS

A. All interior pipe shall be ASTM A135 Schedule 40 black steel pipe with malleable iron screw fittings or cut grove fittings similar to Victaulic, Grinnell, or equal, as required. Fittings shall be ASME B16.3 Class 300 standard pattern with threads according to ASME B1.20.1. Provide all required pipe supports under building and above ground in accordance with National Fire Codes.

B. All piping shall be manufactured in the United States of America.

C. Underground piping shall be class 150, cement lined and exterior coated, ductile iron water pipe with mechanical joints. At Contractor's option, 6' outside of the building may be PVC C900, class 150 water pipe with mechanical joint fittings with a minimum pressure of 250 PSI.

D. All piping and fittings shall be rated for the hydraulic pressure encountered throughout the system.

2.5 SPRINKLERS

A. Sprinkler heads in unfinished ceiling areas to be brass upright.

B. Sprinkler heads in finished areas shall be concealed type heads with white cover.

C. All heads in acoustical tile areas shall be centered in the tile, both ways.

D. Contractor shall include, in his bid, any and all heads required to meet all applicable sections of NFPA 13, weather indicated on the drawings or not.

E. It is the intent of this section that the contractor provide a complete and operational system that shall meet all codes and that all costs shall be included in this bid price.

F. All heads to be quick response type.

G. Provide (2) two additional brass upright and (2) two additional concealed heads to be installed as directed by the Engineer. Include approximately 25 feet of piping and necessary fittings for each head.

2.6 SPRINKLER SYSTEMS

A. Wet pipe sprinkler systems shall be provided to all areas of the building. These systems shall be designed for a Light Hazard Occupancy, except as defined below.

B. All equipment rooms, storage rooms, mechanical rooms and electrical rooms shall be provided with a sprinkler system designed for ordinary hazard group 1 occupancy.

C. Provide ground level fire department Siamese connection where shown on the drawings. Connections shall be Potter-Romer Series 5100 or Elkhart Brass Company 163, chrome plated, flush type fitted with chained caps. Threads shall match Fire Department requirements. Connect Siamese to fire protection system.

2.7 VALVES

A. All valves used in the fire protection system shall be UL listed and FM approved with 175 psig non shock minimum working pressure rating.

B. Gate valves, 2 inches and smaller shall be UL 262 cast bronze, threaded ends, solid wedge, outside screw and yoke, rising stem.

A. Gate valves 2-1/2" and larger shall be 262, iron body bronze mounted, taper wedge, outside screw and yoke, rising stem.

B. Swing check valves, 2-1/2" and larger shall be UL 312, cast-iron body and bolted cap with bronze or cast iron disc with bronze disc ring.

2.8 GENERAL CONSTRUCTION WORK

Provide all openings for proper installation of work specified, in walls, ceilings, and floors and do all patching of same as required.

2.9 ENGINEERING

Prior to installation of any work, this Contractor is to prepare installation and fabrication drawings and have same approved by the insurance authority having jurisdiction and Owner's representative.

2.10 INSURANCE

This Contractor is to furnish certificates of insurance prior to commencing work.

2.11 PERMITS

This Contractor is to pay for all permits required for this portion of the work.

2.12 HYDROSTATIC TEST

This Contractor is to hydrostatically test the entire interior system to 200 PSI for a period of two (2) hours in accordance with NFPA 13, and show evidence that he has had an authorized representative of the Owner present for the test.

2.13 WARRANTY

This Contractor is to warrant all material and workmanship, free from defects, for a period of one (1) year from date of acceptance of installation.

2.14 WATER FLOW SWITCH

Provide one water flow switch (1) Grinnell Model VSR-D or Potter Model VSRF on the supply pipe to the sprinkler systems of the building, make compatible with fire alarm system, connection shall be by fire alarm contractor.

2.15 CODE COMPLIANCE

A. The Contractor shall flush all piping as required by NFPA – 13 and 24. Flow rates for flushing shall be as required by these codes.

B. Thrust blocks and underground supports shall be provided as required by NFPA-24.

C. All signage including Siamese connection shall be provided in accordance with NFPA – 13 and 24.

D. All test certificates in NFPA 13 and 24 shall be completed by Contractor and submitted as part of review process.

E. Contractor shall review reflected ceiling, mechanical, fire protection and electrical plans and include all heads as required by NFPA-13 for complete sprinkler coverage including coverage around obstructions such as ductwork, piping and ceiling features.

END OF SECTION 211300

SECTION 220500 - VALVES, STRAINERS, UNIONS AND FITTINGS

PART 1 – GENERAL

1.1 SUMMARY

The work under this heading includes the furnishing and installing of all required appurtenances incidental to the piping systems as indicated on the drawings. Refer to BASIC MATERIALS AND METHODS SECTION which shall apply to all work in this Section.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide factory-fabricated valves for use in service indicted. Provide valves of types and pressure ratings indicated; provide proper selection to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is installer's option. Valves shall be of same make for all these services.

B. Valves shall comply with the following:

Gate - cast iron - MSS SP-70
Gate - bronze - MSS SP-80
Globe - cast iron -MSS SP-85
Globe - bronze - MSS SP-80
Ball - MSS SP-110
Butterfly - MSS SP-67
Check - cast iron - MSS SP-71
Check - bronze - MSS SP-80

C. Gate valves shall be equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable.) Valves shall be designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower. Guides for disc on rising stem valves shall be machined for accurate fit.

D. Globe valves shall be equipped with packing suitable for intended service. (Under no circumstances is asbestos acceptable.) Globe valves shall be designed so back seating protects packing and stem threads from media when valve is fully opened, and equipped with gland follower.

E. Ball valves shall have FULL port opening blow out proof stem: hard chrome plated forged brass ball, rated not less than 600# W.O.G. for sizes 3” or smaller.

F. Provide gear operators on butterfly valves 8" and larger. Valve bodies shall have extended necks to provide for 2-1/4" insulation.

G. Provide valves with features indicated and where not otherwise indicated, provide proper valve features as outlined in this specification. Comply with ANSI B31.1.

H. Valve flanges shall comply to ANSI B16.1 (cast iron), ANSI B16.5(steel), ANSI B16.24 (bronze). Steel flanges shall be Class 150.

I. Threaded valve ends shall comply with ANSI B2.1.

J. Butt-Weld valve ends shall comply with ANSI B16.25.

K. Solder Joint valve ends shall comply with ANSI B16.18.

L. Flangeless valve bodies shall be manufactured to fit between flanges and shall comply with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).

M. Fabricate pressure-containing components of valves, including stems and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing that resist de-zincification.

N. Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn.

O. Butterfly valves shall be designed for flow regulation, and manufactured to be tight in closed position. Test pressures in accordance with MSS SP-67 as follows: Seat 2-12" 220psi. No leakage shall be permitted under test.

2.2 GLOBE VALVES FOR STEEL PIPING (SERVICES UNDER 200 DEGREES F)

A. Threaded Ends 2" and Smaller: Class 125, bronze body, union bonnet, rising stem, Teflon disc.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc.

2.3 GATE VALVES FOR STEEL PIPING (SERVICES UNDER 200 DEGREES F)

A. Threaded Ends 2" and Smaller: Class 125, bronze body, union bonnet, rising stem, solid wedge.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge.

2.4 GLOBE VALVES FOR COPPER PIPING (SERVICES UNDER 200 DEGREES F)

A. Soldered Ends 2" and Smaller: Class 125, bronze body, screwed bonnet, rising stem, bronze disc (swivel type).

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bolted bonnet, rising stem, OS&Y, renewable seat and disc. Provide dielectric gasket and bolt isolators.

2.5 GATE VALVE FOR COPPER PIPING (SERVICES UNDER 200 DEGREES F)

A. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bronze mounted, bolted bonnet, rising stem, OS&Y, solid wedge. Provide dielectric gasket and bolt isolators.

B. Solder Ends 2" and Smaller: Class 125, bronze body, screwed bonnet, rising stem, solid wedge. (Non-rising stem gate valves may be used where headroom prevents full extension of rising stems.)

2.6 BALL VALVES (SERVICES UNDER 200 DEGREES F)

A. Threaded Ends 3" and Smaller: 600# W.O.G., forged brass two piece body, hard chrome plated forged brass ball, blow-out proof stem.

B. Soldered Ends 2" and Smaller: 600# W.O.G., forged brass two piece body, hard chrome plated forged brass ball, true adjustable packing nut ("O"-ring only type stem seal not acceptable), blow-out proof stem.

C. Flanged Ends 2-1/2” and larger: Class 150, flanged ends, carbon steel body with 316 s.s. trim, uni-body design, full port, blowout proof s.s. stem and ball, telfon seat.

2.7 BUTTERFLY VALVES (SERVICES UNDER 200 DEGREES F)

A. For chilled/hot water system provide lug type with rated working pressure of 200 psi on sizes 2" thru 12". Valve shall be cast iron, drilled and tapped bug body, lever operated, 10 position throttling handle, memory plate, type 410 stainless steel stem with EPDM seat.

2.8 SWING CHECK VALVE IN COPPER PIPING (SERVICES UNDER 200 DEGREES F)

A. Soldered Ends 2" and Smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, bronze disc.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron body, bronze mounted, horizontal swing, cast-iron disc. Provide dielectric gasket with insulated bolts.

2.9 SWING CHECK VALVES IN STEEL PIPING (SERVICES UNDER 200 DEGREES F)

A. Threaded Ends 2" and Smaller: Class 125, bronze body, screwed cap, "Y" pattern swing, Teflon disc.

B. Flanged Ends 2-1/2" and Larger: Class 125, iron, bronze mounted, horizontal swing, cast-iron disc.

2.10 UNIONS IN COPPER LINES (SERVICES UNDER 200 DEGREES F)

Cast Bronze Unions.

2.11 UNIONS IN BLACK STEEL, WROUGHT IRON OR GALVANIZED STEEL PIPING

Ground joint malleable iron galvanized Class 300 for 2" nominal pipe sizes or below. For pipe sizes 2-1/2" and larger use forged steel welding flanges (Galvanized for galvanized piping).

2.12 UNIONS IN CONNECTION BETWEEN COPPER AND STEEL OR IRON PIPING (SERVICES UNDER 200 DEGREES F)

Provide bronze valves or dielectric waterways.

2.13 LUBRICATED PARALLEL PLUG VALVES

A. Lubricated parallel plug valves shall be installed at all locations shown on the drawings for gas valves and shall be the same sizes as the entering pipe. Valves shall have a pressure rating of 125 PSI at 450 degrees F and 200 PSI from –20 degrees F to 150 degrees F.

B. Valves shall be of the lubricated parallel (cylindrical) plug type with clearance between plug and body sealing surfaces equal to, or less than .002 inch. The body, plug and bottom cover shall be cast iron (ASTM A126 C1B).

C. Valves shall be flanged with face to face dimensions in accordance with ANSI B16.10 short pattern.

D. The plug shall have a rectangular port, reduced bore, having a flow area equal to, or greater than, 60% of the same size of the pipe. The body/plug juncture shall have a reinforced TFE thrust washer to minimize operating torque. The valve body shall have a surface penetrating hot phosphate protective treatment.

E. The valve lubricating systems shall have a lubricating screw with buttonhead fitting, and a tight sealing lubricated check valve in the valve stem, and shall be so constructed as to ensure complete lubrication of all sealing surfaces. Lubricant extruding around the valve stem shall indicate that the system is filled to capacity. The sealing compound shall have a temperature ranging from –20 degrees F to 400 degrees F.

F. Valves shall be Milliken Model 171M or Homestead Model 612, or approved equal.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND INCIDENTAL ITEMS

A. All valves shall be installed so as to be easily accessible for cleaning, inspection, maintenance, and operation.

B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward for horizontal plane unless unavoidable. Provide chain operators on all valves over 6’ above floor in mechanical rooms.

C. Except as otherwise indicated, install valves with the following ends or types of pipe/tube connections:

Tube Size 2" and smaller - Soldered-joint valves
Pipe Size 2" and smaller - Threaded valves
Pipe Size 2-1/2" and larger - Flanged end valves

D. Install swing check valves in horizontal position, unless otherwise shown on drawings, with hinge pin horizontally perpendicular to centerline of pipe. Install for proper direction of flow.

E. Provide access panels at all concealed valves.

F. Major control and sectionalizing valves throughout building shall be identified by means of a brass valve tag bracketed to valve handle. Contractor shall prepare schedule of such identifying plates and frame under glass for installation in main equipment room.

G. All welded piping to be welded by certified welders skilled in the work to be done.

H. No piping of dissimilar metals placed in contact or in close proximity with each other. Provide bronze valves wherever piping of dissimilar metals is joined.

I. Run all piping concealed unless specifically noted otherwise, making all necessary offsets, turns, etc., necessary to conceal piping from view.

J. Provide all necessary steel frame supports, anchor bolts, sleeves, etc., required for safe support of equipment and piping installed under this contract. The Mechanical Contractor shall be completely responsible for the accurate position and dimensions of all foundations and support items.

END OF SECTION 220500

SECTION 220700 - PIPING AND EQUIPMENT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide a complete system of insulation, as herein specified, for both inside and outside of building.

B. The General Provisions of the Contract including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

C. Refer to Section BASIC MATERIALS AND METHODS, which is applicable to this Section.

D. Insulation shall include insulating materials, their applications, finish, bands, tie wire and weather protection for all piping, fittings, valves, and equipment as indicated and specified herein.

1.2 GENERAL

A. All insulation shall be applied in a workmanlike manner by skilled workmen regularly engaged in this type of work.

B. All pipe insulation shall have COMPOSITE flame and smoke hazard ratings as tested in accordance with standard testing methods (NFPA) 255 and UL 723).

C. Composite ratings shall not exceed: flame spread 25, smoke developed 50.

D. Accessories such as adhesive, mastic, cement, tapes and asbestos cloth shall have the same component ratings as listed above.

E. THE INSULATION CONTRACTOR SHALL CERTIFY IN WRITING, PRIOR TO INSTALLATION, THAT ALL PRODUCTS TO BE USED WILL MEET THE ABOVE CRITERIA.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING ABOVE GROUND

A. Insulate all new above ground hot & cold water pipe with glass fiber pipe insulation with factory applied white all service jacket, with self-sealing lap (ASJ-SSL).

B. Insulate fittings, flanges and valves with performed insulation with PVC premolded one-piece fitting covers, with fiberglass inserts. Premolded or shop fabricated Glass Fiber covers may be used in lieu of above at the Contractor's option. Optional covers to be given a smoothing coat of finishing cement in exposed areas and vapor sealed in all areas with vapor barrier mastic coating reinforced with white glass fabric.

C. Insulation thickness for all cold water piping to be ½ inch.

D. All new domestic hot water and hot water circulating piping shall be insulated in accordance with the Schedule below.

	PIPE DIAMETER	INSULATION THICKNESS
All mains, branches and other piping	1-1/4” and less	1/2”
	1-1/2” to 4”	1”

E. Provide an isolating vapor seal between pipe insulation jacket and pipe at butt joints of insulation at fittings, flanges, valves, hangers and at 21 foot intervals on continuous runs.

F. Adhere longitudinal laps and butt strips of jacket with factory applied pressure sensitive tape system.

2.2 DUCT INSULATION

A. DUCT SIZES SHOWN ON DRAWINGS ARE FREE AREA SIZES. See Section 233000 for insulation and duct material and type required for each application. Insulation shall be as per the following:

C. Lined Duct system - All lined ducts shall be lined with Knauf Duct Liner E-M, Manville Lina-Coustic ductliner, or approved equal. Duct Lining shall be applied in strict accordance with the latest edition of SMACNA's "HVAC Duct Construction Standard Metal & Flexible." Mechanical fasteners shall meet "Standards for Mechanical Fasteners MF-1-1975." Length of mechanical fasteners shall not compress the insulation more than 1/8" and shall be installed perpendicular to the duct surface. Adhesive shall conform to ASTM C 916 and be applied to the sheet metal with a 90% minimum coverage. All exposed edges of the duct liner material shall be coated with the same adhesive. All rips and tears shall also be repaired using adhesive. All internal duct areas shall be covered with duct liner. Transverse joints shall be firmly butted with no gaps, and coated with adhesive. Longitudinal corner joints shall be overlapped and compressed. For velocities from 4001 to 6000 FPM, metal nosing shall be applied to all upstream transverse edges to additionally secure the insulation." Liner shall be 1” thick, I.5 PCF.

Exterior Duct Wrap - Exterior insulation duct wrap shall be 2” thick .75 PCF fiberglass wrap with F.S.K. jacket, KNAUF duct wrap, or approved equal.

2.3 AIR CONDITIONING DRAINS AND REFRIGERANT PIPING

A. Insulate all air conditioning condensate drains and refrigerant pipe, fittings, flanges and valves with flexible foamed plastic tubing insulation, J-M Aerotube 11, Rubatex, or approved equal. Thickness to be 3/4 inch.

B. Insulate all horizontal waste piping (new or existing) above ground that receives A/C condensate from drain to vertical stack. Also insulate the "P" trap of those drains. Insulation shall be same as specified for above ground domestic cold water piping, fitting flanges and valves except thickness shall be 1/2 inch for all pipe sizes.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND INSTALLATION

A. All insulation shall be applied per manufacturer's specifications and installation requirements.

B. Insulation shall be applied over clean dry surfaces after all test have been performed and approved.

C. Methods of application and other details not specified herein shall be in accordance with manufacturer's recommendations, which shall constitute minimum standards.

D. Sheet Metal Saddles - 10" long shall be provided on all hangers supporting insulated lines. They shall be fabricated to conform with the outside diameter of the pipe covering and shall be fabricated from 22 gauge sheet iron for pipe through 2-1/2" 20 gauge sheet iron for pipes through 8" and 16 gauge for all pipes over 8".

E. A rigid insulation material shall be used at each pipe hanger as an insert and the pipe covering shall pass full thickness through the hangers.

F. On all outdoor piping insulation above ground (including covered parking area), provide aluminum jacket 0.016 inch thick with longitudinal z-joint secured with preformed 2" wide butt strips, as manufactured by KNAUF, MANVILLE or approved equal. Provide preformed aluminum fitting cover on all fittings.

END OF SECTION 220700

SECTION 221100 - PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

A. Furnish and install new fixtures, waste, vent, cold water and hot water piping shown on plans.

B. Connections of all equipment and fixtures with accessory fittings, shut-off valves, trimmings, traps, structural supports, insulation, etc., as herein specified and/or as shown on drawings.

C. Refer to SECTION 230500 which is applicable to this Section.

D. Include (but not necessarily limited to) the following items of mechanical equipment, fixtures and materials installed and in a first class operating condition:

1. All labor, materials, equipment, accessories, and miscellaneous items required to provide a complete plumbing system. Provide adequate supervision at all times during the progress of the work.
2. All plumbing piping and hangers for same as specified herein and where shown on the Architectural and/or mechanical drawings.
3. All sewer, waste and vent piping and all cleanouts necessary for a complete operation installation as shown on mechanical drawings, or as required by the State and Local Sanitary Codes.
4. Temporary water, sanitary, etc., facilities during construction period.
5. Gas piping including new meter.

1.3 QUALITY ASSURANCE

A. Manufacturer: Provide plumbing fixtures and accessories for work in this Section produced, meeting the requirements specified.

B. Soldering processes shall conform to ASME B31.3 Process Piping and Copper Development Association recommended practices.

PART 2 - PRODUCTS

2.1 SANITARY SEWER

A. All soil, waste and vent piping shall be solid core, pressure rated schedule 40 PVC with solvent weld fittings. Pipe and fittings shall conform with ASTM D 2665.

B. Cleanouts in sanitary lines, both inside and outside at building, PVC with screw plugs.

C. Cleanout covers located in floors for sewer lines inside of building, with satin brass scoriated tops and covers.

D. Cleanouts shall be installed in each change of direction of sewer lines where more than a 45 degree angle turn is made. Cleanouts shall be provided within 18” of each sanitary tee.

E. Cleanouts on exterior underground lines shall be brought to a cast-iron cleanout box, with service marking, 1/2" thick flanged type and loose cover. Provide 12" X 4" thick concrete slab around cover and frame.

F. Size and distance between cleanouts shall be required by local authorities and/or as indicated on drawings.

G. All floor drains shall be provided with trap primers and ½” trap primer line.

2.2 DOMESTIC WATER

A. Ball valves shall be provided where indicated on drawings and shall be designed for a minimum water working pressure of not less than one hundred fifty (150) pounds per square inch. Each underground valve shall be protected by a cast-iron valve box with minimum thickness of 3/16 inch. The cover shall have the word "WATER" cast in the metal.

B. Hot and cold water piping inside the building shall be hard drawn seamless copper tubing, type "L", with wrought copper sweat fittings and lead free solder above grade. No joints shall be allowed under building slab, on piping 1" and smaller, larger pipe sizes shall have joints with lead free solder. Water piping underground shall be Type "K". Piping on exterior of building shall be Type “K”. Underground water service shall be C900 PVC Class 150.

C. All piping, fittings, solder and flux used in conjunction with the potable water systems shall be lead free. The term "lead free" shall be as defined in the Safe Drinking Water Act Amendment of 1986 (P.L. 99-339).

2.3 FIXTURES

A. Furnish, install and/or connect all plumbing fixtures indicated on drawings or as herein specified. Refer to Mechanical as well as Architectural Drawings for location and number of fixtures required. If any fixtures shown on Architectural Plans but not on Mechanical Plans, or vice versa, these fixtures shall be furnished, installed and connected the same as if indicated on all drawings. See Architectural Drawings for specific fixtures required. Where a specific manufacturer's name and catalog number is used to indicate the type and quality required, it shall be assumed that other manufacturer's products may be used, where they are equal and approved by the Architect as stipulated elsewhere herein.

B. Each plumbing fixture shall be fitted with all necessary and proper fittings, trim and operating devices and shall be left in perfect operating condition. The finish of all traps, wall escutcheons, and exposed metal work in connection with fixtures, trimmings and operating devices shall be chromium plated.

C. Before setting any fixtures or rough-in for fixtures, obtain the exact mounting height, as desired, from the Architect.

D. Equipment shown on drawings to be furnished under other sections shall be roughed-in, installed and connected by this Contractor under this Section. This Contractor shall furnish and install all necessary valves, piping, fittings and waste traps, etc., not provided with said equipment but as required for proper operation and installation. Obtain rough-in dimensions before installing any piping.

E. Plumbing fixtures shall be as follows:

SEE PLANS FOR FIXTUTRE SCHEDULE

HOSE BIBB (MARK HB)
3/4" rough brass, loose key sill cock with vacuum breaker, Smith 5609.QT or Mifab MHY-16. Use for all interior hose bibs.

HOSE BIBB (MARK HB-1)
Wall hydrant J. R. Smith 5509.QT or Mifab MHY-26 cast box with cover, bronze finish, loose key with vacuum breaker. Use for all exterior hose bibs.

FLOOR DRAIN (MARK FD)
J. R. Smith 2005-B, or Mifab F1100C-S, cast-iron - See plans for sizes. Nickel brass square strainers in toilet rooms and finished areas. All floor drains shall have 4” deep seal traps and trap primer connections.

FLOOR DRAIN (MARK FD-1)
J.R. Smith No 2010-F37 or Mifab F1100C-ER cast iron body and flashing collar with extended rim nikaloy strainer, install with rim flush with floor. All floor drains shall have 4” deep seal traps and trap primer connections.

TRAP PRIMER (MARK TP)
Automatic water metering type, Precision Plumbing Products Model PR-500, with SS-8 supply tube and DU distribution unit to serve drains as shown on drawings. Install per manufacturers recommendations and provide wall access panel for periodic inspection. Alternate Manufacturer Mifab Model MI-DU.

WASHING MACHINE BOX (MARK WM)
Metal recessed wall box with hot and cold water hose connections with shutoff valves and drain connection.

2.4 VALVES, STRAINERS, UNIONS AND FITTINGS

A. General - All material shall be new, of the best quality with same brand or manufacturer for all similar installations. SEE SECTION 220500 for type and manufacturer.

2.5 WATER HAMMER ARRESTORS

A. Provide arrestors as marked A.C. (air chambers) where shown on the drawings and/or as necessary to prevent water hammer in the piping based on actual piping arrangement on the job.

