

**INVITATION TO BID**

**#462-492-88014**

**COMFORT STATION CONSTRUCTION**

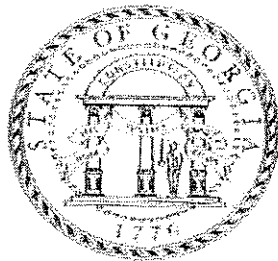
**AT**

**TUGALOO STATE PARK  
LAVONIA, GEORGIA**

**PROJECT MANUAL**

**VOLUME I**

**OCTOBER 13, 2010**



**GEORGIA STATE FINANCING AND INVESTMENT COMMISSION**

**ATLANTA, GEORGIA**



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES  
CHRIS CLARK, COMMISSIONER

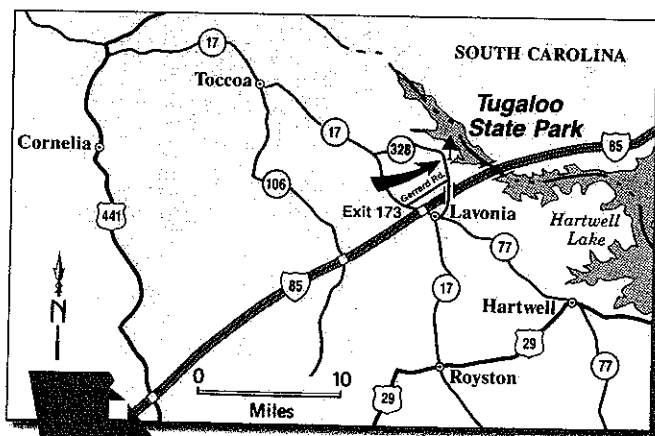
October 20, 2010

To Whom It May Concern:

RE: Comfort Station Construction  
Tugaloo State Park  
Lavonia, Georgia

There will be a pre-bid meeting concerning the above project at Tugaloo State Park, 1763 Tugaloo State Park Road, Lavonia, Georgia 30533 on Tuesday, November 23, 2010 at 10:00 AM. The purpose of this meeting is to review the project and answer questions. This meeting is mandatory and failure to attend will result in rejection of your bid. Check at the park visitor center for the exact location of the meeting.

Tom Hooks  
Contracts Administrator



Location: Take I-85 exit #173 north on Georgia 17; follow park signs to Gerrard Road, turn right. Go 1.5 miles to Ga. Hwy. 328 and turn left. Proceed 3.3 miles to park; entrance on right.

BECKY KELLEY, DIRECTOR  
PARKS AND HISTORIC SITES DIVISION  
2 MARTIN LUTHER KING, JR. DRIVE, SUITE 1352  
ATLANTA, GEORGIA 30334  
(404) 656-2770

COMFORT STATION CONSTRUCTION  
TUGALOO STATE PARK  
LAVONIA, GEORGIA  
INVITATION TO BID #462-492-88014  
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**SECTION A**  
**INVITATION TO BID**  
**No. 462-492-88014**

- A-01.** Notice is hereby given that the Georgia State Finance and Investment Commission (GSFIC) will accept sealed bids on behalf of the Georgia Department of Natural Resources for Comfort Station Construction at Tugaloo State Park, Lavonia, Georgia, in strict conformity with the bidding and Contract Documents.
- A-02.** Each bid must be submitted on the prescribed Form of Proposal. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures, and the certification (reference Form of Proposal paragraph B-09) must be fully completed and executed when submitted.
- A-03.** Such sealed bids as received will be opened and read aloud at 2:00 P.M. on December 2, 2010 in the GSFIC Bid Room located on the Second Floor, 270 Washington Street, Atlanta, Georgia. All mailed or hand delivered bids must be received by the Georgia State Finance and Investment Commission, Second Floor, 270 Washington Street, Atlanta, Georgia 30334, on or before that date and time. Bidder retains full responsibility for assuring that bids are received in the Procurement Division by the time stated for bid opening.
- A-04. COPIES OF BIDDING DOCUMENTS MAY BE OBTAINED FROM:**  
The Georgia Procurement Register at: <http://ssl.doas.state.ga.us/PRSapp/index.jsp> under "State Government" and "Georgia State Financing and Investment Commission". Information concerning the pre-bid conference may be obtained from: Tom Hooks or David Clark, Department of Natural Resources, 2 Martin Luther King, Jr. Drive, Suite 1352, Atlanta, Georgia 30334, 404-656-2770 [tomh@dnr.state.ga.us](mailto:tomh@dnr.state.ga.us) or [david.clark@dnr.state.ga.us](mailto:david.clark@dnr.state.ga.us)