B. Install fluid water hammer arrestors in compliance with ASSE Standard 1010.

C. Each unit shall be constructed with a single moving part. The barrel shall be fabricated of Type "K" hard drawn copper, with the cap fabricated from standard wrought copper fittings attached to the barrel with lead free solder. The piston shall be machined from brass and equipped with rubber "O" rings.

2.6 GAS PIPING

All gas piping above ground shall be Schedule 40 black steel. Above ground piping system 2" size and larger shall be all welded pipe and fittings. Above ground piping system 1-1/2" size and smaller shall be threaded pipe and fittings using malleable iron fittings. The above ground system shall meet the requirements of ASTM A53. Underground gas piping shall be heat fusion joined medium density polyethylene, SDR 13.5 yellow color installed with metallic tracer tape. Gas pipe shall be manufactured in accordance with ASTM D2513 with the resin having a D3350 cell classification of 234343E, Grade PE24. Operating pressure shall be 20 PSI. Piping shall be installed in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. All piping, waste and stacks shall be run concealed underground, in ceiling spaces, walls or in chases provided. The entire installation must present an appearance truly in keeping with the best practice and indicative of skill and neatness. In areas of exposed ceilings piping shall be grouped together and run on common pipe hangers with piping run parallel to building lines.

B. All material shall be installed in a neat and workmanlike manner by competent specialists for each sub-trade. The installation of any materials and equipment not meeting these standards may be condemned by the Architect and shall be removed and re-installed at no additional cost to the Owner. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner.

3.2 INSTALLATION

A. Pipe shall be laid to the grades and alignment indicated on the drawings. Each pipe shall be laid line to line and grade and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line. The interior of the pipe shall be cleaned of all dirt and superfluous materials of every description. Trenches shall be kept free from water until the pipe joining material has set and pipe shall not be laid when the conditions of the trench or the weather is unsuitable for such work. At times when the work is not in progress, open ends of pipe and fittings shall be securely closed, so that no trench water, earth or other substance will enter the pipe or fittings. Minimum compacted pipe coverage shall be 2'-0", or as indicated on drawings.

B. Where the location of the sewer is not clearly defined by dimensions on the drawings, the sewer shall not be run closer horizontally than 6'-0" to water supply main except that the bottom of the water pipe will be at least twelve (12") inches above the top of the sewer pipe, both pipes may be lain in the same trench. Where sewer mains cross above water services the sewer piping for a distance of ten (10') feet each side of the crossing shall be cast-iron without any joint closer horizontally than three (3') feet to the crossing.

3.3 SANITARY SEWER PIPING

A. New piping shall be a complete system to waste and vent lines from all fixtures.

B. All waste lines shall be installed on a continuous waste and vent system as required by codes and/or regulations.

C. All piping shall be installed straight and true and sized as indicated on drawings.

D. All changes in direction shall be made by the use of 45 degree wyes, double wyes, long sweep quarter bend or 1/8 bends, except that single sanitary tees may be used on vertical stacks. Tees and crosses may be used in vent pipes.

E. Cleanouts easily accessible shall provide at the foot of each vertical waste or soil stack. Cleanouts shall be of nominal size as the pipes up to four (4") inches and not less than four (4") inches for larger pipes. The distance between cleanouts in horizontal lines shall not exceed those distances required by local authorities, whether indicated or not.

F. All cleanouts installed so as to be easily accessible, and all outside cleanouts installed flush with finished grade.

G. Horizontal soil or waste lines shall be run at uniform grade of not less than 1/4" per foot. Horizontal lines shall be supported or anchored at intervals specified in BASIC MATERIALS AND METHODS. All stacks shall be supported at their base and every floor to the roof line and pipes shall be rigidly secured.

H. Every fixture trap shall be protected against siphonage and back pressure and air circulation assured by means of a soil or waste stack vent, a continuous waste or soil vent, a loop or circuit vent.

H. No vents shall be less than 2" in diameter and no case shall branch or main vent have a diameter less than half that of the soil or waste pipe served, or as required by local code.

J. Make all arrangements with Local Authority for the inspection of the installation of the new sanitary sewer system, and pay all costs and assessed fees.

3.4 HOT WATER AND COLD WATER SYSTEMS

A. This installation comprises a complete and operating system of hot and cold water distribution and connection to each and every fixture and appliance requiring this service and/or as indicated on drawings.

B. All ends of tubing shall be square cut and burrs removed before assembling. Joints shall be thoroughly cleaned with sandpaper or emery cloth before applying the flux.

C. All water supply piping, fittings, and fixtures shall be protected against water hammer shock, or surge pressure, by adequate air chambers.

D. Each riser battery shall be valved in an accessible location.

E. No hot water piping shall be run closer than six (6") inches from cold water pipes.

F. Distribution and sizes shall be as indicated on drawings.

G. Pitch all piping to low points to allow for system drainage.

H. Make all arrangements with Local Authority for inspection of the new water system and for the building, pay all assessed costs and fees.

3.5 GAS PIPING

A. Gas distribution system shall consist of a distribution system to each service point as

indicated on drawings.

B. Provide gas cocks shut-off valve and union at each piece of equipment and where indicated on plans.

C. Connections and piping shall be as shown on plans. Provide drip legs at all low points.

D. Provide pipe sleeves at all places piping passes through walls. Sleeves shall be such as to provide not less than ¼" clearance all around gas pipe.

E. Install all gas lines inside building exposed, no gas piping shall be installed above ceilings. No gas piping shall be installed under building slab. Piping installed through ceiling spaces and floors shall be installed through a galvanized iron, ventilated pipe thimble. All piping shall be installed in accordance with NFPA 54, Standard Gas Code and State of Louisiana Safety Standards for the transportation of natural and other gas by pipeline.

F. See Section 230500 for testing of gas piping.

3.6 MISCELLANEOUS ITEMS OF WORK

A. Contractor shall be responsible for securing all information and data for connection to all utilities and pay all costs including meter fees and connection fees.

B. Contractor shall provide temporary water and sewerage on site for use during construction period as required.

C. All valves shall be installed so as to be easily accessible for cleaning, inspection maintenance, and operation.

D. Provide access panels at all concealed valves.

E. All welded piping to be welded by Certified welders skilled in the work to be done.

F. No piping of dissimilar metals placed in contact or in close proximity with each other. Provide bronze valves wherever piping of dissimilar metals is jointed.

G. Provide all necessary steel frames supports, anchor bolts, sleeves, etc., required for safe support of equipment and piping installed under this contract. The Mechanical Contractor shall be completely responsible for the accurate position and dimensions of all foundations and support times.

END OF SECTION 221100

SECTION 230500 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

B. Separation of specifications into sections is for convenience only and is not intended to establish limits of work or liability. The following are the Sections that will apply to this project.

230500 - Basic Materials and Methods
220700 - Piping and Equipment Insulation
221100 – Plumbing
211300 – Fire Suppression System
230000 - Heating, Ventilation and Air Conditioning
220500 - Valves, Strainers, Unions and Fittings

1.2 DESCRIPTION OF WORK

A. The work to be done under this heading includes the furnishing of labor, materials, equipment, and service necessary for and reasonably incidental to the proper completion of all mechanical work as shown on the drawings and herein specified.

B. Visit and examine the job site, and with all authorities concerned in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed. Pay all costs and fees for utility connections.

C. Materials and equipment shall be new, except where otherwise indicated, of the best quality, with same brand of manufacturer for all similar material. All equipment shall be installed in accordance with manufacturer's requirements. Equipment with electrical components shall be laboratory tested.

D. All work shall be performed in a neat and workmanlike manner, and in accordance with all codes, standards, and requirements of the industry. All workers shall be trained in the tasks they perform. Training shall be by an industry accepted trade school.

E. In general, provide the installation of plumbing, fire standpipe system, HVAC systems and central plant renovations complete with all pumping, piping, fittings, fixtures, equipment, etc.

F. Regardless of titles and subdivisions herein employed, consider these specifications as one complete document with General Section applying to all other sections. All bidders are cautioned to read entire specifications and to thoroughly familiarize themselves with all requirements thereof.

G. Check all specifications and all drawings and bring to attention any conflicts or variations as shown as noted.

H. Specifications and accompanying drawings apply to all contracts or sub-contracts entered into for supplying material or labor for construction of work specified herein and shown on drawings.

I. Protect Owner and his agents including Construction Manager, Architect and/or Engineer from any and all damages and expense arising from fulfillment of contract and at completion of work repair all damages done.

J. For any points which are not clear, or for items and/or details which the Contractor feels are in need of clarification, consult the Architect before submission of a proposal.

K. The drawings and the specifications are complementary and what is shown and/or called for on one shall be furnished and installed the same as if shown and/or called for in the other.

L. In case of discrepancies and/or ambiguities in the drawings and/or in the specifications, the Architect shall be consulted prior to submission of a proposal. Failure to do so on the part of the successful bidder shall be construed as explicit agreement on his part to abide by the Architect's decision in such matters.

M. The word "provide" as used in these Specifications and on the Drawings shall be termed to mean "furnish and install".

N. Contractor shall include in base bid the connection of all sewer, and water piping to mains as shown on the drawings. Contractor shall include all material and all costs for complete installation, including meter fees and connection fees.

O. If the Contractor notices during the bidding any items of the contract documents which will violate any applicable code, these items shall be brought to the attention of the Architect before the bid date. Failure to bring these items to the attention of the Architect shall be construed as explicit agreement that the Contractor has included in his bid price any and all modifications necessary to complete the project in accordance with all applicable codes.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. All exposed piping, ductwork and other equipment requiring painting will be painted under PAINTING SECTION. Leave all these surfaces clean of oil, dirt, plaster, etc., ready for painting section's work.

B. Power wiring for all equipment shall be done under ELECTRICAL SECTION.

C. Provide approved wiring diagrams to the Electrical Contractor showing interlocking of all equipment and controls, assisting in all wiring problems affecting his equipment, checking and verifying that same is wired correctly under the Electrical Section for proper operating of all mechanical items.

D. Furnish under this section all heating, air conditioning, ventilating and other mechanical systems controls, starters, firestats, relays, and related equipment.

E. Openings for all access doors, relief and return air grilles, etc., shall be provided under the respective trade sections.

F. Curbs, flashings, etc., for exhaust fans, vents, etc., shall be provided under the respective sections.

G. All HVAC control wiring shall be furnished and installed by Building, Automation and Temperature Control Contractor.

H. Piping and ductwork penetrations through fire rated partitions/floors shall be fire sealed in accordance with the UL fire resistance directory. See Sealant Specification for materials. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained.

1.4 QUALITY ASSURANCE

A. The Contractor bidding on this portion of the work must be fully experienced in installations of equal size, complexity, and quality, and must be licensed to perform such work as required by the Louisiana State Legislature, R.S.37:2152-2163.

B. In bidding he acknowledges that he fully understands the scope of work and design, and has the ability for the contract price to assemble and install the equipment, piping and ductwork shown or specified, so as to mold same into a satisfactory workable system and arrangement.

C. Contractor shall recognize that a fault or error in his work remains his responsibility regardless of whether such difficulty was discovered after the work had progressed, and shall make corrections at no cost to the Owner.

D. Adequate and competent constant supervision shall be provided by Contractor to assure that work is done in accordance with good standard practice and workmanship and with intent of drawings and specifications. Contractor shall recognize that amount of information and detail could be provided to contract documents is limitless and could extend into every minute detail and sequence of operations, to a point where only workmen would be required, without drawing on ability, experience and ingenuity of the Contractor.

E. All work shall be installed in strict accordance, with all existing local and state codes and ordinances, with National Board of Fire Underwriters

F. This Contractor shall secure all permits and inspections and shall pay all fees and taxes and shall provide Owner with certificates of approval from agencies having jurisdiction over various phases of work.

G. Contractor shall maintain and service all equipment until time of acceptance by Owner. Contractor shall include all required service access in the installation as required by the manufacturer and governing codes.

H. Prior to starting any work, the Contractor shall submit a quality assurance plan for approval by the Architect. In the quality assurance plan, the Contractor shall provide the following information:

1. List of all sub-contractors and equipment suppliers.
2. List of all foreman and job superintendents including job experience for all trades.
3. Construction time schedule demonstrating coordination with other trades and showing detailed time lines for test and balance and commissioning being completed prior to final punch list inspection.

1.5 SUBMITTALS

A. Shop Drawings and Submittal Data required:

1. Submit to the Architect for review, complete descriptive information and dimensional data on all items of equipment, materials and accessories, including duct, equipment and

sprinkler layouts. Piecemeal submissions shall not be approved. Written approval there of must be obtained before ordering or installation. The following shall be submitted:

Exhaust Fans	Insulation
Plumbing Fixtures	Valves, Strainers, Unions & Fittings
Gas Fired Furnaces	Cooling Coil
Water Heater	Gas Unit Heaters
Condensing Units	Air Purification Units
Electric Unit Heaters	Diffusers, Grilles & Registers
Range Hood	Ductwork Shop Drawings

2. Shop drawings and submittal data shall be considered to be instruments of service only and submitted for the sole purpose of convenience to the Contractor to assist him in the performance of the contract. The Architect's review of the shop drawings and submittal data shall not supersede these specifications, the accompanying drawings, or the contract terms, unless specifically covered by a properly executed change order, and then only to the extent specifically and explicitly stipulated therein.

3. Submit in accordance with requirements of Architectural Sections, Division 1.

4. Ductwork shop drawings shall be at a minimum ¼" scale. Duct shop drawings shall show the following:

   a. All structural members larger than 4".
   b. All hydronic piping 2" or larger.
   c. All conduit 2" or larger
   d. All duct fittings, take-offs, volume dampers, control devices and fire dampers.
   e. All grilles, louvers, registers and diffusers.
   f. Duct dimensions and insulation methods.
   g. Duct dimensioned from structural beams and columns.
   h. Architectural ceiling heights, furrings, chases, etc.
   i. Cross-sections in areas of congestion or conflict.
   j. Installation details for all duct and related equipment.
   k. Lights, speakers, smoke detectors and other ceiling mounted devices.

B. After completion of project Contractor shall turn over to the Architect complete operating and maintenance instructions including listing of supply and repair items and locations of places to purchase same. Comply with requirements of Division 1 Sections.

C. Substitutions:

1. All material, equipment, methods, and accessories entering into the work under this section of contract are subject to approval or disapproval of the Owner. Approval of any manufacturer, material, or product shall not constitute a waiver of Owner's right to demand full compliance with contract requirements, including shape, size, quality and performance.

2. Equality of materials is that established by opinion of Owner. Decision of Owner is final.

3. Whenever a material or article of equipment is specified by use of a proprietary name, or by naming the manufacturer or vendor, any material or article which will perform adequately the duties imposed by the design will be considered for substitution, providing it is of equal substance, and function, meets specifications, and is aesthetically acceptable to the Owner. Refer to Division 1 Sections for approval procedures.

4. Literature, technical data, etc., includes complete data and samples if necessary, with submissions for substitutions. Burden of proof that material offered for substitution is equal, or superior, in construction and efficiency to that named, rests on Contractor, and unless proof is satisfactory to Architect, substitution will not be approved. Contractor shall note any deviations from specified equipment with the substituted submittal. Failure to note deviations will result in rejection of substituted equipment and materials.

D. See Architectural Specifications for "As-Built" requirements.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

Take necessary precautions to protect all material, equipment, apparatus and work from damage. Failure to do so to the satisfaction of the Architect will be sufficient cause for the rejection of the material, equipment or work in question. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner. Comply with equipment manufacturer's requirements. No insulation or electrical components, shall be subject to water damage.

1.7 JOB CONDITIONS

A. Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance for normal job conditions and interferences.

B. Whenever it becomes necessary to shift ducts or pipes or to change shape of ducts, such changes shall be referred to Architect for approval.

C. Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of Contractor. Contractor shall consult manufacturer for details specific to their items of equipment.

D. Furnish detailed duct layout and equipment room shop drawings based on field measurements and actual job conditions.

E. Schedule and perform all mechanical work to avoid delays to the Contractor and other trades.

F. All piping, cleanouts and covers, and other mechanical items in way of construction or remodeling, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes shown or specified in any or all of various sections of specifications. Unknown piping that is encountered will be referred immediately to Architect for method of disposition before continuation of work.

G. The Contractor shall review the architectural drawings to become familiar with the phasing of construction required for this project.

1.8 GUARANTEE AND SERVICE

A. Guarantee all equipment, materials, and workmanship for a period of one (1) year following date of acceptance.

B. During the period of guarantee any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner.

C. Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Any deficiencies in equipment capacity specified shall be promptly corrected.

D. Guarantee does not include maintenance items.

PART 2 - PRODUCTS

2.1 ACCESS PANELS

A. Provide all access panels necessary for proper access to valves, traps, fixture connections, control devices or other items installed under this contract.

B. Panels to be Milcor, Type M, or KARP Model D3C-214M hinged with screwdriver lock or as indicated on drawings for special locations, minimum size 12” x 12” or larger as required for proper access.

C. Exact locations for panels to be directed by Architect.

2.2 TOOLS AND SCAFFOLDING

Furnish all tools, equipment, scaffolding and other facilities required to properly and expeditiously perform the work.

2.3 SIPHON PREVENTORS

Furnish and install on all equipment and fixtures requiring same, backflow preventors or vacuum breakers of a type approved by the Louisiana Health and Human Resources. Water connections to fixtures and equipment shall be made in such a way as to prevent back siphonage when the water supply is out or the pressure drops. Provide reduced pressure type back flow preventors where indicated on drawings. They shall be Watts series 900 or Febco Series 825, size as indicated on drawings.

2.4 SLEEVES AND THIMBLES

A. Pipe sleeves - wrought iron or cast iron of sufficient size for piping and installation to be installed in floors, walls below grade, and grade beams where piping passes through.

B. Thimbles above grade - heavy galvanized steel of proper size to allow freedom of piping and insulation, set in floor or roof slab as work progresses, also to be installed in wall and partitions where piping passes through.

C. Thimbles below grade - same as pipe sleeves above.

D. Sleeves through floors extend 1" above finished floor. Caulk around and seal all piping in chases and piping passing through floor slab.

E. Provide sleeve seals and shields for all pipe penetrations of ground floor slab.

F. Provide UL listed fire-stopping in all pipe penetrations of rated floors and walls, see Architectural Specifications for Requirements.

2.5 BUCKS, GROUNDS AND CHASES

A. Be responsible for proper location and sizes or for any errors or omission in placing same.

B. Failure to inform the General Contractor promptly of such requirements shall not relieve the Mechanical installer of the responsibility for providing a complete mechanical system.

2.6 HANGERS

A. Horizontal piping above grade without hubs shall be rigidly supported. Distance between pipe supports:

1.	1/2" pipe	6'-0" maximum
2.	3/4" pipe	7'-0" maximum
3.	1" pipe	8'-0" maximum
4.	1 1/4" pipe	9'-0" maximum
5.	1 1/2" pipe and over	10'-0" maximum

B. Hangers shall be similar to "Split Ring" type.

C. Metal strap or wire will not be acceptable.

D. For two or more systems of piping run parallel and with same grade trapeze hangers may be used.

E. Use #22 gauge galvanized sheet steel saddles, minimum 18” long between the pipe covering and each pipe hanger on all insulated lines. Saddles shall extend along pipe runs and at least half way up piping on each side.

F. All above grade horizontal sewer drain, vent, waste and similar piping shall be hung at every hub using the same type hangers as specified for other piping.

G. All underground piping under building shall be run in crawl space and shall be supported from slab with S.S. clevis hangers.

H. Rods supporting pipe hangers shall have the following dimensions:

½” to 2” pipe	3/8” rod
2-1/2” to 3” pipe	½” rod
4” to 5” pipe	5/8” rod
6” pipe	¾” rod
8” through 12”	7/8” rod

Rods for trapeze hangers shall be a minimum of 3/8” and shall have the equivalent cross section, listed above, per pipe supported.

2.7 PAINTING AND IDENTIFICATION

A. Equipment, including pumps, motors, and similar factory fabricated and assembled units shall be furnished with factory applied protective prime coat paint of finished baked enamel. Equipment surfaces damaged during course of construction or shipment shall be refinished by the Mechanical Contractor.

B. Uncoated black ferrous piping and fittings shall be cleaned under this section and painted with one coat of enamel paint under PAINTING SECTION. Color of piping shall be selected by Architect. Hangers and supports shall be coated by dipping or brush painting with one coat of asphalt varnish. Steel frame equipment supports shall be cleaned and painted with one coat of aluminum paint.

C. Detached motor controllers, disconnects, etc., shall be identified with metal or plastic plates with etched letters to completely identify service of electrical equipment.

D. Major control and sectionalizing valves shall be identified by means of etched brass plates bracketed to valve handle. Contractor shall prepare schedule of such identifying plates for Architect's approval.

E. Exposed ductwork shall be cleaned under this Section and painted under Painting Section.

PART 3 - EXECUTION

3.1 EXCAVATION, TRENCHING AND BACKFILL

A. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings. During excavation material suitable for backfill shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All material not suitable for backfilling shall be removed completely from job site. Such shoring shall be done as hereinafter specified.

B. Trenches shall be of necessary width for the proper laying of the pipe and the banks shall be as nearly vertical as practicable. The bottom of the trenches shall be accurately graded to provide uniform bearing and support. Bottom of trenches shall have 6" layer of compacted limestone aggregate. Care shall be taken to provide uniform bearing and support.

C. Bell holes and depressions for joints shall be dug after compaction and grading in order that the pipe will be supported along its entire length. Whenever wet or otherwise unstable soil that is incapable of receiving the bottom preparation and support piping, as determined by the Engineer, is encountered, such soil shall be removed to the depth required and the trench backfilled to the proper grade with river sand.

D. All shoring required to perform and protect the excavation, and as required for the safety of employees, shall be installed. The sides of the trenches, four (4') feet or less shall be protected as required. For trenches more than four (4') feet in depth, the sides shall be secured by the use of continuous sheet piling and shall be not less than two (2") inches in thickness. Meet the minimum requirements of OSHA for trench shoring not described above.

E. The trenches shall not be backfilled until all required pressure tests are performed and until the certificates of inspection from the proper authorities are obtained by the Contractor. The trenches shall be carefully backfilled with the excavated materials approved for backfilling consisting of earth, loam, sandy clay, sand and gravel, or other approved materials free from large clods of earth or stone, deposited in six (6") inch layers and thoroughly and carefully

rammed until the pipe has a cover of not less than two (2') feet. The remainder of the backfill material shall then be thrown into the trench in one (1') foot layers and tamped. Any trench improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted, with the surface restored to the required grade and compaction, mounded over, and smoothed off. Sidewalks, drives and streets broken up by this work shall be repaired and returned to original condition.

3.2 FLASHING AND COUNTERFLASHING

All pipes and ducts that pass through roof and walls shall run so as not to interfere with the structural system and to permit proper application of base and counterflashing. All plumbing vents are to be finished with 2-1/2 pound sheet lead turned down into pipe. Other pipes to be provided with suitable curbs and flashed to roof or walls as indicated. Flues shall be properly flashed and counterflashed with approved type jacks. Roof drains shall have 2-1/2 pound lead sheet base secured to drain clamp and extending minimum of 2'-0" in all directions.

3.3 CLEANING, STERILIZING AND PIPING

A. When all work has been finally tested, Contractor shall clean all fixtures, pipes and exposed work.

B. All pipes shall be free from all obstructions.

C. All plated and other finished products shall be thoroughly cleaned and polished.

D. New water piping shall be sterilized as required by State Sanitary Code. Provide detailed reports describing sterilization method and duration for each piping section.

E. All piping shall be installed so that it may expand and contract freely without damages to equipment, other work, or injury to piping system. All necessary swing joints, expansion joints, or offsets to protect piping, etc., shall be installed whether indicated or not. Piping shall be graded to allow for system drainage.

F. Stainless steel or chromium plated floor, wall and ceiling plates shall be furnished on all exposed piping passing through floor, walls, or ceilings. Plates shall be secured in place with round head screws or toggle bolts of proper size and type for adjacent construction.

G. All piping shall be installed and sized as indicated on plans and be of equivalent materials to piping as hereinafter specified.

I. All piping shall be installed with runs arranged parallels or perpendicular to walls and ceilings with symmetrical and equal spacing between parallel pipes. Offsets shall be made using factory fittings, bending of piping shall not be accepted.

I. Notify Engineer a minimum 72 hours prior to enclosing piping in concealed spaces so that piping may be inspected.

3.4 TESTING AND INSTRUCTION

A. Piping shall be tested to pressure hereinafter specified. Where pressures are not mentioned, it shall be understood that testing to 1-1/2 times service conditions, before insulation is applied, will be acceptable. All tests shall be held for a minimum of 24 hours before inspection.

B. Furnish all necessary gauges, pumps, test plugs, and temporary connections and shall test sections of the building as work progresses.

C. All new underground sewerage, waste and storm drainage piping shall be plugged at outlets and tested hydrostatically to 10 psi before being covered. Notify Engineer a minimum 72 hours prior to any backfill of underground piping so that piping may be inspected. Failure to notify Engineer prior to backfill will constitute a rejection of the underground piping installation. All other drainage piping, vent and waste risers shall be plugged and tested by filling with water from top to bottom of each floor prior to being connected to fixtures. Tests shall be held a minimum of 24 hours.

D. All new cold and hot water supply piping shall be tested hydrostatically to 125 pounds per square inch before application of insulation. Test shall be held a minimum of 24 hours.

E. All new gas piping shall be air tested to a pressure of 75 PSI. During the test, all joints shall be painted with a soap solution to test for leak. The test shall be held a minimum of 24 hours.

F. All tests shall be made in the presence of the Architect or his representative. Where pipes or connections in new piping are found to leak, they shall be made tight and the tests repeated.

G. Make all necessary adjustments to controls, dampers, valves, etc., to obtain best operation first with empty building and later under actual conditions. A minimum of two job site visits required.

H. Thoroughly check the operation of each item of equipment and controls while testing, without waiting first for the Owner or Architect to complain about their operation. Verify that same are wired correctly and completely, notifying the proper parties for necessary corrections. Thoroughly instruct the Owner's representative in the operation and care of controls, individual equipment, and entire system.

3.5 CUTTING AND PATCHING

Cooperate to the fullest extent with all other trades to reduce to a minimum the amount of cutting and patching of other work necessary for this installation. Do not cut or patch the work of other trades but arrange to provide cutting templates in time, or otherwise pay the respective other contractors for changing theirs, to accommodate this work. No cutting into any structural units likely to impair the strength shall be done without the approval of the Architect.

3.6 CLEAN UP

Remove debris, surplus and waste materials, oil, grease or stains resulting from the work performed and leave the premises in a broom clean condition AT THE END OF EACH WORKING DAY. All debris, surplus and waste material shall be removed completely from the job site.

END OF SECTION 230500

SECTION 233000 - HEATING, VENTILATION AND AIR CONDITIONING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.

B. Refer to Basic Materials and Methods Section 230500 which shall apply to work in this Section.

1.2 DESCRIPTION OF WORK

A. The work to be done under this Section includes the furnishing of all labor, tools, materials, equipment and services necessary for and reasonable incidental to the installation of complete air conditioning and heating and ventilation equipment as shown on plans and herein specified, excepting only work and/or materials indicated as being done and/or furnished under other sections.

B. Contractor shall refer to other Sections of the Specifications which may be applicable to or associated with this Section.

1.3 RELATED WORK SPECIFIED IN OTHER SECTION

A. Electrical Section will provide all power wiring including furnishing and installing of disconnect switches where specified. Control wiring for air conditioning equipment shall be provided by Building Automation and Temperature Control Contractor.

B. Other Sections will provide and install structural supports for equipment. These supports must be checked and coordinated by this Section so that they suit the equipment which is to be supported.

C. Other Sections will provide all platforms slabs, lintels and curbs, as directed by this Section, to accommodate the mechanical equipment.

D. Mechanical Contractor shall provide starters for motors furnished under this Section.

1.4 QUALITY ASSURANCE

A. These specifications with accompanying drawings, require complete apparatus, fully erected and in successful operating condition. Perform all work in best, most substantial manner.

B. All equipment furnished and installed under this Section shall be U.L. or E.T.L. approved and labeled where applicable.

C. All unfired pressure vessels furnished under this Section shall be ASME and National Board stamped.

D. All manufacturers products shall comply with the requirements of this Section.

E. Employ qualified sheet metal workers in accordance with SMACNA Duct Construction Standards.

F. Qualify welding/brazing process and welder/brazer performance in accordance with AWS B2.2, Standard for Brazing Procedure and Performance Qualification, or ASME Boiler and Pressure Vessel Code, Section IX (See 15050). Provide copy of certification for welding and brazing processes.

G. Soldering processes shall conform to ASME B 31.3, Process Piping and Copper Development Association recommended practices.

1.5 SUBMITTALS

A. Contractor, before beginning work, shall submit dimensional shop drawings (in accordance with requirements of Division 1), for approval, for all duct systems. Contractor is responsible to coordinate all plumbing, piping, sprinkler, ductwork and electrical to avoid all conflicts. Conflicts encountered after work has started will be corrected at Contractor's expense.

B. Where the equipment installed is of a different configuration and/or size than that shown on the drawings, Contractor shall assume all responsibility to conform with the intent of the contract documents. The Architect shall be advised of any changes and deviations for his approval. The same shall be true for any field modification required because of "on job" construction conditions.

PART 2 - PRODUCTS

2.1 DIFFUSERS, GRILLES, REGISTERS AND LOUVERS

A. All sizes shall be as indicated on drawings.

B. All outlets shall be balanced to obtain specific air quantities free of all objectionable draft and noises.

C. Diffusers, grilles and registers shall be of normal commercial grade as indicated on Schedule on drawings.

D. Louvers shall be as scheduled and/or detailed on drawings.

2.2 FIRE DAMPERS

Fire dampers shall be solid sheet curtain type, dynamic closure type corrosion resistant galvanized steel construction. Dampers mounted in the horizontal position shall be closed by a stainless steel negate spring. Damper to be easily reset through standard access panel for required periodic maintenance. Access panels are required for access to all fire dampers, minimum size 12 X 12 inches. Dampers shall be 100% out of air stream. Provide fusible links rated at 160 degrees F.

2.3 ACCESS DOORS

Access doors shall be installed in ductwork wherever required for ready access to any operating part. Doors shall not be smaller than 12 X 12 inches, with brass hinge and sash type fasteners. Ducts 30" or larger shall be supplied with minimum 18 X 18 inch access doors. Doors shall be double wall insulated type, hinged with sash locks and gaskets.

2.4 FANS AND OUTSIDE AIR INTAKES

A. Size and quantity shall be provided as indicated on drawings.

B. All roof exhaust fans and roof outside air intakes shall be provided with factory prefabricated curbs.

2.5 HVAC DUCTWORK

A. Provide and install a complete system of ductwork as herein specified to include, but not limit to supply, return, exhaust and fresh air with grilles, registers, diffusers and appurtenance to provide a complete functional and operational system. Duct sizes shown on drawings are free area dimensions. Design shall be as described in the latest edition of SMACNA manuals and as per the following:

1. Galvanized sheet metal shall be lock form quality per ASTM A653 with a G90 zinc coating.

2. Outside air and exhaust air ducts shall be galvanized sheetmetal with air-tight seams and as per applicable sections of SMACNA manuals for low velocity ducts. Insulate outside air and exhaust air ducts with internal liner if rectangular duct or external wrap if round duct as per SECTION 15250.

3. Supply and return ducts for low pressure system and, low velocity systems shall be galvanized sheetmetal with airtight seams and as per applicable section of SMACNA manuals for low velocity ducts. All ducts shall be insulated with 2" exterior wrap as per Section 15250.

4. Rectangular ductwork for medium pressure, high velocity systems shall be galvanized sheetmetal with airtight seams and as per applicable section of SMACNA manuals for high velocity ductwork. Insulate with 2" exterior duct wrap as per Section 15250.

5. Round rigid ductwork shall be all round single wall spiral pipe and fittings, galvanized steel, as per applicable sections of SMACNA manuals for high velocity duct. Insulate with 2" exterior duct wrap as per Section 15250. Seal all seams, joints and wall penetrations with hardcast as herein specified.

6. All ducts shall be sealed per SMACNA Seal Class A. All joints, longitudinal seams and wall penetrations of all supply, return outside air and exhaust ducts shall be sealed with an elastomeric tape which shall consist of a pressure sensitive layer of modified butyl rubber sealer laminated to a foil backing material which shall conform to surface variations and irregular areas and shall not harden crack or peel. The sealant shall be waterproof and shall be a minimum of 15 mils thick. All ductwork shall be cleaned and prepared and sealant shall be applied strictly in accordance with manufacturer's instructions and recommendations. Sealant shall be Hardcast FG-1402, Suretape #653 or approved equal, at Contractor's option flanged gasketed duct system may be used for POSITIVE PRESSURE SYSTEM ONLY.

7. Flexible round duct where indicated on plans shall be listed by Underwriters' Laboratories, Inc., under UL-181 standards as Class I flexible Air Duct Material complying

with NFPA Standards 90A. Ducts shall be rated on maximum pressure of 6 inches WG positive and 2 inches WG negative. The duct shall be factory fabricated assembly composed of: an inner duct of woven and coated fiberglas providing an air seal and bonded permanently to corrosion resistant coated steel wire helix: a 2” thick fiberglas insulating blanket and low permeably outer vapor barrier of fiberglas reinforced metalized film laminate. Pressure drop not to exceed .15" SP at 500 Fpm through 6" or larger duct. Maximum length of flexible duct shall not exceed 8'-0". Connect flexible round duct with ½” wide nylon positive locking nylon straps on inner duct and outer duct.

8. Splitter dampers shall be installed where branches take off of main trunk ductwork, where ducts divide or where shown on the drawings. Splitters shall be fitted with nickel plated damper regulators in finished areas. Splitters shall be factory fabricated in accordance with SMACNA Duct Construction Standards.

B. Flexible connections shall be provided between each fan unit and ductwork on supply side and also on return side. Material shall be flexible fire-resistive material, minimum 4” wide, UL listed, with no metal to metal contact.

C. Duct supports for rectangular ducts shall be a minimum 1" X 18 gauge galvanized steel bands. Hanger bands shall be bent under lower corners and secured with self-tapping screws at corners and six (6") inch intervals up the sides. Distance between hangers shall be as recommended by SMACNA manual for low and medium ductwork. Ductwork shall be rigidly supported to prevent vibration. Duct attachments to structure, lower hanger attachments, ducts traps and rods and trapeze angles shall be in accordance with SMACNA Low Pressure and High Pressure Duct Standards.

D. Where the ducts pass through walls, draft stops or partitions, the space shall be packed with non-combustible materials, filling all voids around duct.

E. Fire dampers with fusible links shall be installed at all points in ductwork where indicated on drawings, and/or as required by NFPA, 90-A, AND MECHANICAL CODE OF THE IBC.

F. Provide radius elbows unless specifically indicated otherwise or space prohibitive. Rectangular radius elbows shall be factory fabricated with a centerline radius of not less than the width of the duct. Round duct elbows shall have a minimum center line radius of 1-1/2 times the diameter of the duct and shall be smooth where possible. Provide square elbows where indicated or space prohibits the use of radius elbows. Square elbows shall be factory fabricated with double thickness airfoil turning vanes pre-assembled and securely attached to runners.

G. In general, vertical risers and other duct runs, where the method of support specified above is not applicable, or not specifically detailed on drawings, shall be supported by substantial angle brackets designed to meet field conditions, installed to allow for duct expansion and approved by Architect.

H. Provide exposed operators for operation of dampers and splitters in inaccessible ceilings, operators shall be chrome plated.

I. Maximum duct leakage shall be +/- 5%, SMACNA Seal Class A. Supply air, outside air, return air and exhaust air systems shall be designed for 1.0” static pressure. Construct ductwork in accordance with SMACNA Duct Construction Standards for the specified pressure class.

J. Install Automatic dampers, airflow stations and other duct mounted devices.

K. Flanged gasketed exhaust and return ductwork will not be accepted.

2.6 PIPING AND PIPING IDENTIFICATION

All piping at each piece of equipment shall be stencil to show the service and direction of flow. Stencils shall be black on a white background with letters one (1") inch high spaced at approximately forty-eight (48") inches apart by equipment or 10 foot intervals along piping runs.. Pressure-sensitive pipe markers ANSI Standard A 13.1 may be used in lieu of stenciling.

2.7 GAS UNIT HEATERS

A. The unit heaters shall be propeller type completely packaged and arranged for ceiling suspension with directional louvers. Capacities shall be as listed in the schedule on the drawings.

B. Gas heat exchanger shall be stainless steel.

C. Controls shall be provided with unit heater and shall consist of unit mounted thermostat, automatic high limit and fan time delay relay. This contractor shall install controls and make operational.

D. Motors shall be permanently lubricated with internal overloads.

E. Each unit shall be U.L. listed.

2.8 GAS FURNACE SYSTEMS

A. Each system shall have the capacities and configuration as listed in the schedule on the drawings.

B. Furnace section enclosure shall be insulated and constructed of galvanneal steel, bonderized and finished with baked enamel. The variable speed fan motor shall be factory lubricated, have internal overload protection and be resiliently mounted. Fan-motor assembly shall slide out for service. Reversible filter rack shall have duct connection flanges and be equipped with permanent-type filter that slides out for maintenance. Gas furnace shall have 2-stage heating with multi-port in-shot burners, electronic control, sealed one piece heat exchanger, UL listed.

C. Cooling coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coils shall have a factory-installed refrigerant metering device and be equipped with refrigerant line fittings which permit mechanical connections. Coil casing shall be insulated and constructed of galvanneal steel, bonderized and finished with baked enamel. Coil shall have a double slope insulated drain pan.

D. Compressor shall be of the welded-hermetic type 2 stage scroll with internal vibration isolation and be covered with a shield of muffle operating sound. Compressor motor shall have both thermal and current-sensitive overload devices, internal high-pressure protection, high- and low-pressure cutout switches, start capacitor and relay, crankcase heater and relay and a timer to prevent compressor rapid cycle.

E. Condenser coil shall be of circular construction. Tubes shall be aluminum with mechanically bonded aluminum plate fins. Condenser fan shall be propeller-type, direct-driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated, inherently protected and resiliently mounted and shall have high and low speeds.

F. In addition the system shall have the following:

1. Louvered coil guard.
2. Liquid line shutoff.
3. Vapor line shutoff.
4. Filter drier.
5. R-410 refrigerant.

2.9 CONTROLS

A. Each air conditioning system shall be controlled by a low voltage wall mounted electronic programmable heating-cooling thermostat with fan “on-off-auto” switch. With fan switch in “off” position entire system shall be de-energized. With fan switch in “auto” position fan shall cycle around thermostat setting. “On” position shall allow continuous fan operation. Compressor or heater, shall cycle around thermostat and selector setting.

B. Furnish and install a 125 degree F. firestat in the return air inlet of all fans and blowers. Firestat and detector shall be manually reset type and shall interrupt fan service if activated.

2.10 PIPING AND FITTINGS

A. Furnish and install all piping related to air conditioning systems including refrigerant piping, air conditioning condensation drains, and other miscellaneous piping.

B. All piping shall be installed parallel and square with building lines and shall be sloped to permit drainage, with suitable provision for drainage at all low points.

C. Piping shall be arranged to maintain headroom and keep passageways clear and where necessary shall be offset to maintain the required clearance and conform with the structural features of the building. Contractor shall determine in advance of construction locations for all piping sleeves, hangers, etc. No allowance will be made for extra due to inaccurate location of sleeves, piping or equipment.

D. All piping shall have provisions for expansion and contraction with anchorage at each point shown on the plans and/or as required.

E. Full length pipe shall be used where possible, short lengths and couplings will not be permitted. After cutting, all pipes shall be reamed out to full bore and before erection, all cutting and foreign matter shall be removed from the inside of pipes. Screwed joints shall be made tight without caulking or the use of lead or paint and no lubricant shall be used except flake granite and cylinder oil paste, or approved pipe compound applied to make threaded pipe.

F. Pipe sleeves shall be provided for the passage of all pipe through walls, floors and partitions.

G. All condensate drain piping shall be installed using ASTM B88 type "L" hard drawn copper with wrought copper sweat fittings. Changes in direction of piping shall be made with short turn tee pattern or 45 degree wye fittings with brass cleanout plug. Insulate drain piping, minimum drain on fan coil units – 3/4”, air handling units – 1-1/4”.

H. Refrigerant piping shall be type “L” hard drawn copper wrought copper sweat type fittings and silfos solder. Provide a catch-all liquid line strainer and a liquid line moisture indicator sight glass at each condensing unit. Strainer shall be installed in a three valve by-pass.

Completely evacuate system before providing refrigerant operating charge as recommended by equipment manufacturer. Pipe sizes shall be as recommended by equipment manufacturer for installation shown. Insulate per Section 220700.

2.11 AIR PURIFICATION UNIT

A. The air purification system shall consist of an air filtration system and activation system to capture, reduce or eliminate vehicle exhaust products. The unit shall be Air Hawk 3000-XL or approved equal. The system shall be mounted and installed per the manufacturer's recommendations.

B. The unit shall consist of a MERV 11 pre-filter, MERV 16 HEPA grade primary filter and a gas-phase filter with a 50/50 blend of activated carbon and potassium permagnate on zeolite.

C. Photo – Catalytic Oxidation Chamber: The photo-catalytic oxidation chamber shall utilize a grid made of aircraft aluminum honeycomb material with 1/8" cells, ¾" thick with a minimum of 70 sqft. of surface area. Titanium dioxide shall be impregnated throughout the entire grid. The surface of the grid shall be illuminated with two UV lamps of at least 3milliwatts/CM^2.

D. The unit shall have a 16 gauge steel cabinet with holes pre-drilled for the 3/8" support rods. The cabinet shall be powder coated and baked finished. Access doors shall be provided and the unit shall be equipped with 4-way adjustable diffusers.

E. The motor blower shall be direct drive, forward curved, 1 HP, 208V, single phase, permanent split capacitor motor.

F. Control Panel: The unit shall have a NEMA 4X control enclosure with start/stop push button, power light/motor overload indicator, diagnostic scree, time boost push button, sequenced motor starting, long range photo-electric, CO/NO_2 monitor, LED filter change.

G. Unit shall include necessary controls and photo eyes to operate the unit upon opening and closing of any of 4 roll up doors for a timed period of 10 minutes (adj.). System shall also be set for automatic mode where any vehicle passing the photo eye operates the system. Provide all necessary controls, wiring and hardware to operate the system.

2.12 EXHAUST HOODS

A. The hood shall be constructed of 18 & 20 gauge (type 304) polished stainless steel. Hood shall have fire suppression system factory installed into the hood system. Activation of the mechanical fire suppression system shall be by 212 or 280-degree fusible link (30" vs. 36" sizes). Fire suppression agent will be Amerex 660 Low PH wet chemical suppressant. Unit shall include centrifugal fan with air delivery of 380 to 610 cfm depending of calibration of unit. Unit shall include fuel shutdown option for Gas, Electric or Dual Element Devices. The hood system will also have multiple alarm and monitoring contacts factory installed into the hood.
B. Designer to verify CFM and pressure drop with manufacturer.

Greenheck Model	Width	Fan Type	Venting	CFM (at hood)	Duct Length (max)
GRRS-30-R-G-N	30	Internal	Rear	500	N/A

C. Hood system include commercial-grade grease extractor type, high efficiency cartridge style baffle filters of adequate number and sizes to ensure optimum performance in accordance with manufacturer's published information. The filter housing shall terminate in a pitched, full-length grease trough, which shall drain into a removable grease container.

D. Shatter proof light fixtures shall be included in the hood system. Wiring shall conform to the requirements of the National Electrical Code (NEC #70).
   1. Pre-Installed Fire protection system to provide duct entry, plenum, and surface protection for hood system and equipment located below ventilator. Provide submittal and review fee for hood suppression system to State Fire Marshal. Include necessary cut sheets, calculations, applications and checklist. Requirements can be found on the state fire marshal website.
   2. System interconnected with included shunt trip breaker and gas solenoid valve of equipment located below ventilator for power and fuel shutoff during system actuation.

E. Environmental Monitoring / Internal Monitoring / Pre-Suppression
   1. Two temperature sensors are located on the inner face of the hood; one at a medium set point, the other at high. Under cooking conditions, when the medium set point is reached, the fan is turned on high. This feature dissipates the heat from the area but also draws it into the unit, past the fusible links in the system. If temperatures continue to rise and the high temperature set point is reached, the system reacts by shutting down power to the range prior to suppression system release. When this occurs, the unit's internal alarm is activated so that occupants are notified that the system is working to prevent further escalation of a potential fire. This is considered two stages of pre-suppression, where the unit is interacting with the cooking environment - working to minimize the risk of a fire event

      Should temperatures continue to rise, fire is present. The fusible links will melt, mechanically actuating the suppression system and releasing a low PH wet chemical agent across the cook-top. At actuation, the system will also make a second attempt to shut down power to the range; in the event of a flash-fire, or something that happens too quickly to register with the temperature sensors. The system will continue to sound its internal alarm while also communicating a "fire code" back to a monitored alarm panel.

      The PLC Self-Monitoring-System also monitors the entire suppression assembly for completeness and continuity. If the suppression system is ever compromised through a loss of pressure or broken connection, or tampering of any kind, the unit reacts by shutting down power to the range. In this case the suppression system is compromised therefor the range shouldn't be in use. Under this condition, the system communicates a separate "maintenance code" saying that the unit is down and needs service. When preemptive shutdown occurs, the system and the cooking equipment will not come back on-line until the GRRS is reset.

F. Options
   1. Manual Pull Station (MPK) – Mechanical assembly allowing the fire suppression system to be actuated manually normally located at the point of egress.
   2. Powder Coating (PC) – The hood system can be powder coated in a variety of standard colors, the manufacturer can also color match.
   3. NFPA101 Upgrade (NFPA101) – Combines MPK, CLBX and an upgraded fan to deliver >500cfm in order to comply with the requirements of the NFPA Life Safety Code.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment and controls shall be installed in accordance with manufacturer's recommendations. Installation, adjustments and starting shall be done under supervision of manufacturer's representative.

B. All ductwork and equipment shall be installed in a neat and workmanlike manner in accordance with the guidelines of NFPA 90-A, SMACNA and the best practice of the trade.

C. Provide manual firestats, set at 125 degrees F, in return inlets of all fans and blowers and all exhaust fans of 600 cfm and over.

D. Upon completion of the installation of all work and equipment the Contractor shall start all equipment and make all necessary tests and adjustments to place entire heating, ventilating and air conditioning systems in a satisfactory condition for continuous safe operation of facilities.

END OF SECTION 233000

SECTION 260500 - ELECTRICAL GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, tools, materials, fixtures, equipment, accessories, transportation, etc., required for complete electrical lighting and power systems, complete with necessary auxiliaries as indicated on drawings and as hereinafter specified.

B. The GENERAL CONDITIONS of the Contract and Architectural Drawings and Specifications shall apply to all work under this Section. Separation of Specifications into Sections is for convenience only and is not intended to establish limits of work or liability. The following are the Sections that apply to this project.

260500 - Electrical General
260600 - Electrical Materials and Methods
263213 – Emergency Generator
265000 - Lighting Fixtures
270500 – Telecommunication and Video Distribution Systems
283000 – Fire Alarm System

C. In general, the work shall consist of the following installations:

1. Panelboards, feeders, switches and complete systems per plans.
2. Power wiring to all mechanical and air conditioning equipment.
3. Electrical lighting and appliance systems complete with wiring, fixtures and lamps.
4. Wiring and connections for equipment indicated on Architectural drawings.

D. Prior to submitting quotation for electrical work, Contractor shall visit and examine the job site in order to become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed.

E. It is the intent of these specifications that in all particulars, the materials and workmanship shall conform to the best practice and that the equipment and accessories as furnished and installed shall be complete and ready to operate.

F. All materials shall be new, except where otherwise indicated, and shall conform with the standards of underwriters' Laboratories in every case where such a standard has been established for the particular type of material in question.

G. The drawings showing the layout of electrical work indicate approximate location of the outlets, receptacles, panelboards and other electrical equipment, unless noted otherwise. The runs of feeders and branches are schematic only and are not intended to show the exact routing of conduits. The final determination of the routing shall be governed by structural conditions, other conditions and other construction. The Contractor shall consult all drawings which may affect the location of any outlet, apparatus, or equipment to avoid possible interference and any reasonable changes in the location of an outlet, apparatus or equipment, up to the time of rough-in, is reserved by the Architect, and any minor deviations shall be made without additional cost. It shall be the Contractor's responsibility to see that all equipment such as junction boxes, panelboards, switches, and other apparatus, as may require maintenance from time to time, are made easily accessible. Although the location of the equipment may be shown on the drawings, the construction may disclose the fact that such location does not make its position readily accessible, in which case the Contractor shall

call the Architect's attention to the condition before advancing the construction to a point where a change in location would require additional cost.

1.2 MEASUREMENTS

Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories necessary. The Contractor shall carefully investigate structural conditions, walls, furring and chase locations and room finishes and shall make actual measurements on the job so that the panelboards, switches, receptacles, lighting fixtures and accessories shall fit.

1.3 LAWS, CODES AND PERMITS

A. Latest edition of the following listed established standards constitute part of the specification requirements.

National Electrical Code, 2005 (NFPA No. 70)
Applicable State Requirements
Underwriters' Laboratories (UL)
Electrical Testing Laboratories (ETL)
American National Standard Institute (ANSI)

B. The Contractor shall apply for all permits and pay all fees incidental to the carrying on of the electrical work. This Contractor shall give notice to the Architect in ample time for the work to be inspected and approved as it progresses and no work shall be concealed until inspected and approved by Architect, should the plans or these specifications in any way conflict with the Code, or State Rules, these latter are to be followed, without expense to the Owner, but the Architect shall be notified of this condition and approval secured before changes are made.

C. Upon completion of the installation, a certificate of approval from the Electrical Inspection Department having jurisdiction thereon shall be furnished to the Owner, and all fees paid by the Contractor. The certificate of inspection shall not release the contractor from any defects to material, workmanship or installation, should any develop within one (1) year after final acceptance of the work.

1.4 JOB CONDITIONS

A. Accompanying drawings, including plans, details, diagrams, notes, etc., are shown to limit and explain structural conditions, construction requirements, sizes, capacities and method of installation and erection. Structural and other conditions may require certain modifications and adjustments from conditions shown. Such deviations are permissible; however, specific sizes capacities and requirements affecting the satisfactory performance and operation of the installation shall remain unchanged. Make allowance for normal job conditions and interferences.

B. Ask for details whenever uncertain about method of installation. Lack of details not requested shall not excuse improper installation and correction shall be responsibility of the Contractor.

C. Schedule and perform all electrical work to avoid delays to the Contractor and other trades.

D. All piping, conduits, conductors and other electrical items in way of construction, shall be rerouted, relocated or otherwise adjusted to work out with such construction or changes

shown or specified in any or all of various sections of specifications. Unknown electrical devices that are encountered will be referred immediately to Architect for method of disposition before continuation of work.

E. The Contractor shall review the architectural drawings to become familiar with the phasing of construction required for this project.

PART 2 - PRODUCTS AND INSTALLATION

2.1 APPROVALS

A. Name of manufacturer or catalog numbers are mentioned herein in order to establish a standard as to design and quality. Other products similar in design and of equal quality may be used if submitted to the Architect and approved by him.

B. Within thirty (30) days after award of General Contract, Contractor shall submit complete dimensional shop drawings and descriptive literature covering the following equipment and materials. Written approval thereof must be obtained before ordering or installation.

Panelboards	Wiring Devices and Plates	Conductors
Safety Switches	Lighting Fixtures	Generator & ATS

C. Comply with requirements of Division 1 Sections regarding submittals, number of copies, and procedures.

2.2 PROTECTION OF FIXTURES, MATERIAL AND EQUIPMENT

A. Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss, except as may be caused by agents or employees of the Owner. He shall adequately protect adjacent property as provided by law.

B. Conduit openings shall be capped or plugged during installation. Fixtures and equipment shall be tightly covered and protected against dirt, moisture, chemical and mechanical injury. At the completion of the work, the fixtures, material and equipment shall be thoroughly cleaned and delivered in condition satisfactory to the Architect.

2.3 CUTTING, PATCHING, AND SEALING

A. All cutting and patching for the work of this Section shall be in accordance with the requirements of the GENERAL CONDITIONS. The Contractor shall perform all necessary cutting and patching required for the installation of work. Where floor or roof is cut or penetrated the structural integrity shall be maintained or restored. Cutting of structural members is prohibited except with prior approval of the Architect.

B. Penetrations of all walls, floors, and ceilings shall be sealed with a material capable of preventing the passage of flames and gases in accordance with the requirements of the test standard ASTM-E-814 for fire stops. The integrity of the fire rating, as indicated on the architectural drawings, shall be maintained. See Sealant Specification for materials.

2.4 CLEANING UP

A. This Contractor shall promptly remove from the jobsite all debris, surplus and waste materials, empty crates and cartons resulting from his work.

B. This Contractor shall remove all oil, grease or other stains resulting from his work performed in the building or the exterior thereof.

2.5 TESTING AND BALANCING

A. Make tests which may be required by the Owner or the Architect in connection with the operation of the electrical system in the building.

B. Balance all single phase loads connected to the panelboards in the building to insure an approximate equal division of these loads on main secondary power supply serving building.

C. All tests shall be made in accordance with the latest standards of the IEEE and the NEC.

D. The installation shall be tested for performance, grounds, and insulation resistance. "Megger" type instrument shall be used. Circuit continuity tests and operational tests on all equipment furnished and/or connected by him shall be made by the Contractor after such equipment has been installed.

E. The tests shall be made in the presence of the Architect or his representative. The Contractor shall notify the Owner or his representative. The Contractor shall notify the Owner and the Architect at least seventy-two (72) hours in advance of tests. The Contractor shall provide all testing equipment and all costs shall be borne by him. Written reports shall be made of all tests. All faults shall be corrected immediately.

F. Refer to the Electrical Feeder Diagram on the drawings and the NEC section 517 for additional testing required.

2.6 PAINTING

A. Contractor shall touch-up or refinish all items of electrical equipment furnished with a factory finish coat of paint and which may have been damaged regardless of cause.

B. All electrical equipment such as switches, panelboards, motor controllers, etc., shall be suitably identified with micarta nameplates.

C. See PAINTING SECTION for painting by others.

2.7 GUARANTEE

Upon completion of all tests and acceptance, the Contractor shall furnish the Owner a written guarantee covering all electrical work under this Contract for a period of one (1) year from date of notice of final acceptance. Upon notice from the Owner, Architect or the Consulting Engineer during the Guarantee period, the Contractor shall replace defective materials and correct faults of workmanship and repair any damage caused thereby promptly and free of any charge. Fuses and lamps are excluded from the guarantee.

2.8 CONTRACTOR'S QUALIFICATIONS

The Contractor, bidding on this portion (Electrical Division) must be licensed to perform such work as required by State and Local laws.

2.9 DIRECTORY CARDS, NAMEPLATES AND EQUIPMENT LABELS

Provide in the directory frame of each panelboard and for each feeder switch or circuit breaker, neatly typed directory cards indicating the general area and type of electrical load.

2.10 SUBSTITUTION

A. All specified material, equipment, fixtures, etc., entering into the work under this section of contract are subject to the prior approval or disapproval of the Architect. Refer to Division 1 Sections for approval procedures.

B. Materials, equipment, fixtures, etc., herein named or indicated on drawings establish the type, size, appearance and quality required of products other manufacturers must meet to be acceptable.

C. Requests for substitutions must include necessary data to conclusively demonstrate equality in type, size, appearance, quality, etc. Any deviation in the opinion of Architect may be cause for rejection.

2.11 TEMPORARY POWER AND LIGHTING

A. The Contractor shall make all necessary arrangements for furnishing a temporary power supply with service as required by the General Contractor and various Sub-contractors employed in connection with the work to be performed on the job site. The Contractor shall cooperate with other Sub-contractors to insure that adequate power and lighting service is available at all times during the progress of the work.

B. The Contractor shall include in his price all fees, assessments and permit costs for the new electrical service.

2.12 CONNECTIONS TO MECHANICAL EQUIPMENT

A. All power wiring associated with the MECHANICAL DIVISION of these Specifications shall be as specified in the Electrical Division.

B. All HVAC control wiring shall be as specified in the Mechanical Division.

C. Overload elements in all starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the Contractor who has furnished the particular starter. Starters, for motors furnished by Mechanical Contractor, shall be furnished by Mechanical Contractor.

D. All manual starting switches shall be furnished and installed by Electrical Contractor.

E. All disconnect switches shall be furnished and installed as indicated and as required by the Electrical Contractor.

F. All firestats will be furnished and set under the MECHANICAL DIVISION electrically connected in the branch circuit wiring by the Electrical Contractor.

G. Refer to MECHANICAL DIVISION and to MECHANICAL PLANS for any additional electrical work required.

H. Should the Mechanical or any other Contractor desire to use equipment requiring larger motors than those indicated on the drawings or equipment requiring more elaborate controls than the equipment described in these specifications, the responsible contractor shall reimburse the Electrical Contractor for any extra materials or labor furnished.

I. All wiring and interconnections necessary for speed controllers on exhaust fans shall be furnished and installed by the Electrical Contractor.

2.13 CONNECTIONS TO ARCHITECTURAL EQUIPMENT

A. Coordinate all rough-in for all equipment specified by Architect. All mounting heights and locations shall be determined from shop drawing submittals prior to rough-in.

2.14 NEW SERVICE TO BUILDING

A. This Contractor shall make arrangements for the provision of the required service and shall pay all fees and assessments.

B. All arrangements of service installation shall comply with requirements of the contract documents and approval of Utility Provider. Contractor shall coordinate with Utility Provider for the provision of all raceways, manholes, and points of termination as shown on the contract documents prior to installation. Any conflict shall be brought to the attention of the Architect and Consulting Engineer immediately.

END OF SECTION 260500

SECTION 260600 - ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

Applicable items of this Section shall apply to all sections of ELECTRICAL.

PART 2 - PRODUCTS AND INSTALLATION

2.1 METHODS OF WIRING

A. No wire shall be smaller than No. 12 except those for fixture drops and for control circuits of equipment. All wire shall have 600-volt insulation equivalent to type THHN/THWN unless otherwise noted on the drawings.

B. All wiring shall be run in conduits sized as shown on the drawings and as herein after specified. Conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet or junction boxes.

C. Homeruns to panelboards may be collected in one or more conduits provided all circuiting is done in accordance with Code requirements and the maximum unbalanced current does not exceed the capacity of the neutral conductors.

D. Powdered soapstone or approved pulling compound shall be used as a pulling lubricant for all non-lead covered conductors.

E. All empty conduits installed shall contain a #14 fish wire.

F. Conduit sizes shall conform to the requirements of the National Electric Code and/or sizes shown on the drawings. Minimize size conduit shall be ½".

G. No conduit shall be routed within concrete floor slabs, except as required to serve floor boxes where shown on the drawings. Where required for power/data service to floor boxes, conduit in slab shall be ¾" PVC. Conduit shall be installed in accordance with requirements of Structural Engineer and shall exit floor slab at nearest wall or to accessible ceiling space below. No more than 10 feet of conduit shall be allowed in floor slab per location. Vertical penetrations of concrete slabs shall be sleeved and sealed. Where conduits turn out of slab, conduits shall be transitioned to rigid steel conduits. PVC conduits are not allowed to pass thru slab. In area below a distribution panel, contractor shall provide enhancement of reinforcing as required by structural engineer. Size and location of all sleeves are subject to the approval of the structural engineer. Conduits routed below the first floor slab shall be Schedule 40 PVC, supported using 3/8" stainless steel threaded rods. Supports shall be spaced in accordance with NEC-346-12. Any exposed conduits on exterior of building, shall be heavy wall hot dipped galvanized rigid conduit.

H. Underground conduits for branch circuit conductors shall be Schedule 40 PVC direct buried minimum 24" below grade. Sweep elbows shall be galvanized rigid steel, or Schedule 40 PVC encased in concrete. All underground conduits shall be installed with metallic marker tape buried 12" below grade, directly above conduit, and continuous for entire length of conduit.

I. Conduits in metal stud walls, exposed within mechanical and electrical rooms, and above ceilings shall be EMT. Conduits in hollow cmu walls shall be EMT with concrete tight set screw fittings. Conduits in solid, infilled cmu walls shall be Schedule 40 PVC.

J. Aluminum conduit may be used in lieu of steel conduit in sizes over 2" provided same does not run underground or in or passing through concrete.

K. All raceways shall be concealed unless otherwise indicated.

L. All conduit and tubing shall be Armco, Plastic Wire & Cable, Steelduct, Republic, Allied, or approved equal.

M. Branch circuit conduits feeding outlets in masonry walls shall be concealed in masonry. Where outlet boxes are indicated in bare masonry walls, the box shall be mounted so that two edges of the box or plaster cover will fall in a mortar joint. Where switchboxes will not accommodate the number of conductors required and 4" square or larger boxes are installed, the device covers shall be manufactured by Steel City Manufacturing Co., or Appleton, 1" minimum in depth, with straight rectangular openings for drywall construction. Where grouting is required to fill up improperly cut openings in the masonry, the work will be rejected. Electrical Contractor shall cooperate with the bricklayer to insure a neat and workmanlike job.

N. Solderless Fixed spring connectors (T & B 10-100, Ideal wrap-cap, or equal) shall be used for all branch circuit wiring and fixture connections on all conductors #10 AWG and smaller. Split bolt or 2 bolt connectors (T & B 6 HPW, O-Z Gedney PMX, or equal) shall be used for connections and splices on all conductors #8 AWG or larger.

O. Connections to all motors not equipped with a portable cord shall be made with a short piece of flexible metal conduit between rigid conduit system and motor terminal box. Ground bond of separate copper conductor shall be made between motor frame and rigid conduit system. In all outdoor locations, liquid tight flexible metal conduit shall be used.

P. All recessed fixtures, unless they contain a box approved for THW wire shall be wired with THHN, in four feet (4') of flexible metal conduit from a box at least one foot (1') from the fixture. Not more than two individual or two rows of continuous fixtures shall be connected to any one of these outlet boxes. This box shall be located above the ceiling and shall be accessible by removing fixture. Installation of blank covers on ceilings to provide access to such boxes will not be acceptable.

Q. Splices in all low voltage wiring shall be made at terminal blocks furnished with the equipment. At junction boxes or where other splices are required, these splices shall be soldered.

R. Other routings than those indicated may not be used without the approval of the Architect, but Contractor shall make allowance for possible obstructions to routes indicated. Conduits shall be grouped together and run on common hangers parallel to building lines in areas of open ceilings.

S. Surface mounted raceways shall be 2-piece, steel, with all fittings and mounting hardware necessary for complete installation.

2.2 WIRING IN RACEWAYS

A. Conduit sizes shall conform to requirements of the National Electrical Code and/or sizes shown on drawings.

B. It is not mandatory that all conduits be routed as shown on the drawings. Other routings facilitating speed and ease of installation may be used, provided the general intent of these specifications is followed and the specific intent of the particular circuit or circuits and the National Electrical Code are not violated; such changes and must be approved by the Architect before work is done. Contractor shall make full allowances for possible obstructions to these routes, as no extra charges will be allowed for added lengths that may be necessary.

C. Conduits shall be installed in a neat appearing manner and shall be rigidly secured in place. The use of wooden plugs in masonry or concrete as a base to fasten raceways will not be permitted. Approved anchors only shall be used for this purpose. Exposed conduits shall be installed with runs arranged parallel or perpendicular to walls and ceilings, with rigid angle turns consisting of symmetrical bends, condulets and junction boxes. Bends and offsets shall be held to a minimum. Conduits shall be kept at least six (6") inches from parallel runs of hot piping flues, or other hot objects.

D. Conduits shall be cut with a hacksaw; ends must be square, threads cut and cleaned before reaming. Conduits must be securely fastened to all outlet and junction boxes with two locknuts and one bushing of approved make, care being exercised to see that full number of threads project through to permit bushings to butt up tight against the end of the conduit, after which the locknuts shall be screwed tight. Conduit shall be joined by approved conduit couplings and shall have ends butted in all cases where couplings are used. Use three piece threaded electrical unions where standard couplings cannot be used. The use of running threads will not be permitted. Where condulets cannot be joined by standard thread couplings, approved type conduit unions shall be used. Connectors and couplings for electric metallic tubing shall be of the set screw type. Couplings for rigid heavy-wall conduit shall be of the threaded type.

E. Conduit fittings shall be Crouse-Hinds or Appleton grounding type, or approved equal.

F. Insulated bushings shall be provided for all conductors #4 and larger.

G. No wire shall be pulled in until the conduit system is complete and plastering dried. This does not include the white finish coat of plaster.

H. During Construction, all outlet boxes and conduit stub-ins shall be suitably protected against the entrance of foreign material.

2.3 BOXES AND FITTINGS

A. Boxes and fittings shall conform to requirements of Article 314 of the N.E.C.

B. Junction and pull boxes required by field conditions shall be installed whether indicated on drawings or not

C. The location of outlets not specifically dimensioned on the drawings should be considered as approximate only. The Contractor shall study the general plans with relation to the spaces surrounding each outlet in order that his work fit the work of others so that when fixtures or other fittings are installed, they will be symmetrically located according to design requirements.

D. Use only galvanized outlet and junction boxes, conduit fittings, covers, and supports for interior wiring and cast fittings and boxes with gasketed covers for exterior wiring. The Contractor shall provide all necessary structural supports for boxes and cabinets. Kindorf or Unistrut channels shall be used where applicable.

E. Boxes for concealed outlets shall be 4" square by 1-1/2" deep, or larger, with raised device covers as required, except that 2-3/4" deep switch boxes may be used where only one conduit enters a box.

F. Boxes for concealed ceiling outlets shall be 4" octagonal by 1-1/2" deep, or larger. Boxes in plaster ceilings shall have plaster covers. Fixture outlet boxes shall be equipped with fixture studs secured to the boxes.

G. Outlet boxes for exposed work shall be 4" square by 1-1/2" deep, or larger. Boxes shall have Appleton ½" deep surface metal covers to accommodate the devices indicated, or approved equal.

H. In walls or ceilings of concrete, tile or other non-combustible material, boxes and fittings shall be so installed that the front edge of the box or fitting will not set back of the finished surface more than ¼". In walls or ceilings constructed of wood or other combustible material, outlet boxes and fittings shall be set flush with the finished surface.

I. If a fixture, canopy or pan is used as an outlet box cover, any combustible wall or ceiling finish between the edge of the canopy and the outlet box shall be covered with non-combustible material.

J. Fixture studs shall be installed in all fixture outlets. In each case, the maximum permissible number of conductors shall be reduced by one.

K. Appropriate galvanized blank covers, subject to approval of the Architect, shall be installed over outlet or junction boxes which do not house a device. Multiple devices shall be installed in one-piece multi-gang box with one-piece multi-gang cover plates. On surface mounted switch and receptacle outlets, provide raised covers to permit mounting devices without additional device plates.

L. For junction and pull boxes, 14 gauge or thicker sheetmetal. Attach covers by means of ¼" X 20 round head machine screws. In damp locations, provide rubber or neoprene gaskets.

M. Attention is called to National Electrical Code, Article 314, Paragraph 314-16, Sub-paragraph (a) and (b) relative to allowable number of conductors in outlet boxes. Contractor shall make provisions to prevent overcrowding outlet and junction boxes regardless of number of conductors shown on the drawings at the outlets. There shall be no deviations from Code requirements on this subject.

2.4 CONDUCTORS

A. All conductors shall be copper and no wire shall be less than #12 AWG except as otherwise noted herein and or indicated on drawings.

B. All conductors, except as herein noted and/or as indicated on drawings, shall have 600 volt insulation type THHN/THWN. Wiring through channels of continuous surface or suspended fluorescent fixtures shall be Type RHH, or THHN.

C. Recessed fluorescent fixtures shall be fed with type THHN, or RHH conductors and recessed incandescent fixtures shall be fed with Type THHN conductors.

D. Conductors #8 and larger shall be stranded. Feeders shall be of the size and type indicated on drawings.

2.5 GROUNDING

A. Grounding shall conform to the requirements of Article 250 of the N.E.C.

B. Contractor shall provide grounding system indicated on drawings.

C. The steel conduit systems and the neutral conductors of the wiring systems shall be grounded at the service equipment. The copper service ground conductors shall be extended in conduit from the services to as near as practicable to the point of entrance of the water service. Where the conduit routing is via finished areas, it shall be run concealed. Ground connection shall be visible, and connection of conduit and conductors to the water pipe shall be made with an approved ground connector, conduit hub, and water pipe clamp.

D. A grounding conductor shall be provided in all conduit. The grounding conductor shall be green insulated, with a minimum size of #12 AWG, or as indicated on the drawings or per NEC-250. Grounding conductors routed entirely in soil as part of the ground loop shall be bare copper. The grounding conductor connecting the electrical service to the ground system shall be green insulated copper.

E. The above requirements shall be supplemented by ground to ¾" diameter, 10'-0" long driven copper bonded ground rods as shown on the drawings.

F. Bond jumpers shall be used around concentric or eccentric knockouts on service equipment.

G. Grounding pole of each polarized receptacle shall be bonded to its outlet box with copper wire and machine or self-tapping screw.

2.6 EQUIPMENT SUPPORTS

All electrical switches, panels, appurtenances, etc., shall be rigidly supported on Unistrut, Kindorf or equal steel framing which shall be securely fastened to walls, floors, ceilings, etc., as required. Details of framing must be submitted to Architect for approval before installation.

2.7 WIRING DEVICES

A. Devices shall be Specification Grade as manufactured by Leviton, Hubbell, P & S, or approved equal. Provide red colored receptacle where connected to emergency circuit. All emergency circuits shall be labeled on receptacle face plate.

B. All devices listed below may not necessarily be used.

C. Comparative catalog numbers of devices shall conform to the following: (All devices listed may not be used).

1. Duplex receptacle, 20A, 125V, NEMA 5-20
   Hubbell CR5362
   Leviton 5362
   P & S 5362

2. Duplex receptacle, GFI, 20A, 125V, NEMA 5-20
   Hubbell GF5362
   Leviton 6899
   P & S 2091

3. Simplex Receptacle, 30A, 125V, NEMA 5-30
   Hubbell HBL 9308
   Leviton 5371
   P & S 3802

4. Toggle switch, 20A, 120-277V, SPST
   Hubbel CS1221
   Leviton 1221-2
   P & S 20AC1

5. Toggle switch, 20A, 120-277V, DPST
   Hubbell CS1222
   Leviton 1222-2
   P & S 20AC2

6. Toggle switch, 20A, 120-277V, 3-way
   Hubbell CS1223
   Leviton 1223-2
   P & S 20AC3

7. Toggle switch, 20A, 120-277V, 4-way
   Hubbell CS1224
   Leviton 1224-2
   P & S 20AC4

8. Toggle switch, 20A, 120-277V, pilot light
   Hubbell HBL 1221 PL
   Leviton 1221-7LI
   P & S 20AC1-RPL

9. Incandescent dimmer switch, 120V, 1000W
   Hubbell S11W
   P&S LS1000PW

10. Fan switch, dual control fan and light switch to be supplied by same manufacturer as ceiling fan.

11. Occupancy sensor switch, 20A, 120-277V
    P&S WSP200
    Hubbell WS1277W

12. Duplex Weatherproof – GFI with WP cover.

13. Special Receptacles –
    (250V, 2 pole, 3 wire, 50A) NEMA 6-50R
    (250V, 2 pole, 3 wire, 30A) NEMA 6-30R
    (250V, 2 pole, 3 wire, 20A) NEMA 6-20R

14. Floor Boxes – stamped steel, fully adjustable, shallow rectangular box with 2 compartments (1 for duplex receptacle and 1 for telecommunications), brass trim ring with duplex flap covers, Hubbell B2422/S3825. Provide carpet flanges where required.

D. All receptacles shall be mounted with the grounding connection at the top. All receptacles shall be provided with child safety insulated inserts.

2.8 DEVICE PLATES

A. Wall plates shall be of the one-piece type, .100" smooth nylon of color as determined by Architect. Plates shall be of the same manufacturer as devices furnished.

B. Use Multi-gang plates where switches are grouped.

C. Plates shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will NOT be permitted. Plates shall be installed with an alignment tolerance of 1/16" from the vertical or horizontal. Plates for devices fed with exposed conduit shall be as hereinbefore specified.

D. Device plates shall not be installed until painting is completed. Device plates having paint on their surfaces, or having their finish marred by use of paint remover, shall be replaced at no additional cost to the Owner.

E. Where device is located outdoors or specified as weatherproof, use cast aluminum box with cast aluminum cover listed for wet location when cover is closed (NEC 410-57(b) exception)

2.9 MOUNTING HEIGHTS

A. If not otherwise indicated in Architectural or Electrical drawings, mounting heights to centerline of outlets shall be as follows:

B. Receptacles - 18” above finished floor except above counter where indicated, or as directed by Owner.

C. Light Switches - 48” above finished floor.

D. Panelboard - Not more than 6’-0” from topmost operating handle to floor.

E. Bracket Fixtures - 8’-0” above floor, or where mounted above exterior door, mirror, medicine cabinet, at a height just sufficient to clear the swing of the door or medicine cabinet.

F. The above mounting heights may be adjusted as required to permit bottom or top of plate to align with mortar joints in unfinished masonry walls, provided joints are not raked. Where joints are raked, adjust height as required to insure that center of outlet box will be in center of a masonry unit.

2.10 PANELBOARDS

A. Panelboards shall be constructed with copper or silver plated copper bus bars. Panelboard shall be fully rated (no series rating allowed) with a minimum rating for each panelboard as indicated on panel schedules on the drawings.

B. See drawings for panelboard schedules. Provide 200% neutral bus where indicated. All panels shall have ground bus. Provide contactors where indicated on schedule.

C. Panelboards shall be mounted in suitable electro-galvanized or sherardized, code-gauge, dead front, steel boxes with trim arranged for flush or surface mounting as indicated on drawings. Sufficient space shall be provided for not less than 4” gutters on the sides, top and bottom of panels. The doors shall be fitted with not less than two welded and riveted hinges, fitted with non-removal pins and provided with latches and locks with three (3) keys. Door and trim shall be properly matched and fitted closely by means of welded rebates on the sides of the trim and shall be finished to match surrounding walls or as otherwise directed by the Architect. Directory frame with typewritten directory of circuits under transparent cover shall be provided inside of door.

D. Panelboards shall be so located that its rating will not be reduced by heat from external sources.

E. Circuit breakers shall be bolted to the bus bar, and be quick-make, quick-break, using over-center toggle mechanism. Breakers shall indicate tripped position by assuming the center toggle position. Breakers shall have deion arc extinguisher principle. All two and three-pole breakers shall have single handle and the common trip. No bail handle ties will be acceptable.

E. Panelboards shall be as shown in panelboard schedule and shall be manufactured by Square D (NQ series 240V, NF series 480V), Siemens P series or equal.

2.11 SAFETY SWITCHES

A. Safety switches shall be of the visible blade, heavy duty knife switch type. They shall be of the fused or unfused type as required. Fused switches shall have positive pressure fuse clips. Switches shall be fully interlocked with provision to neutralize the interlock by a screwdriver while under load without interrupting the circuit. Switches shall be complete with insulated base and pressure or solderless lugs. All switches shall be horsepower rated, capable of breaking stalled-rotor motor current at these ratings. Outdoor locations shall have NEMA Type 3R enclosures, indoor locations shall have NEMA 1 enclosures.

B. Switches shall have provision for padlocking in the “ON” or “OFF” positions. Safety switches, as indicated on plans, shall be Square D - F series, Siemens H series or equal.

2.12 FUSES

Fuses utilized shall provide type 2 “no damage” as defined by IEC 947. All fuses shall have a minimum interrupting rating of 200,000 A. Fuses protecting transformers shall be Class J or RK5 time delay. Fuses protecting motor loads shall be Class J or RK1 current limiting. Provide one set of spare fuses for each load protected. Fuses shall be manufactured by Ferraz-Shawmut, Cooper Bussman, or approved equal.

2.13 TERMINATIONS

All termination lugs shall be rated 75 degrees C or higher, and shall be compatible with number and size of wires to be terminated.

END OF SECTION 260600

SECTION 263213 - EMERGENCY GENERATOR

PART 1 - GENERAL

1.1 DESCRIPTION OF SYSTEM

A. Provide a gas fueled generator set to supply electrical power in event of failure of normal supply, consisting of liquid cooled engine, an AC alternator and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified hereinafter.

1.2. REQUIREMENTS OF REGULATORY AGENCIES

A. An electric generating system, consisting of a prime mover, generator, governor, coupling and all controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.

B. The transfer switches must be UL listed for use in emergency systems.

C. The generator set must conform to applicable National Electrical Code and applicable inspection authorities and UL2200 listed.

D. The generator set must be available with the Underwriters Laboratories listing as a stationary engine generator assembly.

1.3. MANUFACTURER'S QUALIFICATIONS

A. This system shall be supplied by GENERAC or an approved equal who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of five years, thereby identifying one source of supply and responsibility.

B. To be classified as a manufacturer, the builder of the generator set must manufacture, at minimum, engines or alternators.

C. The manufacturer shall have printed literature and brochures describing the standard series specified, not a one of a kind fabrication.

PART 2 - PRODUCTS

2.1 ENGINE

A. The prime mover shall be a liquid cooled, natural gas engine of 4-cycle design. It shall each have an 10-cylinder block with a minimum displacement of 6.8 liters.

B. The engine shall be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system providing visual diagnostic means to determine if the system is operating with a normal engine coolant level. The radiator shall be designed for operation in 122 degrees Fahrenheit ambient temperature.

C. The intake air filters, with replaceable element, shall be mounted on each unit. A positive displacement lube oil pump shall provide full pressure lubrication. The engine shall have a replaceable oil filter with internal bypass and replaceable elements. Engine coolant and oil

drain extensions shall be provided to outside of the mounting base for cleaner and more convenient engine servicing. These extensions shall be equipped with ball valves and plugs. A fan guard shall be installed for personnel safety.

D. The engine shall have a battery charging DC alternator with a transistorized voltage regulator. Remote 2-wire starting shall be by a solenoid shift, electric starter.

E. An electronic solid state governor shall control engine speed to maintain alternator frequency. The frequency tolerance shall be held within 0.5% from no load to full load alternator output. Steady state regulation is to be 0.25%.

F. The engine fuel system shall be designed for operation on natural gas.

G. Sensing elements to be located on the engine for low oil pressure shutdown, high coolant temperature shutdown, low coolant level shutdown, overspeed shutdown and overcrank shutdown. These sensors are to be connected to the control panel using a wiring harness with the following features: wire number labeling on each end of the wire run for easy identification, a molded rubber boot or sealed connector to cover the electrical connection on each sensor to prevent corrosion and all wiring to be run in flexible conduit for protection from the environment and any moving objects.

H. Provide the following items installed at the factory:

1. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system.

2. The engine shall have a unit mounted, thermostatically controlled water jacket heater to aid in quick starting. It will be of adequate wattage as recommended by the engine manufacturer. The contractor shall provide proper branch circuit from normal utility power source.

2.2 ALTERNATOR

A. The alternator shall be a 4-pole revolving field type, 12 lead, wired for 120/208 VAC, three phase, 60 Hz rated at 150 kW with brushless, PMG exciters. The stators shall be direct connected to the engines to insure permanent alignment. The stator must be balanced in two planes. The generator shall meet temperature rise standards for Class "H" insulation. All leads must be extended into an AC connection panel. The alternator shall be protected by a main-line circuit breaker and an over excitation protection circuit integral to the voltage regulator.

B. One step load acceptance shall be 100% of engine-generator set nameplate rating and meet the requirements of NFPA 110 paragraph 5-13.2.6. The generator set and regulator must sustain at least 90% of rated voltage for 10 seconds with 250% of rated load at near zero power factor connected to its terminals when equipped with direct or brushless excitation. 300% short circuit current must be selectable on units equipped with permanent magnet exciters. Generators equipped with permanent magnet exciters not allowing the selection of the short circuit current ratings are not allowed.

C. A solid state digital voltage regulator designed and built by the engine-generator set manufacturer must be used to control output voltage by varying the exciter magnetic field to provide + or – 0.25 % regulation during stable load conditions, as well as reactive differential current- compensation between gensets. Should an extremely heavy load drop the output frequency, the regulator shall have an active engine unload (voltage reduction) algorithm. The engine unload algorithm shall reduce voltage at a rate greater than the standard volts per

hertz under-frequency protection. The regulator shall also support Volts per Hertz under-frequency protection.

D. The voltage regulator must contain an overvoltage shutdown circuit to protect the generator and the loads from over-voltage conditions. This circuit shall activate by 115% of rated voltage for 0.75 seconds. On loss of the voltage-sensing signal, the voltage regulator must be capable of shutting down to prevent an overvoltage condition from occurring. This function must not inhibit the generator from supplying 300% short circuit fault current for 10 seconds.

E. A NEMA 1 panel that is an integral part of the generator set must be provided to allow the installer a convenient location in which to make electrical output connections. The generator set manufacturer shall include an isolated neutral lug to insure proper sizing.

F. The electric plant shall be mounted with vibration isolators on a welded steel base that shall permit suitable mounting to any level surface.

G. A thermal-magnetic UL listed main line circuit breaker rated at 600 amps must be mounted in the AC connection panel. A system utilizing a manual-reset field circuit breaker and current transformers is unacceptable.

H. Contact closure to the generator common bus shall be accomplished by an electrically operated (240vdc close, 24vdc trip) contact system located in the power distribution panel of the generator system that is accessible from the exterior of the unit. The contactor shall have mechanical lugs for load-side cable connections. The standard lugs shall accept up to 4 x 250 MCM to 350 MCM per phase.

2.3 CONTROLS

A. The engine-generator set controller shall contain a complete automatic engine start-stop control where a digital signal from a remote transfer switch to the generator initiates the start and stop functions of the engine. A programmable cyclic cranking limiter shall be provided to open the starting circuit after the selected number of starting cycles, latching a shutdown fault. Engine control modules must be solid state plug-in type for high reliability and easy service. All engine alternator controls shall be designed, built, wired, tested and shock-mounted in a NEMA 1 enclosure to each engine-generator set by the manufacturer.

B. The control panel shall have the following features:
   1. Auto/Manual/off key switch
   2. Alarm LED
   3. Not in Auto LED
   4. Alarm Acknowledge Button(on-screen)
   5. Audible Alarm
   6. Emergency Stop

C. Each controller shall include a touch screen LCD interactive RS485 interface to CPU. The Human Machine Interface (HMI) unit shall have at least a 32bit processor operating at 66 MHz with a memory capacity of 128kB. The display shall be at least 5.7” with a resolution of 320 x 240.The operator interface shall provide a minimum of:
   1. 30 pages of information with 10 items per page
   2. Diagnostics through operator interface display or remotely via GenLink, Generac software.
   3. Display of required preventive maintenance intervals

D. The touch screen shall display all pertinent unit parameters including:
   1. Generator Status Current; unit status in real time
   2. Engine operating conditions to include;
      Real time readouts of the engine and alternator analog values

Oil pressure and optional oil temperature
Coolant temperature and level
Fuel level (where applicable)
Engine speed
DC battery voltage
Run time hours
Generator voltages, amps, frequency
Power factor

3. Generator Commands; Current engine start/stop status
4. Alarm Status to include;

Current alarm(s) condition
Low or high AC voltage
Low or high battery voltage
Low or high frequency
Pre-low or low oil pressure
Pre-high or high oil temperature (optional)
Low water level and temperature
Pre-high or high engine temperature
High, low and critical low fuel levels (where applicable)
Overcrank
Over and under speed
Unit not in "Automatic Mode"

5. Alarm Log; Memory of last twenty alarms with date and time stamps
6. Operating parameters; Access to and manipulation of the current operating parameters and alarm limits shall be via Generac GenLink software. The PC based software can be utilized for the standard RS232, RS485 or modem. The software must display the module face, be updated in real time and allow for complete access to all module functions.

2.4 AUTOMATIC TRANSFER SWITCH

A. The automatic transfer switch(s) shall be Generac standard product or approved equal. Generac transfer switches are designed to interface directly with the generator permissive and load shed requirements. Included are the two-wire start output, terminals for the permissive/enable signals and trip-to-neutral function terminals. However, if third party transfer switches are used, they shall provide a two-wire start to the generator when a utility outage occurs. Additionally, third party switches shall be capable of being inhibited by the generator (prevented from switching load to emergency until permissive is invoked) permissive output, until adequate generator power is available. Ideally, if generator failure should occur during emergency operation, third party switches should be able shed load via trip to neutral feature. The advantage is the switch goes to a neutral position, the load is shed and does not re-close to utility that may have a fault present. The minimum alternate to that would be to shunt trip load breakers to shed enough non-essential load to prevent the system from shutting down. The disadvantage is the shunts have to be reset manually. Be sure to contact Generac engineering to discuss the details on the scope of the project and functionality of third party switches prior to finalizing any design specifications. ATS shall be rated 600 amps, 120/208 Vac, 4 pole switched neutral design. Nema 3R Enclosure.

2.5 ADDITIONAL UNIT REQUIREMENTS

A. Each unit shall have equipment installed at the engine-generator set manufacturer’s facility as hereinafter specified.

B. Provide an automatic dual-rate battery charger manufactured by the engine-generator set supplier. The automatic equalizer system shall monitor and limit the charge current to 10 amps. The output voltage is to be determined by the charge current rate. The charger must

have a maximum open circuit voltage of 35 volts and be protected against a reverse polarity connection. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

C. A heavy duty, lead acid battery set shall be provided by the generator set manufacturer. The battery shall produce adequate voltage and amperage to start and operate the engine. Provide all inter-cell and connecting battery cables as required.

D. A kit shall be furnished to provide a means for attaching a flexible coupling between the engine radiator and the building cooling air discharge duct.

E. The engine-generator set shall be factory enclosed in a heavy gauge steel enclosure constructed with 12 gauge corner posts, uprights and headers. The roof shall aid in the runoff of water and include a drip edge. The enclosure shall be coated with electrostatically applied powder paint, baked and finished to manufacturer's specifications. The enclosure is to have large, hinged doors to allow access to the engine, alternator and control panel. The doors must lift off without the use of tools. Each door will have lockable hardware with identical keys. Padlocks do not meet this specification.

F. Exhaust silencers shall be provided of the size as recommended by the manufacturer and shall be of critical grade. The silencers shall be mounted on the weather protective enclosure with solid brackets. It shall be connected to the engine with a flexible, seamless, stainless steel exhaust connection. A rain cap shall terminate the exhaust pipe. All components shall be properly sized to assure operation without excessive back pressure when installed.

2.6 FACTORY TESTING AND REPORTS

A. Before shipment of the equipment, the engine-generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:
   1. Verifying all safety shutdowns are functioning properly.
   2. Single step load pick-up per NFPA 110-1996, Paragraph 5-13.2.6.
   3. Transient and voltage dip responses and steady state voltage and speed (frequency) checks.
   4. Perform an emergency standby event to assure the entire system operates as designed and intended.
   5. Verification that the generators start, synchronize and parallel with each other.

PART 3- EXECUTION

3.1 OWNER'S MANUALS

Three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

3.2 INSTALLATION

Contractor shall install the complete electrical generating system including all fuel connections in accordance with the manufacturer's recommendations as reviewed by the Engineer.

END OF SECTION 263213

SECTION 265000 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Applicable items in all other Electrical Sections shall be included in this Section.

1.2 DESCRIPTION OF WORK

A. Contractor shall furnish and install all lighting fixtures as shown in fixture schedule and at locations indicated on drawings. This includes all fixtures with lamps, necessary supports, etc., for a complete and safe installation, along with wiring and connections thereto. Where fixture model number and description differ, fixture description shall be followed.

B. All recessed fixtures installed in plaster ceilings shall be furnished with metal plaster frames.

C. Contractor shall advise General Contractor as to the exact location of all recessed fixtures so that ceiling construction and/or joist spacing may be coordinated as necessary to permit symmetrical positioning of fixture in each room.

D. In acoustical tile ceilings, recessed fluorescent fixtures shall be installed so as to alleviate the necessity for cutting the tile.

E. Trims of all recessed fixtures shall be installed in a neat and workmanlike manner so as to fit tightly and evenly against the surface of the ceiling. Adapters shall be installed to compensate for slope ceilings.

F. For acoustical tile ceilings, surface fixtures shall be centered on a tile or a tile joint, unless noted otherwise.

PART 2 – PRODUCTS

2.1 BALLASTS

A Ballasts for operation of all fluorescent lamps shall be HPF Electronic with Class A Sound Rating.

B. Fluorescent ballasts for operation of T5HO rapid start lamps shall be electronic high-efficiency type with the following characteristics:

1. Operate multiple lamps as parallel circuit, operating remaining lamps at full light output upon failure of other lamps connected to the same ballast.
2. Operate at rated circuit voltage, at an input frequency of 60 Hz, and tolerate +/- 10% sustained voltage variation without damage to the ballast, and maintain light output at +/- 10% voltage variation.
3. Comply with EMI and RFI limits set by the FCC (CRF 47 Part 18) for non-consumer applications and not interfere with normal electrical equipment.
4. Power Factor shall be not less than 0.95.
5. Total Harmonic Distortion shall be less than 10%.
6. Lamp Crest Factor shall be 1.7 or less.

7. Withstand transients shall be as specified by ANSI C.62.41 for location category A.
8. Shall comply with applicable ANSI standards.
9. Shall be provided with a three (3) year warranty.

C. Individual ballasts specifically designed and UL Listed are to operate one, two, three, or four lamps as scheduled on the drawings.

D. Ballast Factor shall be greater than 0.85, and sound rating shall be “A”.

2.2 LAMPS

A. Lamps may operate in instant start mode, and shall operate at a frequency higher than 20 kHz.

B. All incandescent lamps shall be furnished inside frosted except where specifically noted otherwise.

C. T5HO fluorescent lamps shall be 46” long, miniature bi-pin, rapid start, 3500 K, 85 CRI, except where specifically noted otherwise.

D. All H.I.D. lamps shall be phosphor coated, wattage as specified in the drawings.

E. Where they are indicated, exit fixtures shall have LED lamps and shall have letters at least five (5") inches high on a metal stencil with a red translucent background. Exit fixtures shall be wall mounted (unless ceiling mounted is required for the particular location) above doors as shown on drawings, and shall be mounted such that viewing angles are maximized.

2.3 MANUFACTURERS

A. Certain items in this Specification are listed by manufacturer and/or manufacturer's model number to establish general style, type, character, and quality of product desired. Similar items manufactured by other than those listed will be considered, providing submittals are made according to substitution requirements of the General Specifications. Where fixture description provided is in conflict with the model number provided, contractor shall provide a light fixture meeting the description, not the model number.

B. See Lighting Fixture Schedule on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures to be installed in or on painted ceilings and/or walls shall not be installed until painting is completed. Fixtures installed with paint applied over factory finishes will be rejected.

B. For any type ceiling which itself does not provide sufficient support for fixtures, support fixtures from structure above. Lay-in troffers in grid type ceilings shall be installed with at least 2 supports on diagonal corners.

END OF SECTION 265000

SECTION 270500 - TELECOMMUNICATION AND VIDEO DISTRIBUTION SYSTEMS

PART I - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

A. Furnish labor, materials, equipment, engineering, training, support, and services, and perform all operations to construct the telephone and data systems and conduit for the cable TV systems, described herein and as shown on the Drawings. This work includes but is not necessarily limited to the following:

1. Telephone System
2. Data System
3. Cable TV System

1.3 SUBMITTALS

A. Shop Drawings: Brochures shall be bound booklets containing manufacturer's catalog sheets encompassing information keyed to the procurement document for each item incorporated in the various systems. Quantity and type of devices required may differ from that shown on the Drawings, depending on manufacturer of product proposed and on actual site conditions. As soon as possible after award of Contract, submit for approval two copies of each of the following:

1. Wiring Diagrams: Provide complete point-to-point wiring diagrams for all systems and subsystems. Show all components in the communications path from the central control through all intervening system components, including terminal boards to the individual end devices. Document associated equipment required to complete a transmission path. The intent of this requirement is to provide a document that will permit end-to-end tracing of the system wire and cabling. Where conductors are grouped into a cable for long site runs, a single line properly identified should be shown. Where these cables fan out for termination, individual wire termination and markings shall be shown.

2. Equipment Locations: Provide drawings that show the elevations for every building, indicating exact locations of all equipment in the system, both new and existing.

3. Detail Drawings: These drawings shall indicate the accurate locations of all equipment associated with each system in respect to architectural and structural conditions. Drawings of components, equipment layouts, and other small-size areas shall be dimensioned to the common scale of 1/2" or 1" per foot. Drawings of larger areas shall be dimensioned to the common scale of 1/4" or 1/8" per foot. Drawings shall include explicit notes on the termination of all conductors and shields for each location. Architectural backgrounds shall be in accordance with the latest architectural drawings and shall be complete with elevations, sections, and details as required to depict the installation. If, upon preliminary submittal of drawings, there are corrections to be made, they shall be made to the drawings and resubmitted for approval without extra cost to the Owner. These drawings shall be approved prior to starting work. The decision of the Owner's representative shall be final on all items. These drawings and changes at completion of the work shall become a part of the Contract Documents.

4. Markings: Submit for approval wire marking, panel label, zone label, terminal strip numbering and terminal strip identification styles, and typical text.

1.4 RECORD DRAWINGS

A. Project Record Drawings shall include all bid drawings and all submittals.

B. The Contractor shall obtain and keep up-to-date and available to the User or its representative complete blue line prints of the project, clearly annotated with "as-built" data as the work is performed; and these drawings shall become part of the requirements for progress payments. This data shall include the following:

1. Routing of signal wire and cables, including the designations assigned to each wire/cable and each terminal strip.
2. Accurate location of all equipment installed under the specifications.
3. A complete equipment list for each functional area.

1.5 AS-BUILT DRAWINGS

A. As-builts shall be the record drawings reflecting all construction through closeout of the work. Drawings shall be transferred to a complete set of full-size, reproducible, front-reading mylars.

B. Service Manuals: As a condition of acceptance of the work by the Owner, the Contractor shall supply three complete sets of record drawings showing the completed work as built, operating manuals and replacement parts lists on each piece of equipment provided, including custom-fabricated assemblies. This information shall be suitably indexed and bound in hardback binders permanently identified on the spine with the caption "SERVICE MANUALS - TELEPHONE AND DATA SYSTEMS".

1.6 SYSTEMS DESCRIPTION

A. Telephone System, telephone/data station outlets, telephone backboards, connecting blocks with accessories, and associated hardware for bundling, racking, terminating, and cross-connecting the cables and wires where shown. Telephone premises distribution outlets and connector block will be Category 6-compliant. Station wiring will be Category 6-compliant. References EIA-TIA-568 Commercial Building telecommunications Wiring Standard, Bulletin TSB-36 (characteristics of high-performance unshielded twisted- pair cable), and Bulletin TSB-40 (specifications of transmission characteristics for connecting hardware to ensure compatibility with high-performance unshielded twisted-pair cable specified in TSB-36). Refer also to "C" below.

B. Data System, comprised of relay racks, patch panels, telephone/data station outlets, ethernet trunk cables linking communications equipment/wiring room distribution frames, connecting blocks with accessories, and associated hardware for bundling, racking, terminating, and cross-connecting the cables and wires where shown. Data premises distribution system shall be Category 6-compliant in every respect. Refer to "C" below.

C. Category 6 cables and connectors are characterized up to 250 MHz and are typically intended for emerging applications with transmission rates up to, and possibly beyond, 100 Mbps, 155ATM, 622ATM and gigabite ethernet.

D. Video riser cable and video cabling to each video outlet.

1.7 CODES AND STANDARDS

A. Building codes and ordinances for public-owned buildings, plus the publications listed below, form part of this document as a minimum requirement. Conform to more stringent requirements where specified herein.

1. FCC Rules and Standards (1972), Part 76, Subpart K.
2. NBS 11-81, Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines.
3. NFPA 70 (1996), National Electric Code, Article 800 Communications Circuits.
4. State and Local Codes.
5. ANSI/EIA 310-C (R1981), Racks, Panels, and Associated Equipment.
6. EIA-TIA-568, Commercial Building Telecommunications Wiring Standard.
7. EIA-TIA-569, Commercial Building Standard for Telecommunications Pathways & Spaces.
8. TSB-36, Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted Pair Cables.
9. TSB-40, Additional Transmission Specifications for Unshielded Twisted-Pair Connecting Hardware.

1.8 CUTTING, PATCHING, AND REFINISHING

The Contractor shall perform all cutting, patching, and refinishing attendant to his work. Contractor shall not cut any structural member without the written approval of the Architect. All patching and refinishing shall match the original work to the satisfaction of the Architect.

1.9 BASIC DESIGN

This Document indicates extent and general arrangement of a system with specific operational requirements. Product size, system components, quantity of cable, and the like required to accomplish these requirements, may vary under actual conditions. It shall be the Contractor's responsibility to verify the correctness of his parts list and equipment model numbers for conformance of each component with manufacturer's specifications, for use of equipment specified in the manner specified, and for conditions as they actually exist on the job site. Equipment not mentioned herein or shown on the Drawing(s), but necessary to meet this requirement, shall be provided without claim for additional payment. These items shall be included on the Contractor/Supplier's initial submittal.

1.10 EQUIPMENT COMPATIBILITY AND COMPLETENESS

While certain equipment items may by themselves meet the equipment specifications, and in fact meet the system specifications when electrically associated with other equipment, the system shall be designed so that the combination of equipment actually employed does not produce any undesirable effects such as signal distortions, noise pulses, glitches, hum bars, transients, RFI, EMI, etc. All such equipment required for compatibility and completeness, whether or not specified, shall be furnished and installed.

1.11 CHANGES IN LOCATION

The Architect reserves the right, before rough-in, to make reasonable changes in the equipment locations indicated without incurring additional cost.

1.12 DISCREPANCIES

Should there be a discrepancy between the Drawings and the Specifications, bring this to the written attention of the Architect at least seven days prior to bid date. Upon failure to do so, Contractor shall accept interpretation of the Architect.

1.13 CONFLICTS

In the event that conflicts occur necessitating departure from Drawings, submit report as soon as practicable for review by Architect. Conflicts shall include hazards and interference by structure or other equipment which preclude the intended installation, operation, and access of the work, in whole or in part. Do not proceed without consent of the Architect.

1.14 PRODUCT STANDARDS

Materials specified by reference to the number, symbol, or title of a specific Standard, such as a commercial standard, a Federal specification, trade association standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the date of Invitation for Bids, except as limited by type, class, or grade, or modified in such reference.

1.15 MANUFACTURER QUALIFICATION

Firm must be engaged in manufacturing a complete line of telephone and/or data products which meet applicable requirements of this section and which essentially duplicate products that have been in satisfactory local use not less than three years in similar service.

1.16 CONTRACTOR QUALIFICATIONS

The firm of its principals shall have a minimum of three years experience in the fabrication and installation of equipment similar to that proposed, and shall, if requested, be able to refer to similar installations now rendering satisfactory service. Firm must have installation and service facilities domiciled within 100-mile radius of project. Offerer's facilities shall be available for inspection by Architect.

1.17 CURRENCY OF EQUIPMENT

Notwithstanding the equipment described herein, Contractor shall supply the latest, most recent version of equipment available as of the date specified for bid opening. All equipment furnished shall be new and unused except Owner-furnished existing equipment marked for reuse.

1.18 WARRANTY

A. For a period of at least one year following acceptance of the work, the Contractor shall, at no additional cost to the Owner, correct any defects arising out of design faults, defective materials, and defective workmanship. When warranty repairs cannot be made within 48 hours of a service request, the Contractor shall make available to the warrantee loaner equipment that will provide comparable service to that intended in this Document. Damage due to misuse, abuse, negligence, or other causes outside the control of the Contractor is excluded from warranty.

B. Any guarantees and warranties by the manufacturer(s) extending beyond the one-year warranty period shall be turned over to the warrantee.

1.19 INSTRUCTION

As a condition of acceptance of the work by the Architect, the Contractor shall provide a minimum of two days of instruction for the benefit of designated representatives of the Owner. This instruction shall be conducted by personnel familiar with the installation, knowledgeable of the

system, and experienced in instruction. Coordinate the instruction of the Owner with the Architect.

1.20 COLOR AND FINISH

Color and finish selections will be made by the reviewer of submittals on those equipment items where "color to be selected" is indicated. Include the manufacturer's standard color chips with submittals. The equipment item's description in the submittal's bill of materials shall include blank space for the reviewer to insert his color and finish selections. The exclusion of color chips from a submittal may be cause for its rejection. Where the colors and finishes offered conflict with adjacent equipment and/or room finishes, the reviewer may select either from Federal Standard No. 595A Matching Colors or from manufacturer's standard colors, i.e., Altec green, IBM blue, etc. Color matches shall be within one NBS unit of measure.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE TYPES

A. From 110 wiring blocks to voice jacks: No. 23 AWG solid, 4-pair plenum rated unshielded twisted pair, polypropylene insulation and PVC jacket. Cable shall be Category 6 – compliant with a nominal capacitance of 15.0 pF/ft at 1000 Hz rated to each voice jack. Cable shall be Commscope Ultra Media #7504 or Belden Data Twist 6 (Part #7882A) with grey sheath.

B. From patch panels to data jacks: No. 23 AWG solid, 4-pair plenum rated unshielded twisted pair, polypropylene insulation and PVC jacket. Cable shall be Category 6 – compliant with a nominal capacitance of 15 pF/ft at 1000 Hz routed to each voice jack. Cable shall be Commscope Ultra Media #7504 or Belden Data Twist 6 (Part #7882A) with a green sheath.

C. Video cable: Coaxial cable shall be RG6U with 100% mylar-aluminum shielding and drain wire. Provide fittings manufactured for RG6U cable.

2.2 TELEPHONE, DATA AND VIDEO JACK PLATES

Two-port voice and data jacks (cat 6) shall be Ortronics OR-S22600 or Siemon MX6-02.

Video jacks shall be standard wall jack with F connector, Ortronics OR-21600 or Leviton 80781.

Individual ports will be identified by use with Ortronics or Siemons tab-insert jack markers according to the following color scheme: white for voice port, grey for data port A and blue for data port B. Station outlets shall use Ortronics OR-40300011 Series II or Siemon MX-FP-S-06-02 face plates.

2.3 VOICE TERMINATION BLOCKS

Voice termination blocks shall be rack mounted 100 pr #110 termination blocks.

2.4 WIRE MARKERS

Wire markers, when applied to their host cables, shall be non-contaminating, non-migratory, and permanent in its intended service and environment.

2.5 I.D. PLACARDS

Coordinate selection of placard stock (phenolic, acrylic, brass, etc.), placard style and color, and caption size and style. Engrave captions on selected stock. Machine-bevel edges of placard, and provide means for permanently attaching placard to equipment.

2.6 INSTALLATION HARDWARE

Installation hardware shall be as required by installation conditions, unless otherwise called for. All clamps, fittings, screws, nuts, washers, hooks, chains, shackles, and related installation hardware shall be electro-galvanized finished. All channels, brackets, hangars, and related materials shall be pre- galvanized with zinc weighing not less than 1.25 oz. per square foot of material.

2.7 GROUND BUS

Provide a telecommunications grounding bus-bar in each of the telecommunications equipment rooms. The bus bar shall be grounded in accordance with EIA/TIA-607 standards and NEC required recommendations.

2.8 SURGE/LIGHTNING PROTECTORS

Provide lightning protectors and wiring blocks for incoming 150-pair cable. Provide ground wires to ground tel/data equipment. Provide AT&T #188ECA1-100G Building Entrance Protector with 4C-S; Solid State, Series Protector Units number required to protect 150-pair cable.

PART 3 - EXECUTION

3.1 GENERAL

A. The fabrication and installation of all work shall be neat. All wire shall be marked and all equipment permanently identified. See "Wire Markers" and "I.D. Placards" under "Product" Section. All boxes, equipment, etc., shall be plumb and square.

B. Furnish and install all necessary cable/associated equipment and hardware, and make-up all connections for a complete end-to-end cable/wire system.

3.2 SAFETY FACTOR

All equipment requiring installation under this Contract shall be permanently held in place. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three. Similarly, reinforce walls and provide backup load distribution plates as required to assure a safety factor of at least three in the installation of wall-mounted equipment.

3.3 ASSEMBLY AND INSTALLATION MATERIALS

Provide and install all materials and equipment required for proper installation and operation of system in order to obtain performance specified herein.

3.4 INSTALLATION OF CABLES

A. Install cable without kinks, sharp bends, or deformations, in such a manner as to prevent abrasion. Do not install cable which shows bruises or shipping damages. Install cable in

continuous lengths except for terminations at jack plates or IDF. Do not splice. Do not install connectors in raceways or in any inaccessible locations.

B. Cables shall be installed in conduit. Cables shall not be routed within 12" of any light fixture or any type of power supply.

C. Terminate cables designated for use by telephone on the respective telephone patch panels. Terminate cables designated for use by Data Systems in the respective data patch panel.

3.5 CABLE/WALL PLATE IDENTIFICATION SCHEME

A. Apply wire markers specified under Product section to both ends of all cable/wire. Identification shall be the same at both ends, and duplication of a code for unrelated circuits shall not occur within the same terminal area.

B. Each telephone cable pair shall be plainly marked at its backboard end on the terminal blocks.

C. Each data cable shall be plainly marked at the patch panel on the patch panel designation strip(s).

D. The outlet end shall be permanently identified on the back side of each outlet connector. Each connector outlet designation shall be identified on the floor plans as part of the as-built drawing.

3.6 CABLE TEST

A. Before the Contract shall be considered complete, the Contractor shall conduct cable test on each telephone and data station cable. Employ LANcat System 6 or equivalent test equipment to verify Category 6 250-mHz performance. Test shall include attenuation, near end crosstalk, length, mutual capacitance, and characteristic impedance. Provide printout of test results to the Architect for each cable prior to the final acceptance inspection. Printouts shall be neatly bound. Each printout sheet shall clearly identify the cable under test. Cables not meeting published Category 6 performance standards shall be replaced with new and retested.

B. Test each pair of the telephone voice riser cable for shorts between conductors, between conductors to shield, and between conductors to ground. Provide report of same to Architect prior to final inspection.

END OF SECTION 270500

SECTION 283000 - FIRE ALARM SYSTEM

PART 1 – GENERAL

1.1 SCOPE:

A. This specification describes a Fire Detection and Alarm system. The control panel, shall be intelligent device addressable, analog detecting, low voltage and modular, with digital communication techniques, in full compliance with all applicable codes and standards. The features and capacities described in this specification are required as a minimum for this project and shall be furnished and installed by the Contractor.

B. The system shall be in full compliance with National and Local Codes.

C. The system shall include all required hardware, raceways, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.

D. All equipment furnished shall be new and the latest state of the art products of a single manufacturer, engaged in the manufacturing and sale of analog fire detection devices for over ten years.

E. The system as specified shall be supplied, installed, tested and approved by the Local Authority Having Jurisdiction, and turned over to the owner in an operational condition.

F. The layouts shown on the drawings are schematic in nature. Exact system layout shall conform to NFPA-72 and the Contractor shall include all required wiring and devices in his bid.

1.2 RELATED WORK:

The following Sections of the Specifications shall apply to this work:

Division 1	Bidding Requirements and Conditions Of The Contract.	
Division 16	Section 260500	Electrical Material & Methods.
Division 15	Section 211300	Fire Suppression System.

1.3 STANDARDS & CODES:

A. The publications listed below form a part of this publication to the extent referenced. The publications are referenced in the text by the basic designation only. The latest version of each listed publication shall be used as a guide unless the Authority Having Jurisdiction has adopted an earlier version.

B. National Fire Protection Association (NFPA) Most current or approved Standard
1. NFPA 13 Standard For The Installation of Sprinkler Systems.
2. NFPA 13A Recommended Practice For The Inspection, Testing And Maintenance of Sprinkler Systems.
3. NFPA 70 National Electrical Code.
4. NFPA 72 National Fire Alarm Code.
5. NFPA 90A Standard For The Installation of Air Conditioning And Ventilating Systems.
6. NFPA 101 Life Safety Code.

C. Underwriters' Laboratories, Inc. (UL) Appropriate “UL” equipment standards.
1. “UL” 864 Control Panels.

2. "UL" 268 Smoke Detectors.
3. "UL" 268A Smoke Detectors (HVAC).
4. "UL" 464 Audible Signal Appliances.
5. "UL" 1971, Standard for Visual Signaling Appliances.

D. Building Codes
1. Standard Building Code and the Standard Fire Code.
2. Uniform Building Code and the Uniform Fire Code.
3. International Building Code and the International Fire Code.
4. NFPA 5000 Building Code.
5. State and Local Building Codes as adopted and/or amended by The Authority Having Jurisdiction.
6. ADA, and/or State and local equivalency standards as adopted by The Authority Having Jurisdiction.

1.4 QUALIFICATIONS OF INSTALLERS

A. Before commencing work, submit data showing that the manufacturer has successfully installed fire alarm systems of the same scope, type and design as specified.

B. The contractor shall submit copies of all required Licenses and Bonds as required in the State having jurisdiction. Contractor shall be licensed by the State of Louisiana Fire Marshall as a Fire Alarm Contactor.

C. Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State if required by law. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation and maintenance.

1.5 SUBMITTALS

A. The contractor shall include the following information in the equipment submittals:
1. Power calculations. Battery capacity calculations. Battery size shall be a minimum of 125% of the calculated requirement.
2. Supervisory power requirements for all equipment.
3. Alarm power requirements for all equipment.
4. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.
5. Voltage drop calculations for Notification circuit wiring runs demonstrating worst-case condition.
6. NAC circuit design shall incorporate a 15% spare capacity for future expansion.
7. Submit manufacturer's requirements for testing Device Loop Card circuits and device addresses prior to connecting to control panel.
8. Complete manufacturers catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.
9. Complete drawings covering the following shall be submitted by the contractor for the proposed system:
   a) Floor plans in a CAD compatible format showing all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code used.
   b) Provide a fire alarm system function matrix as referenced by NFPA 72. Matrix shall illustrate alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at time of bid.

10. Incomplete submittals shall be returned without review.
11. Contractor shall provide all documents required by the State Fire Marshal to review. Documents shall include all calculations and data necessary. These documents shall be sent to the Architect for his forwarding to the State Fire Marshal. This Contractor shall pay all fees associated with the Fire Marshal submittal. No work shall be done until the submittal is approved and returned from the Fire Marshal.

1.6 SYSTEM REQUIREMENTS

A. The system shall be a complete, electrically supervised fire detection and notification system, microprocessor based operating system having the following; capabilities, features and capacities:
1. Single addressable loop
2. 252 addressable initiation device capability as a minimum.
3. Each address shall be capable of supporting one input and one out put, for a total of 504 programmable points on a single loop.
4. Addressable devices shall be polarity insensitive.
5. Addressable devices shall operate on “standard wire” no special twist or shield shall be required
6. 4 notification circuits capable of Style Y (Class B), or 2 notification circuits capable of Style Z (Class A).
7. Optional relays or LED drivers for graphic annunciation.
8. Optional Remote annunciator/control panel.
9. Optional DACT capable of sending point information to a Central Station depending on protocol required by the Central Station.
10. 80-character backlit LCD display with 40 character Customer defined message.
11. Be programmable from system keypad or Laptop computer.

1.7 SYSTEM OPERATION

A. Activation smoke detector or sprinkler water flow switch shall activate the building notification appliances.
B. Activation of any alarm causing devices shall signal the Central Station to an alarm condition, if the DACT is installed
C. Activation of a supervisory device shall sound an audible and light LED at the control panel to signal a supervisory condition.
D. Activation of a supervisory causing device shall signal the Central Station to a supervisory condition, if the DACT is installed
E. Activation of a trouble shall sound an audible and light an LED at the control panel to signal a trouble condition.
F. Activation of a trouble shall signal the Central Station to a trouble condition, if the DACT is installed.

PART 2 – PRODUCTS

2.1 MAIN FIRE ALARM CONTROL PANEL:

A. The FACP shall be a Fire-Lite Model MS-25 or equal and shall contain a microprocessor-based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: HFS or equivalent Fire•Lite intelligent addressable smoke and HFS or equivalent Fire•Lite thermal (heat) detectors, HFS or equivalent Fire•Lite addressable modules, annunciators, Digital Dialer and Ethernet Communicators and other system controlled devices. Ethernet communications shall be via a Fire-Lite Model IPDACT. Central station supervisory equipment shall be a Teldat Corporation Visoralarm-Plus 2U listed to UL-864 standards.

B. Operator Control

1. Acknowledge Switch:

   a. Activation of the control panel Acknowledge switch in response to new alarms, supervisory and/or troubles shall silence the local panel piezo electric signal and change the alarm, supervisory and trouble LEDs to steady-ON mode.

   b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.

2. Alarm Silence Switch:

   Activation of the alarm silence switch shall cause all programmed alarm notification appliances and relays to return to the 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. The FACP software shall include silence inhibit and auto-silence timers.

3. Alarm Activate (Drill) Switch:

   The Alarm Activate switch shall activate all notification appliance circuits. The drill function shall latch until the panel is reset.

4. System Reset Switch:

   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.

5. Lamp Test:

   The System RESET switch shall also function as a Lamp Test switch and shall activate all system LEDs and light each segment of the display.

C. System Capacity and General Operation

1. The control panel shall provide, or be capable of, expansion to 25 intelligent/addressable devices of any type, detector or module

2. The control panel shall include two Form-C programmable relays, which can be used for Alarm, and Supervisory and a fixed Trouble relay rated at a minimum of 2.5 amps @ 24 VDC. It shall also include 2 programmable Notification Appliance Circuits (NACs) capable of being wired as NFPA Style Y (Class B).
   Either programmable Notification circuit shall also be capable of providing auxiliary power when programmed as such.

3. The control panel must have a built in annunciator with three characters of display each consisting of seven segments and feature LED's for AC, General Trouble, Silenced, Ground Fault, Low Battery, Walk Test, NAC 1 and 2 Active and Trouble, and Zones 1 through 5 Alarm, Supervisory, and Trouble. All control and programming keys are a membrane style buttons. The annunciator must be able to silence and reset alarms by opening the cabinet door and pressing SILENCE or RESET once. The annunciators must have an installer code that will allow the limitation of operating system programming to authorized individuals.

3. Modifications to the default panel program can only be accomplished using the embedded web server of the control panel. There are two ways to connect to the panel: connected to an existing network with a DHCP Dynamic Host Configuration Protocol) server present or. plugged in directly to a PC using a standard CAT5e Ethernet cable.

5. The system shall allow the programming of any input to activate any output.

6. The FACP shall provide the following features:

a. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.

b. Detector sensitivity test, meeting requirements of NFPA 72, Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.

c. Alarm verification, with counters and a trouble indication to alert maintenance personnel when a detector enters verification an excessive number of times.

d. Periodic detector test, conducted automatically by the software.

e. Walk test mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested will operate the associated notification appliance for three seconds. The FACP will then automatically perform a reset and confirm normal device operation.

D. Central Microprocessor

1. The microprocessor shall be a state-of-the-art; it shall communicate with, monitor and control all external interfaces. It shall include non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.

2. The microprocessor shall contain and execute all specific actions to be taken in the condition of an alarm. Control programming shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.

3. An auto-programming capability (JumpStart) shall be provided to quickly identify devices connected on the SLC and make the system operational.

E. Display

1. The display shall provide all the controls and indicators used by the system operator.

2. The display shall include status information for all intelligent detectors, addressable modules and zones.

3. The display shall contain dedicated LEDs for the annunciation of AC POWER, FIRE ALARM, SUPERVISORY, TROUBLE and GROUND FAULT, LOW BATTERY,WALKTEST, , , conditions.

4. The keypad shall be part of the standard system and have the capability to command all system functions. Installer password level shall be provided to prevent unauthorized system control or programming.

5. The display shall include the following operator control switches:

ACKNOWLEDGE, ALARM SILENCE, DRILL (alarm activate), ALARM ID, SUPERVS ID, TROUBLE ID and SYSTEM RESET.

F. Signaling Line Circuit (SLC)

1. The SLC interface shall provide power to and communicate with up to 25 devices of any type including: intelligent detectors (photoelectric or thermal) addressable pull stations, intelligent modules (monitor control). Each SLC shall be capable of NFPA 72 Style 4 (Class B) wiring.

2. The CPU shall receive information from all intelligent detectors to be processed to determine whether normal, alarm or trouble conditions exist for each detector. The software shall automatically compensate for the accumulation of dust in each detector up to allowable limits. The information shall also be used for automatic detector testing and for the determination of detector maintenance conditions.

3. The detector software shall meet NFPA 72, requirements and be certified by UL as a calibrated sensitivity test instrument.

G. The control panel will have the capability of Reverse Polarity Transmission or connection to a Municipal Box for compliance with applicable NFPA standards.

H. Digital Alarm Communicator Transmitter (DACT). The on board DACT is an interface for communicating digital information between a fire alarm control panel and a UL-Listed central station. When the optional IPDACT Ethernet module is connected to the on board DACT, the system shall be capable of transmitting contact ID formatted alarms to a central station equipped with a compatible IP receiver via Ethernet over a private or public WAN/LAN, Intranet or Ethernet

1. Communication shall include vital system status such as:

- Independent Zone (Alarm, trouble, non-alarm, supervisory)
- AC (Mains) Power Loss
- Low Battery and Earth Fault
- System Off Normal
- 12 and 24 Hour Test Signal
- Abnormal Test Signal (per UL requirements)

2. The DACT shall support independent zone reporting via the Contact ID format. In this format, the DACT shall support the transmission of zones within the system. This format shall enable the central station to have exact details concerning the location of the fire for emergency response.

I. Enclosures:

1. The control panel shall be housed in a UL-listed cabinet suitable for surface mounting. The cabinet and front shall be corrosion protected and painted red via the powder coat method with manufacturer's standard finish.

2. The back box and door shall be constructed of steel with provisions for electrical conduit connections into the sides and top.

3. The door shall provide a key lock and shall provide for the viewing of all indicators.

J. Field Charging Power Supply:
The FCPS is a device designed for use as either a remote 24-volt power supply or as a booster for powering Notification Appliances.

1. The FCPS shall offer up to 8.0 amps (6.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 18.0 amp hour batteries.

2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a control relay. Four NAC outputs, wired NFPA Style Y, shall be available for connection to the Notification devices.

3. The FCPS shall optionally provide synchronization of all connected strobes or horn strobe combinations when System Sensor, Wheelock or Gentex devices are installed.

4. The FCPS shall function as a sync follower as well as a sync generator.

5. The FCPS shall include a surface mount backbox.

6. The Field Charging Power Supply shall include the ability to delay the reporting of an AC fail condition per NFPA requirements.

7. The FCPS shall provide 24 VDC regulated and power-limited circuitry per UL standards. Should this be updated to latest UL standard?

K. Power Supply:

1. The main power supply for the fire alarm control panel shall provide up to 2.0 amps of available power for the control panel and peripheral devices.

2. Provisions will be made to allow the audio-visual power to be increased as required by adding modular expansion audio-visual power supplies.

3. The power supply shall provide an integral battery charger or may be used with an external battery and charger systems. Battery arrangement may be configured in the field.

4. The main power supply shall continuously monitor all field wires for earth ground conditions.

5. The main power supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.

L. Programmable Electronic Sounders:

1. Electronic sounders shall operate on 24 VDC nominal.

2. Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones with an output sound level of at least 90 dBA measured at 10 feet from the device.

3. Electronic sounders shall be flush or surface mounted as shown on plans.

M. Strobe lights shall meet the requirements of the ADA, UL Standard 1971 and shall meet

the following criteria:

1. The maximum pulse duration shall be 2/10 of one second.

2. Strobe intensity shall meet the requirements of UL 1971.

3. The flash rate shall meet the requirements of UL 1971.

N. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of Section A listed above for audibility.

2. Shall meet the requirements of Section B listed above for visibility.

O. Specific System Operations

1. Alarm Verification: Each of the intelligent addressable smoke detectors in the system may be independently programmed for verification of alarm signals. The alarm verification time period shall not exceed 250 seconds.

2. Zone Disable: Any addressable device in the system may be enabled or disabled through the system keypad.

3. Zone Read: The system shall be able to display the following point status:
   a. Alarm ID
   b. Supervisory ID
   c. Trouble ID

4. Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

5. The fire alarm control panel shall include Silent and Audible Walk Test functions – Silent and Audible. It shall include the ability to test initiating device circuits and Notification Appliance Circuits from the field without returning to the panel to reset the system. The operation shall be as follows:

   a. Alarming an initiating device shall activate programmed outputs, which are selected to participate in Walk Test.

6. Supervisory Operation: An alarm from a supervisory device shall cause the appropriate indication on the control panel display, light a Zone supervisory LED.

7. Signal Silence Operation: The FACP shall have the ability to program each output circuit (notification circuit or relay) to deactivate upon depression of the Signal Silence switch.

2.2 ADDRESSABLE INITIATION DEVICES

A. Smoke detectors shall be an intelligent photoelectric detector with thermal element that provides digital communications to the FACP. Detectors shall be listed for use as open area protective coverage, in duct installation and duct sampling assembly installation and shall be insensitive to air velocity changes. Detectors shall be programmable as application specific, selected in software for a minimum of eleven environmental fire

profiles unique to the installed location. These fire profiles shall eliminate the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report. The detector shall be designed to eliminate calibration errors associated with field cleaning of the chamber. The detector shall support the use of a relay, or LED remote indicator. The detector shall not exceed 2.5 inches of extension below the finish ceiling. Detector wiring shall not require any special cable. Provide (10) ten additional detectors where directed by Engineer. Include approximately 25 feet of wiring, conduit and fittings for each detector.

B. The addressable thermal detector shall be a rate of rise detector rated at 135F.

C. The addressable detector shall be a photo only detector that uses the light scattering principle with a supervised light source and receiver.

D. Detector bases shall be low profile twist lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box. Bases shall be supplied with the following features as required for performance to this specification. Select the following bases as required for design operation;
   1. Standard detector base.
   2. Detector relay base with software programmed addressable relay integral to the base.
   3. Detector audible base with software programmed operation of the base audible.

E. Duct Detector, Intelligent shall use one of the photoelectric detectors listed above for the sampling.
   1. The duct detector shall be capable of multi colored LED remote indicator light.
   2. The detector shall be supplied with the appropriate sampling tubes to fit the duct shall be monitored.
   3. Where indicated on drawings provide duct detector with remote relay that shall be operated form the control panel.

F. The manual pull station shall be addressable and semi flush mounted. Where surface mounted is required supply the manufacturers surface mount box. Supply either of the following;
   1. A single action pull station.
   2. A double action pull station.

G. Furnish and install, for the monitoring of contact type initiation devices and for the control of electrical devices where required, intelligent analog signaling circuit interface module. Modules shall be supplied to meet the project requirements as follows:
   1. A single circuit intelligent signaling circuit interface module for monitoring alarm, trouble, supervisory or status contact type devices.
   2. The single circuit interface shall also be available as a freestanding shrink-wrapped unit with pigtail wire leads for direct mounting with contact devices.
   3. A single circuit intelligent signaling circuit interface module for monitoring alarm, trouble, supervisory security or status contact type devices with form C software programmable control contacts for the management of specified electrical loads as required by this specification.
   4. Dual circuit intelligent signaling circuit interface module for monitoring alarm, trouble, supervisory security or status contact type devices.

2.3 ADDITIONAL DEVICES

1. Waterflow Indicators

   a. Waterflow switches shall be an integral, mechanical, non-coded, non-accumulative type. Coordinate sprinkler system requirements with Division 15.

   b. Waterflow switches shall have an alarm transmission delay time adjustable from 0 to 60 seconds. Initial settings shall be 30-45 seconds.

   c. Waterflow switches shall be provided and connected under this section but installed under Division 15.

2. Sprinkler and Standpipe Valve Supervisory Switches

   a. Each sprinkler system water supply control valve riser, zone control valve and standpipe system riser control valve shall be equipped with a supervisory switch. Coordinate sprinkler system requirements with Division 15. As a minimum, each floor, the Atrium and the theater shall be zoned separately.

   b. Main gate valves shall equiped with a supervisory switch.

   c. Supervisory switches shall be provided and connected under this section but installed under Division 15.

3. Addressable Modules

   a. Addressable monitor modules shall be provided to connect supervised zones to fire alarm control panel SLC loops. There shall be one monitor module for each supervisory switch or alarm switch. Fire pump shall be monitored in accordance with NFPA 72.

   b. Addressable control modules shall be provided to supervise and control operation of addressable control points. There shall be one control module for each control point. For fan shutdown, damper closure and other auxiliary control functions, the control module may be set to operate as a dry contact relay.

4. 120V Smoke Detectors

   a. Smoke detectors shall be 120V with combination horn sounder and visible strobe. The detectors shall be looped together for synchronized alarm.

2.4 INTERFACE WITH OTHER BUILDING SAFETY SYSTEMS

A. HVAC and fans shall shutdown when either the duct detector for that unit is alarmed or when any device of the fire alarm system is activated. The FACP and remote annunciator shall be programmed with buttons for manual operation of each air-handling unit and smoke control fan.

B. Sprinkler monitoring shall include waterflow switches and supervisory switches. Coordinate with Section 211300 requirements to interconnect all monitored points with the fire alarm system.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Perform work in accordance with the requirements of NFPA 70, NFPA 72.

B. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

C. All cable runs shall be run parallel or at right angles to building walls, supported from structure at intervals not exceeding 3 feet and where installed in environmental air plenums, be rated for such use and tied/supported by components listed for environmental air plenums installation.

3.2 BOXES, ENCLOSURES AND WIRING DEVICES

A. Boxes shall be installed plumb and firmly in position.

B. Extension rings with blank covers shall be installed on junction boxes where required.

C. Junction boxes served by concealed conduit shall be flush mounted.

D. Upon initial installation, all wiring outlets, junction, pull and outlet boxes shall have dust covers installed. Dust covers shall not be removed until wiring installation when permanent dust covers or devices are installed.

E. "Fire alarm system" decal or silk-screened label shall be applied to all junction box covers.

3.3 CONDUCTORS

A. Each conductor shall be identified, as shown on the submittal drawings, with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.

B. All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.

C. Wiring for Notification Appliance circuits shall be a minimum 14 AWG

D. All splices shall be made using solderless connectors. All connectors shall be installed in conformance with the manufacturer recommendations.

E. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.

F. Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.

G. A consistent color code for fire alarm system conductors throughout the installation.

H. The installation contractor shall submit for approval prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.

I. Wiring within sub panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

3.4 DEVICES

A. Relays and other devices shall be mounted in auxiliary panels are shall be securely fastened to avoid false indications and failures due to shock or vibration.

B. Wiring within panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

C. All devices and appliances shall be mounted to or in an approved electrical box.

3.5. CERTIFICATE OF COMPLIANCE

A Certificate of Compliance shall be completed and submitted to the Architect, in accordance with NFPA 72, most current edition, as required by the State Of Louisiana Fire Marshall.

3.6. FIELD QUALITY CONTROL

A. Testing, general
1. All Alarm Initiating Devices shall be observed and logged for correct zone and sensitivity. These devices and their bases shall be tagged with adhesive tags located in an area not visible when installed, showing the initials of the installing technician and date.
2. Wiring runs shall be tested for continuity, short circuits and grounds before system is energized. Resistance, current and voltage readings shall be made as work progresses.
3. The acceptance inspector shall be notified before the start of the required tests. All items found at variance with the drawings or this specification during testing or inspection by the acceptance inspector shall be corrected.
4. Test reports shall be delivered to the acceptance inspector as completed.
5. All test equipment, the installing contractor shall make instruments, tools and labor required to conduct the system tests available. The following equipment shall be a minimum for conducting the tests:
   a) Ladders and scaffolds as required to access all installed equipment.
   b) Multi-meter for reading voltage, current and resistance.
   c) Two way radios, and flashlights.
   d) A manufacturer recommended device for measuring airflow through air duct smoke detector sampling assemblies.
   e) Decibel meter.
   f) In addition to the testing specified shall be performed by the installing contractor, the installation shall be subject to test by the acceptance inspector.

3.7 ACCEPTANCE TESTING

A. A written acceptance test procedure (ATP) for testing the fire alarm system components and installation shall be submitted by the Contractor to the Architect and shall be in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.

B. A program matrix shall be prepared by the installing contractor referencing each alarm input to every output function affected as a result of an alarm condition on that input.

C. The installing contractor prior to the ATP shall prepare a complete listing of all device labels for alphanumeric annunciator displays.

D. The acceptance inspector shall use the system record drawings in combination with the documents specified in this specification during the testing procedure to verify operation as programmed. In conducting the ATP, the acceptance inspector shall request demonstration of any or all input and output functions. The items tested shall include but not be limited to the following:
1. System wiring shall be tested to demonstrate correct system response and

correct subsequent system operation in the event of:
a) Open, shorted and grounded signal line circuits.
b) Open, shorted and grounded notification circuits.
c) Primary power or battery disconnected.

2. System notification appliances shall be demonstrated as follows:
   a) All alarm notification appliances actuate as programmed
   b) Audibility and visibility at required levels.
3. System indications shall be demonstrated as follows:
   a) Correct message display for each alarm input at the control display.
   b) Correct annunciator light for each alarm input at each annunciator and graphic display as shown on the drawings.
   c) Correct history logging for all system activity.
4. System off-site reporting functions shall be demonstrated as follows:
   a) Correct point transmitted for each alarm input
   b) Trouble signals received for disconnect
5. Secondary power capabilities shall be demonstrated as follows:
   a) System primary power shall be disconnected for a period of time as specified herein. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period as specified.
   b) System primary power shall be restored for forty-eight hours and system-charging current shall be normal trickle charge for a fully charged battery bank.
   c) System battery voltages and charging currents shall be checked at the fire alarm control panel

3.8 DOCUMENTATION

A. System documentation shall be furnished to the owner and shall include but not be limited to the following:
   1. System record drawings and wiring details including one set of reproducible masters and drawings on a CD ROM in a DXF format suitable for use in a CAD drafting program.
   2. System operation, installation and maintenance manuals.
   3. System matrix showing interaction of all input signals with output commands.
   4. Documentation of system voltage, current and resistance readings taken during the installation, testing and ATP phases of the system installation.
   5. System program showing system functions, controls and labeling of equipment and devices.

3.9 SERVICES

A. The contractor shall warrant the entire system against mechanical and electrical defects for a period described in the contract general conditions.

B. The fire alarm system subcontractor shall offer, for the owner's consideration at the time of system submittal, a priced inspection, maintenance, testing and repair contract in full compliance with the requirements of NFPA 72. The owner shall have the option of renewing at the price quoted for single or multiple years up to five years.

C. The contractor performing the contract services shall be qualified and listed to maintain ongoing certification of the completed system to the UL for specific installed system listing.

D. The installation contractor shall furnish training as follows for a minimum of four employees of the system user:
   1. Training in the receipt, handling and acknowledgment of alarms.

2. Training in the system operation including manual control of output functions from the system control panel.
3. Training in the testing of the system including logging of detector sensitivity, field test of devices and response to common troubles.
4. The total training requirement shall be a minimum of 2 hours, but shall be sufficient to cover all items specified.

END OF SECTION

SECTION 311000

SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section and the plans describe the work required and also the work that will be performed by others.

B. The Project Area shall be cleared and grubbed of designated trees, brush, and stumps. Topsoil will be stripped and stockpiled; designated improvements such as fences, pavements, and buildings foundations demolished. Designated utilities and other facilities and improvements shall be removed or abandoned in place as noted on the plans to allow construction of planned improvements. All resulting debris shall be removed from the site for legal disposal by the Contractor. All areas beyond the designated limits of construction and disturbed by the Contractor shall be restored as directed by the Engineer at no additional cost to the Owner.

C. This Section includes the following:
   1. Protection of Existing Trees to Remain
   2. Topsoil Stripping
   3. Clearing and Grubbing of Trees and Brush
   4. Sawcutting and Removal of Existing Pavement
   5. Removal of Debris
   6. Disposal of Waste Materials

D. Related Sections
   1. 311050 Soil Erosion and Sediment Control
   2. 312000 Site Earthwork

1.2 SUBMITTALS

A. Coordinate submittals indicated herein with the requirements of other sections and combine for a single submittal addressing temporary facilities, site utilization, proposed staging and/or storage areas, protection and maintenance of the project area.

B. Verification that utility owners have been notified and buried lines have been marked on the ground prior to excavation.

C. Contractor's detailed Storm Water Pollution Prevention Plan and Notice of Intent prior to proceeding.

1.3 PROJECT CONDITIONS

A. The project site is a predominantly flat, grassy area at the front and wooded area in the rear. Incidental construction debris may be encountered and shall be loaded and disposed of by the Contractor as provided below at no additional cost.

B. The project Site is located within Ascension Parish, Louisiana. Storm water drainage must comply with Parish's and LDOTD regulations.

C. Traffic: Conduct site demolition and clearing operations to ensure minimum interference with roads, streets, and other adjacent occupied or used facilities. Do not close or obstruct roads or other occupied or used facilities without permission from authorities having jurisdiction.

D. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements scheduled or shown on the plans to remain.

E. Protect improvements on adjoining properties including the Owner's property.

F. Restore damaged facilities to their original or better condition, as acceptable to the Engineer/Architect.

G. Project Area: The Project Area shown on the drawings is defined as the area on which construction shall take place to include access to the construction areas from site roads and from the Contractor's temporary staging areas.

H. Protection of Existing Trees: Protect designated trees within the project area and all existing trees outside of the construction limits against any cutting, breaking or skinning roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, or vehicular traffic, or parking of vehicles within drip line. Provide temporary barriers to protect trees to remain at no additional cost to the Owner.

I. Protection of Existing Topsoil and Ground Cover: Protect existing topsoil and grasses from removal or disturbance in those areas not designated for earthwork operations as a part of this contract. Damage shall be corrected and repaired to the satisfaction of the Engineer/Architect.

J. Explosives: Use of explosives will not be permitted under this Contract.

K. Existing Utilities:
1. Locations of existing utilities shown on the plans are approximate. Contractor shall hand excavate and probe to locate actual location of utilities and protect from any damage before commencing work. Record actual locations of existing utilities for use during construction and for permanent Record Drawings for Owner.
2. Contractor shall call 1-800-272-3020 "One Call" 48 hours prior to construction to locate utility lines in the area in which work can be accomplished within a reasonable amount of time, i.e., one week.
3. Local Utilities:
   a. Water Company – Ascension Water
   b. Gas Company - Entergy
   c. Power Company – Entergy
   d. Telephone Company - Bell South
   e. Sanitary Sewer – Private Treatment (MoDAD)

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, located within the designated construction or clearing limits as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated.

A. Coordinate and sequence removal of existing improvements with project phasing or sequencing plans.

B. Coordinate removal of fences with erection of temporary or new fences to maintain a secure and continuous fence between the construction site and private property.

3.2 TOPSOIL: Topsoil is defined as a friable clay surface soil, found at a depth not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, large clay lumps, sticks, and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.

A. Strip topsoil within all areas to be excavated or filled. Remove topsoil to the depth necessary to remove all vegetation, including grasses and other ground cover, and roots. Required depth of removal shall vary in depth from 6 inches to 18 inches.

B. Stockpile topsoil at areas on the site as directed by the Engineer. Construct storage piles to provide free drainage of surface water.

C. Dispose of unsuitable or excess topsoil as specified for disposal of waste material.

3.3 CLEARING AND GRUBBING: Designated standing timber and other trees and brush shall be cut and cleared within the project construction limits. Some additional areas where noted in the project site shall be cleared and grubbed as noted in the plans. All stumps within the construction or clearing limits shall be grubbed as provided below:

A. Completely remove all stumps and roots of trees and shrubs 3 inches in diameter and larger to a minimum depth of two foot below the ground surface.

B. Fill depressions caused by clearing and grubbing operations as provided in Section 02200.

3.4 REMOVAL OF DEBRIS AND CONCRETE: Remove any debris within the areas on the plans designated to be cleared. Debris includes trash, drainage pipes, construction or building materials, downed timber, concrete and stones larger then 6 inches in diameter.

A. Removal of Improvements: Remove all existing above-grade and below-grade improvements as indicated to minimum depth of two feet and as necessary to facilitate new construction

B. Saw-cutting and Removal of Existing Pavement: As shown on the plans Contractor shall demolish and remove concrete curb and pavement as required for installation of the new work. Removal of the pavement shall be to neat straight lines, preceded by saw-cutting full-depth of pavement. Protect remaining pavement edge to prevent raveling. Re-cut to neat and straight lines to the satisfaction of the Engineer if raveling occurs. Remove existing pavement and base, as required, to clean lines, for construction of new driveways. All work shall comply with LDOTD standards and requirements.

C. Protect Existing Utilities. Relocate existing utilities prior to demolition operations where feasible to minimize service interruptions. Coordinate activation of utility mains and services with the facility owner.

3.5 DISPOSAL OF WASTE MATERIALS

A. Burning onsite is prohibited.

B. Debris, construction waste, trash, and etc. shall be removed off site and disposed of in a legal manner.

C. Maintain cleanliness on all roadways and other public roadways and other public areas used by debris removal equipment.

D. Disposal of hazardous materials shall be removed off site and disposed of in a legal manner. Follow all State and Federal laws and coordinate with specifications for handling, hauling, record keeping, and disposal found in other technical sections of these specifications.

E. Existing facilities or improvements scheduled for salvaging, shall be inventoried prior to removing, loaded and hauled to a site designated by the Owner for stockpiling materials and unloaded without damage due to Contractor negligence.

END OF SECTION 311000

SECTION 311050

SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes but is not limited to the following:
   1. Rock Filter Dams
   2. Rip Rap
   3. Silt Fences
   4. Baled Hay Filter
   5. Hydro-seeding
   6. Maintenance and Removal of All Sediment and Erosion Control Measures

B. Related Sections: The following sections contain requirements that related to this Section:
   1. Section 311000: Site Clearing
   2. Section 312000: Site Earthwork

C. Related Documents
   1. Louisiana Standard Specifications for Roads and Bridges (2000) (LSSRB)

D. Erosion Control Details included in the Construction Drawings.

E. Erosion Control Plan developed by the Engineer.

F. U.S. Environmental Protection Agency (EPA) regulations under the National Pollution Discharge Elimination System (NPDES), Detailed Pollution Prevention Plan developed by the Contractor.

1.1 SUBMITTALS

A. **General:** Submit to the Owner's Representative the following items:
   1. Product data and descriptive literature for all pre-manufactured erosion control devices.
   2. Laboratory certification of materials to be used.
   3. Seed certifications.
   4. The Contractor shall prepare and submit Contractor's detailed Storm Water Pollution Prevention Plan and Notice of Intent (N.O.I.) directly to the DEQ prior to starting work.

1.3 OPERATIONS AND MAINTENANCE

A. Operations
   1. Construction period erosion control shall be provided by a coordinated program of measures in compliance with U.S. EPA rules and regulations under the National Pollution Discharge Elimination System (NPDES) program. The Contractor shall provide temporary stabilization measures where areas are exposed during clearing and grubbing, earthwork and any other element of work with the potential of soil loss.
   2. Permanent control measures shall eliminate or minimize soil erosion measures after construction. This shall be accomplished by constructing the proposed site improvements, including roadways, parking areas, and buildings, and by seeding and mulching and matting the remaining exposed soil to produce a healthy stand of grass.
   3. The purpose of temporary control measures is to eliminate or minimize soil erosion during construction.

4. Temporary erosion and sedimentation controls include, but are not limited to, silt fences and hay bale filters. Temporary controls shall be constructed as to ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by regulatory requirements or applicable permit conditions.
5. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.
6. Work shall not commence until appropriate erosion control devices are in place. All permanent erosion control features shall be incorporated into the project at the earliest practical time.

B. Maintenance
1. Maintenance of the erosion and sedimentation control facilities shall be the responsibility of the Contractor. Maintenance shall include the inspection of facilities after each significant rainfall event and on a periodic basis. Immediately after a storm event, erosion and sedimentation facilities and measures shall be cleaned, repaired and replaced as needed. Silt fences shall be inspected and restored to an upright and effective position after storms or at any time they are observed to be in need of maintenance. Contractor shall maintain the erosion and sedimentation control facilities until permanent protections are in place.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hydro-seeding shall comply with Section 739 of the latest edition of LSSRB.

B. Rip Rap in the form of durable stone in accordance with (LSSRB) Section 711, Class 55 lb.

C. Silt fences, hay bale filters, rock filter dams, and other temporary erosion controls shall meet the requirements of LSSRB and the notations on the standard details for Temporary Erosion, Sediment and Water Pollution Control Measures included in the Plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Submit a schedule at the pre-construction conference for providing the soil erosion and sediment control measures required by the plans and specifications.
1. Incorporate the project's permanent erosion control features into the project at the earliest possible time. Perform and schedule clearing and grubbing and earthwork operations that allow permanent erosion control features to follow as soon as possible.
2. Hydro-seeding: Install hydro-seeding as required in Section 739 (LSSRB).
3. Maintain all sediment and erosion control facilities as required to assure their effective and continued function.
4. Install temporary erosion controls in accordance with project details.
5. Completely remove all sediment and erosion control measures not required for subsequent construction at the completion of each phase of construction. Restore all disturbed areas to the satisfaction of the Owner's Representative before acceptance.

END OF SECTION 311050

SECTION 312000

SITE EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Clear, proof-roll, excavate, backfill, compact and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

B. Earthwork for exterior paving is included in this section.

1.3 SOIL REPORT

A. For the information and assistance of the Contractor in anticipating conditions, which may be encountered at the site, a copy of the soil report is available.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements of the methods needed for proper performance of the work of this section.

B. Use equipment adequate in size, capacity and numbers to accomplish the work of this section in a timely manner.

1.5 TESTING AND INSPECTION OF SERVICES

A. Contractor shall retain and pay for the services of a testing laboratory of recognized standing, approved by the Architect, to control all work covered under this section and provide the following services:

B. Verify adherence to specifications for all select fill placed on the site.

C. Direct all fill placement and make the following density determinations per lift:
   1. Paving Areas, 1 per 2,000 sq.ft or less of paved area, but in no case fewer than two tests.

D. Each lift shall be tested and accepted prior to placing any more fill.

E. Tests failing to meet specified compaction shall be removed, recompacted and retested at Contractor's expense.

PART 2 - PRODUCTS

2.2 MATERIALS

A. Select Fill Material Within Paved Areas: Sandy clay or low plasticity clay meeting ASTM D 2487 for Group SC or CL material with a maximum liquid limit of 45 and a plasticity index between 8 and 25 for the Geotechnical Report.

PART 3 - EXECUTION

3.1 DRAINAGE

A. Prior to construction, adequate permanent drainage should be provided to drain surface water away from the construction site during and after construction. Motorized equipment, particularly wheeled equipment should not be allowed in the foundation area during periods of inclement weather to prevent rutting of the ground surface.

B. Excavations should be kept dry and, in this regard, should be poured and backfilled as soon as possible after completion of the excavation.

C. All requirements for temporary erosion control shall be in place prior to start of construction.

3.2 CLEARING

A. The entire area within designated areas shall be stripped of all grass, brush, vegetation, etc., and all trees, roots, stumps, paving and foundations shall be removed.

B. After removal of the above material, the entire area within paved areas shall be proof-rolled so as to detect any soft spots per Section 5.2 of the Geotechnical Report.

C. All soft spots, including ditches, holes, and low areas shall be dug out and removed as well as all slush, muck or other unsatisfactory material which will decay or produce unsatisfactory subsidence.

3.3 EXCAVATING

A. All excavations shall be made to the proper depth and correct line, with sufficient allowance for correct forming, shoring, etc. All ditching and pond shall be cut to line, grade and dimensions as required.

B. The sides of excavations shall be maintained secure until permanent support is provided.

C. Excavated areas shall be cleared of all debris, water, slush, muck and soft, unsound, loose or other foreign matter and shall be conditioned. If the bottom of the excavation is carried below the elevations called for on the Drawings, or is made mucky or unstable due to Contractor's operations or carelessness, he shall, without additional compensation, deepen the excavation to the undisturbed soil and backfill with approved materials to the desired elevation. Backfill shall be compacted to the densities specified hereinafter under BACKFILLING.

D. Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavations, bases, etc., free from seepage, standing or running water at all times throughout the period of construction.

E. Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining, or other accepted means necessary to accomplish same.

F. Excavation shall be completed per Section 5.4 of the Geotechnical Report.

3.4 BACKFILLING

A. Backfilling includes all select fill material necessary to backfill and includes select fill material necessary

to bring all areas up to the necessary grades for support of paving slabs.

B. Excavated earth shall not be used for fill under structures or paved areas but may be used for site grading only.

C. All fill supporting sidewalks and paving shall be placed in loose layers not exceeding 8 inches in thickness at moisture contents within 2% of optimum, and thoroughly compacted by approved mechanical methods to at least 95% of maximum dry density per Standard Proctor Test, ASTM D 698.

D. Any lifts failing to meet the compaction requirements shall be removed, re-compacted and re-tested at Contractor's expense.

3.5 SITE GRADING

A. The site shall be generally graded and filled to the grades shown on the Drawings. Fill material shall be spread and thoroughly compacted in loose layers not exceeding 8 inches thick. Excavated soils containing organic material may be used for fill at unpaved areas only.

B. Areas adjacent to buildings and paved areas shall be fine graded from the finished grade at buildings and paved areas to existing or new contour grades at a point 25 feet away unless otherwise shown. This fill shall be compacted to at least 90% Standard Proctor test

C. Place a minimum of 2 inches approved top soil over areas which are filled or cut by grading.

D. Finished slopes shall be free from irregularities, hollows or depressions. In areas adjacent to buildings, maintain slopes that provide drainage away from the buildings. Hand fill and grade areas where water stands to eliminate ponding. Repair, fill and regrade any ruts or eroded areas.

END OF SECTION 312000

SECTION 312050

PAVEMENT BASE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to Section 312000 – "Site Earthwork" for additional requirements that relate to work of this Section.

C. Concrete paving surface is specified in Section 321313 – "Concrete Paving".

1.2 DESCRIPTION OF WORK

A. This Section includes preparation of base and sub-base for both asphaltic concrete paving and portland cement concrete paving.

B. Extent of paving work is shown on Drawings.

1.3 SUBMITTALS

A. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with Louisiana Department of Transportation and Development Standard Specifications for Roads and Bridges, latest edition, and with local governing regulations if more stringent than herein specified.

1.5 TESTING

A. Provide testing and inspection services as specified in Section 312000 – "Site Earthwork".

1.6 SITE CONDITIONS

A. Weather Limitations: Base course may be placed when air temperature is above 30 deg.F (-1 deg.C) and rising.

B. Grade Control: Establish and maintain required lines and elevations.

PART 2 -PRODUCTS

2.1 MATERIALS

A. General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations and in conformance with LaDOTD Standard Specification for Roads and Bridges Section 302 for a Class II Base Course.

B. Base Course: Crushed aggregate, 6" minimum compacted thickness.
   1. Comply with LaDOTD Standard Specification for Roads and Bridges Section 302 for Class II Base Course:
      Provide crushed aggregate complying with LaDOTD article 1003.03 (d).

C. Select Fill: Meet requirements for Select Fill Material within Paved Areas as specified in Section 022000– “Site Earthwork”.

PART 3 -EXECUTION

3.1 PAVEMENT BASE PREPARATION

A. General: Typical pavement base shall consist of the following: 6 inch minimum thickness compacted crushed aggregate base, over 8 inch minimum thickness compacted select fill sub-base.

B. Subgrade (sub-base) preparation: Preparation of the paving area subgrade shall be done in the following manner:
   1. Remove existing pavement, topsoil, soil and waste, proof roll subgrade, and remove and repair soft spots in conformance with Section 022000 “Site Earthwork,” and replace with select fill as stated therein under requirements for backfilling.
   2. Prior to backfilling, scarify exposed subgrade at least eight inches (8") in depth and recompact to density specified below.
      a. Maintain moisture content of existing subgrade soil within 2% below and 4% above its theoretical optimum moisture content.
      b. Compact the existing subgrade to 95% of the density defined by ASTM D-698 (standard proctor) for the native soils.

C. Placement and compaction of select fill under paving:
   1. Place fill on tested and accepted compacted subgrade in thin lifts not to exceed eight inch thickness (loose).
   2. Maintain moisture content of fill soil within 2% below and 4% above its theoretical optimum moisture content.
   3. Compact each lift to at least 95% of the density defined by ASTM D-698 (standard Proctor).
   4. Place a minimum of 8 inches of compacted select fill sub-base over prepared subgrade at all paved areas.

D. Place a minimum six inch (6") thick layer of compacted crushed aggregate base course under all paved areas. Compact crushed aggregate base course per geotech report.

3.2 SURFACE PREPARATION

A. Remove loose material from compacted base surface immediately before applying paving materials.

B. Proof roll prepared base course surface to check for unstable areas and areas requiring additional

compaction.

C. Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient base course and sub-base areas have been corrected and are ready to receive paving.

3.3 FIELD QUALITY CONTROL

A. General: Test in-place base and sub-base courses and subgrade for compliance with requirements for thickness and compaction. Frequency of testing and other testing requirements shall be as specified in Section 02200 – “Site Earthwork”. Repair or remove and replace unacceptable materials as directed by Architect.

B. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
   1. Base Course: 1/2", plus or minus

C. Surface Smoothness: Test finished surface of each course for smoothness, using ten foot (10') straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
   1. Base Course Surface: 1/4".

D. Check surface areas at intervals as directed by Architect.

END OF SECTION 312050

SECTION 321313

CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes

B. Cast-in-place concrete includes, but is not limited to, the following:
   1. Headwalls and end treatments for culvert pipe
   2. Incidental Paving
   3. Concrete Drainage Swales

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 312000: Site Earthwork
   2. Section 334100: Storm Sewerage and Drainage

1.2 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others if requested by Project Representative.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

D. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.

E. Laboratory analysis of concrete materials.

F. Material certificates in lieu of material laboratory analysis reports when permitted by Project Representative. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements.
   1. Design Mix: Submit a design mix for all concrete proposed for use on the Project.

1.3 QUALITY ASSURANCE

A. General: Scheduling of testing of materials used in concrete construction shall be the responsibility of the Contractor.

B. When test results indicate, as determined by the Owner's Representative, that materials installed are not as specified, the material shall be removed and replaced to meet specification requirements, at no additional expense to the Owner. Retests or additional tests on failed areas as provided below may be performed to determine conformance with specification requirements.

C. Codes and Standards: Comply with applicable American Concrete Institute (ACI) and Concrete

Reinforcing Steel Institute (CRSI) standards and specifications.

D. Provide copies of all delivery tickets for concrete delivered to the site and forward to the on-site Owner's Representative.

PART 2 -PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Coatings Agent: Provide commercial formulation form coating agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to surface.

E. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

D. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

E. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

B. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete when indicated on plans.
   1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

   2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Project Representative.

3. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances.
4. Coarse Aggregate: Clean uncoated, processed aggregate containing no clay, mud, loam, frozen particles, cemented particles, or foreign matter as follows:
   a. Crushed stone, processed from natural rock or stone.
   b. Washed gravel, either natural or crushed. Use of pit or bankrun gravel is not permitted.
   c. Maximum Aggregate Size: Not larger than one-fifth of the narrowest dimension between sides of forms, one- third of the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.

C. Water: Potable.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. High-Range Water-Reducing Admixture: ASTM C 494, Type F.

G. Water-Reducing, Accelerating Admixture: ASTM C 494, Type C.

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

I. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

2.4 PROPORTIONING AND DESIGNING MIXES

A. In general the concrete strength requirements are shown in the specific details for new work with the designation represented as the minimum 28-day compressive strength. Except where specifically indicated in other related sections of the specifications or noted in the plans, all concrete shall have a minimum 28 day compressive strength of 4000 psi when tested in accordance with ASTM C172, ASTM C31, ASTM C39, and ASTM C78. Concrete shall have a minimum of 6 bags of cement per cubic yard and an air content of 5% +/- 2% by volume.

B. Prepare design mixes for each type and strength of concrete by laboratory trial batch method as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Project Representative for preparing and reporting proposed mix designs.

C. Submit written reports of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed and approved by Project Representative.

D. Design mixes to provide normal weight concrete with 28-day compressive strengths of 4000 psi.

2.5 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg

C. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate.

D. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.6 CONCRETE MIXING

A. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

B. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
   1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 -EXECUTION

3.1 GENERAL

A. Coordinate the installation of other related materials with placement of forms and reinforcing steel.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
   1. Provide Class A tolerances for concrete surfaces exposed to view.
   2. Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

D. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

E. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

3.4 JOINTS

A. Construction Joints: Locate and install construction joints so as not to impair strength and appearance of the structure.

B. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

C. Furnish and install joint filler and sealant materials.

3.5 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify Project Representative at least 24 hours prior to placing concrete.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
   1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

F. Maintain reinforcing in proper position during concrete placement operations.

G. Cold-Weather Placement: Comply with provisions of ACI 306. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view. Repair and patch defective areas with fins and other projections completely removed and smoothed. Unless specified otherwise, all surfaces exposed to view shall receive this finish.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

3.8 SURFACE FINISH FOR EXTERIOR SLAB-ON-GRADE

A. Provide a broom finish on all exterior slabs-on-grade unless shown otherwise on the plans.

3.9 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

3.10 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, until acceptable to the Project Representative.

B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Project Representative. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

D. Repair concealed formed surfaces that contain defects that adversely affect the durability of concrete. When defects cannot be repaired to the satisfaction of the Project Representative, remove and replace concrete.

E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

F. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

H. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete.

I. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

3.11 CLEANING

A. Keep excavated areas free from debris and stored materials that could damage surfaces or interfere with progress of Work.

B. Remove excess materials from the Site promptly to prevent large accumulation. Store reusable material neatly in designated locations.

C. On a daily basis and upon the completion of the work of this section, dispose of, away from the site, debris, trash, containers, residue, remnants and scraps which result from the Work of this Section. Contractor shall not discard any construction materials such as form ties, welding rods, nails, rebar, scraps, etc. on the ground. All waste shall be placed in a location for daily pickup.

3.12 ACCEPTANCE TESTING

A. Allow testing agency to inspect, sample and test plastic concrete mix from either the delivery truck or from with the forms. Water shall not be added after samples have been taken without approval of Owner’s Representative. A notation shall also be made on the delivery ticket estimating the quantity of water added when so approved.

B. The Contractor will perform testing on samples taken from the work in accordance with Section 01400 Quality Control. Any area that is deficient or not in compliance with the specifications, whether identified by testing or inspection, shall be corrected by the Contractor as provided above.

3.13 MINIMUM TESTING FREQUENCY BY CONTRACTOR

A. Section - 025150 Concrete (Site Work)
   1. Fresh Concrete:
      a. Sampling Fresh Concrete (ASTM C 172, except modified for slump to comply with ASTM C 94): Mold and cure compression test cylinders in accordance with ASTM C 31.

b. Compression Test Specimen (ASTM C 31): One random set of three standard cylinders for each type of concrete per each 100 cubic yards or fraction thereof for Structures. Two random sets of three standard cylinders for each type of concrete per each 5,000 square foot or fraction thereof for Paving. Mold cylinder specimens, store and protect on site for 24 hours, and transport to laboratory for curing and testing.
c. Slump (ASTM C 143): One test will be taken when Compression Test Specimen is made. Additional tests may be taken as directed when concrete consistency appears to the Resident Project Representative to have changed.
d. Air Content (ASTM C 231- Pressure method for normal weight concrete): One for each slump test performed.
e. Concrete Temperature (ASTM C 1064): One for each slump test performed.

2. Compressive-Strength Tests (ASTM C 39): Three specimens tested at 28 days.
   a. Compressive Strength specified concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 10 percent.

3. Additional Tests: The testing agency may make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure at the Contractors request to retest before possible replacement. This test will be performed at the Contractor's expense. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as approved.

4. Test Reports: Report test results in writing to Contractor and Owner's Representative within 24 hours with the following information as applicable in addition to the information required on all test reports:
   a. Concrete Supplier
   b. Type of concrete and mix number from delivery ticket
   c. Vehicle number
   d. Cylinder identification number and date cast
   e. Location from which test samples were taken
   f. Compressive strength
   g. Slump, air content and temperature
   h. Amount of water added at the site

END OF SECTION 321313

SECTION 321319

PARKING ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Louisiana Department of Transportation (La DOTD – Louisiana Standard Specifications for Roads and Bridges (LSSRB) – 2000 Edition.

1.2 SUMMARY

A. Section includes Parking Accessories including supplementary items necessary to complete the Work required for their installation.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Submit Product Data in the form of manufacturer's technical data, specifications, and installation instructions for each product specified.

1.4 SITE CONDITIONS

A. Apply pavement markings in strict accordance with manufacturer's instructions. Do not apply marking paint when weather is foggy or rainy, or ambient or pavement temperatures are below 50 deg. Fahrenheit nor when such conditions are anticipated during eight hours after application.

PART 2 - PRODUCTS

2.1 MARKING PAINT

A. Alkyd resin type, traffic marking paint, ready mixed, complying with Section 1015.12 (a) of the Louisiana Department of Transportation (LaDOTD) – Louisiana Standard Specifications for Roads and Bridges (LSSRB)
   1. White color for stalls and direction markings
   2. Blue and white for handicapped parking symbols

2.2 PARKING BUMPERS (WHEEL STOPS) (WHEN SHOWN IN THE PLANS ONLY)

A. Precast Concrete: ASTM C 94, 5 sack normal weight concrete, minimum 4000 psi 28 day compressive strength.

B. Reinforcing: ASTM A 615, Grade 40, 2 continuous No. 3 deformed reinforcement bars.

C. Size: Approximately 8 in. wide by 6" high by 72" length with chamfered corners and drainage slots on underside.

D. Anchor Pins: 5/8 in. x 24 in. deformed steel bars, 2 for each wheel stop, or 5/8 in. deformed bar cast-in-place, 2 for each wheel stop, extending a minimum of 18 in. below bottom of wheel stop.

E. Epoxy Anchoring Adhesive: Preco Ind. “Gold Label” two component anchoring/adhesive system or approved substitutes.

2.3 TRAFFIC CONTROL SIGNS

1. Refer to Architectural spec section 10400 – Signage.

PART 3 -EXECUTION

2.4 PREPARATION

A. Thoroughly clean surfaces free of dirt, sand, oil, grease or other foreign matter.

B. Coordinate location of Parking Bumpers with pavement marking layout.

2.5 INSTALLATION

C. Pavement Markings (See site plan for locations):
   1. Apply in accordance with manufacturer’s latest published requirements, specifications and details. Immediately before applications, paint shall be agitated and mixed thoroughly to a uniform consistency, free from lump or agglomerates. Paint shall be kept covered to retain volatiles. Paint shall not be thinned without approval.
   2. Paint shall be applied at the rate required to provide striping of 4-inch width at a thickness of 15 wet mils.
   3. Tolerances of +1/2 inch and –1/8 inch from the specified widths will be allowed, provided the variation is gradual. Segments shall be squared off at each end without mist or drip.
   4. Apply handicap parking symbols at handicap parking stalls.
   5. Apply required appropriate designations with approved stencils at small or compact car stalls.

D. Parking Bumpers:
   1. Install a pre-cast parking bumper at each parking space in accordance with layout as indicated.
   2. Install wheel stops at asphalt paving with anchors pins in accordance with manufacturer’s instructions.
   3. Install wheel stops at concrete paving with epoxy anchoring adhesive in accordance with manufacturer’s instructions.
   4. Leave wheel stops securely anchored and in proper alignment.

END OF SECTION 321319

SECTION 334100

STORM SEWERAGE AND DRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Non-perforated Schedule 40 PVC Pipe for storm sewer piping less than 12" diameter outside of building lines.

B. Reinforced Concrete Pipe for driveway culverts in state/parish right-of-way.

C. A-2000 Ribbed PVC Pipe for 12” diameter and larger storm sewer piping outside of building lines.

D. Drainage manholes, junction boxes, catch basins and other drainage structures as indicated.

1.2 RELATED DOCUMENTS

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

B. Refer to Mechanical Drawings and Specifications for roof drain piping and storm drain piping within building lines.

C. Refer to Mechanical Drawings and Specifications for all sanitary sewer systems and sanitary sewer piping both inside and outside of building lines.

D. Refer to Mechanical Drawings and Specifications for all water systems and water piping both inside and outside of building lines.

1.3 REFERENCES

A. ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

B. References are made herein to the 2000 Edition of the Louisiana Standard Specifications for Roads and Bridges, copies of which can be obtained from the Louisiana Department of Transportation and Development.

PART 2 - GENERAL

2.1 MATERIALS

A. PVC Compound: Pipe and fittings shall be made of PVC compound having a minimum cell classification of 12454 in accordance with ASTM D1784. Additional fillers (such as calcium carbonate for modulus enhancement) that lower the tensile strength of the compound and change the minimum cell classification shall not be allowed.

B. Rubber Gaskets: Gaskets shall meet the requirements of ASTM C-443 and be suitable for the service intended.

C. Pre-formed Flexible Mastic shall meet the requirements of Federal Spec. SS-S-210A Bituminous Plastic Cement, and be suitable for the service intended.

D. Pipe under twelve inches (12") in diameter shall be non-perforated Schedule 40 P.V.C. minimum, and shall conform to Louisiana Standard Specifications for Roads and Bridges - Section 701.

E. Reinforced Concrete Pipe (RCP) shall conform to Louisiana Standard Specifications for Roads and Bridges - Section 701.

F. A-2000 Ribbed PVC pipe shall conform to and meet requirements of ASTM F949 and installed and installed per requirements of ASTM D2321.

G. Concrete for drainage manholes, junction boxes, catch basins and other drainage structures shall be 3000 psi compressive strength (28-day).

H. Brick for drainage manholes, junction boxes, catch basins and other drainage structures shall conform to Louisiana Standard Specifications for Roads and Bridges - 1004.01

I. Manhole, junction box and catch basin frames, grates and covers shall conform to Louisiana Standard Specifications for Roads and Bridges - 1018.04 (or as indicated on the drawings).

J. Joint filler related to manholes, junction boxes, catch basins and other drainage structures shall conform to Louisiana Standard Specifications for Roads and Bridges - 1005.01

K. Backfill materials and granular fill materials shall comply with Division 2 Section “Site Earthwork” and applicable portions of referenced standards.

2.2 MANUFACTURER AND CONSTRUCTION

A. Pipe: Unless otherwise indicated, storm drain piping for driveway culverts twelve inch (12") and larger diameter shall be reinforced concrete pipe manufactured in accordance with ASTM C76 specifications and AASHTO M-170.

B. Joints: All pipe joints shall be bell and spigot type for round pipe 30" diameter and smaller, and tongue and groove joints for round pipes 36" diameter and larger, and tongue and groove joints for arch pipes, and shall be field connected. The joints shall utilize elastomeric sealing gasket with a double sealing surface design, or pre-formed flexible mastic joint sealant. The joints shall be watertight and shall meet the requirements of ASTM D3212.

C. Fittings: Couplings, elbows, reducers, tees, wyes, laterals and other fittings shall be capable of with-standing all operating conditions when installed. They may be molded or fabricated.

D. Storm Drain Pipe over twelve inches (12”) in diameter shall be non-perforated A-2000 ribbed pipe with gasketed joints per ASTM F949 and installed per ASTM D2321.

E. Storm Drain Pipe under twelve inches (12") in diameter shall be non-perforated Schedule 40 P.V.C. minimum with solvent-welded joints, and shall conform to Louisiana Standard Specifications for Roads and Bridges - Section 701.

2.3 DIMENSIONS

A. Diameters: The inside and outside diameters of the pipe barrel shall be in accordance with referenced ASTM Specifications when measured in accordance with ASTM D2122.

B. Lengths: Reinforced Concrete Pipe shall be supplied in standard lengths of 8 feet. PVC Pipe shall be supplied in standard lengths of 10 feet.

C. Wall Thickness: The minimum wall thickness shall be as stated in referenced ASTM Specifications when measured in accordance with ASTM D2122.

D. Sockets: All socket (bell) dimensions on pipe and fittings shall meet the requirements given in referenced ASTM Specifications when measured in accordance with ASTM D2122.

E. Pipe Sizes shall be as indicated on the Drawings.

2.4 PERFORMANCE REQUIREMENTS

A. Pipes: Pipes shall be manufactured and tested in accordance with ASTM C76 specifications and AASHTO M-170.

B. Joints: Joints shall remain watertight when tested in accordance with ASTM D3212.

2.5 PACKAGING, HANDLING AND SHIPPING

A. Packaging, handling and shipping shall be in accordance with the manufacturer's instructions.

PART 3 - GENERAL

3.1 INSTALLATION

A. Bedding, backfill, and general installation requirements shall comply with manufacturer's written installation instructions, ASTM D2321 and Section 701 -Culverts and Storm Drains -of the 2000 Edition of the Louisiana Standard Specifications for Roads and Bridges, except where modified by these Specifications (All references made therein to methods of measurement and payment are hereby deleted. Payment shall be made under the lump sum bid price for the project). The manufacturer shall provide a booklet with detailed instructions on unloading, handling and installing pipe and fittings. Gaskets shall be shipped in a box to prevent damage from UV exposure and handling. Gaskets shall be placed on the spigot end and both spigot and bell ends must be free of debris prior to insertion. Lubricants supplied by the manufacturer will be liberally applied to both the gasket and the interior of the bell. The spigot end will be marked to ensure adequate joining is achieved.

3.2 DRAINAGE

A. Drainage manholes, junction boxes, catch basins and other drainage structures shall conform to Section 702 -Manholes, Junction Boxes and Catch Basins - of the 2000 Edition of the Louisiana Standard Specifications for Roads and Bridges, except as modified by these Specifications and as specified below:
   1. All references made therein to methods of measurement and payment are hereby deleted. Payment shall be made under the lump sum bid price for the project.
   2. Concrete for drainage manholes, junction boxes, catch basins and other drainage structures shall be 3000-psi compressive strength (28-day).
   3. The bottoms of all catch basins, junction boxes and manholes shall contain benches, and they shall be constructed to allow smooth flow through the system. Grout shall extend to a height of six inches (6") for fifteen inch (15") and eighteen inch (18") diameter pipe and a height of one third (1/3) diameter of pipe for twenty-four inch (24") and larger pipe at all outside edges, and shall slope to the invert of the catch basin.
   4. On all masonry constructed catch basins, junction boxes and manholes, both the interior and exterior walls shall be coated with a half inch (1/2") thick layer of mortar.
   5. Manholes, junction boxes and catch basins shall be constructed as shown on the Drawings.

3.3 CONNECTIONS

A. Connection: Connect storm drain piping to catch basins, manholes and junction boxes in an approved manner compatible with the type of piping and drainage products used and in accordance with manufacturer's recommendations. Connect new drainage system to existing drainage structures in accordance with referenced standards, manufacturer's recommendations and requirements of authorities having jurisdiction.

3.4 CLEANING AND PROTECTION

A. Provide temporary erosion control around catch basin inlets and other drainage structures to prevent "silting-in" of storm drain system. Clean out sediment from storm drain system at completion of project and ensure that all components of storm drainage system are clean, free-flowing and unobstructed. Remove and legally dispose of temporary erosion control materials.

END OF SECTION 334100