**IMPORTANT**

**A MANDATORY PRE-BID CONFERENCE** will be held at Tugaloo State Park, 1763 Tugaloo State Park Road, Lavonia, Georgia 30533. The GSFIC reserves the right to disqualify a potential bidder due to a failure by the bidder to arrive for the site visit by the scheduled time. Failure to attend a mandatory site visit will automatically result in disqualification from the bid process.

- A-05.** Except for the purposes of obtaining bidding documents, from the date that this Invitation To Bid (ITB) is issued until a bidder is selected and the selection is announced, there will be no communication for any reason between a bidder and any State employee other than the contracting officer listed below regarding this ITB. The GSFIC reserves the right to reject any proposal for violation of this provision. No questions other than written will be accepted, and no response other than written will be binding upon the GSFIC.
- Contracting Officer: Cassandra Zuber  
270 Washington Street, Second Floor  
Atlanta, Georgia 30334  
404-463-5733  
404-463-5699 (Fax)  
[czuber@gsfic.ga.gov](mailto:czuber@gsfic.ga.gov)
- A-06.** Each bid must be accompanied with a BID BOND (Bond only; certified checks or other forms are not acceptable) in an amount equal to 5% of the base bid, payable to the Georgia State Finance and Investment Commission and issued by a Corporate Surety authorized to do business in the State of Georgia, in order to guarantee that the bidder will enter into a contract to construct the project strictly within the terms and conditions stated in this bid and in the bidding and Contract Documents, should the construction contract be awarded to him.
- A-07.** All bids submitted shall remain open for a period of thirty-five (35) days after the date of the bid opening.
- A-08.** The owner reserves the right to reject any or all bids and to waive technicalities and irregularities.

**A-09.** All expenses for preparing and submitting responses are the sole cost of the party submitting the response. The GSFIC is not obligated to any party to reimburse such expenses. All submittals upon receipt become the property of the GSFIC. Labeling information provided in submittals "proprietary" or "confidential", or any other designation of restricted use will not protect the information from public view. Subject to the provisions of the Open Records Act, the details of the proposal documents will remain confidential until final award.

**SECTION B  
PROPOSAL FORM**

BID CLOSING DATE AND TIME: December 2, 2010 @ 2:00 P.M.

TO: Procurement Division  
Georgia State Finance and Investment Commission  
270 Washington Street, Second Floor  
Atlanta, Georgia 30334

FOR: GEORGIA DEPARTMENT OF NATURAL RESOURCES  
AN AGENCY FOR THE STATE OF GEORGIA

Gentlemen:

- B-01.** Having carefully examined the Bidding Documents entitled: Comfort Station Construction at Tugaloo State Park, Lavonia, Georgia, dated October 13, 2010, and Addendum(a) No.(s) \_\_\_\_\_ as well as the premises and conditions affecting the Work, *[the state reserves the right to disqualify any bid submitted which fails to acknowledge receipt of all issued addendum (a)]* the undersigned proposes to furnish all services, labor, and materials called for by them for the entire Work, in accordance with said documents, for the sum of:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_), which sum is  
hereinafter called the Base Bid.

- B-02. ALTERNATE/UNIT PRICES:** The following alternate prices/unit prices are hereby established and subject to owner approval: (1) may form the basis of a change order or (2) may be incorporated into the contract price at the time of the award. Said prices shall remain firm and in effect for 30 days after the notice to proceed is issued by the owner. The owner reserves the right to exercise/accept any combination of independent alternates and adjust the contract price accordingly:
- There are no alternate or unit prices.
- B-03.** The undersigned hereby agrees that this proposal may not be revoked or withdrawn after the time set for the opening of bids, but shall remain open for acceptance for a period of 35 days following such time.
- B-04.** In the event that the undersigned is notified in writing by mail, telegraph, or delivery of the acceptance of this proposal within 35 days after the time set for the opening of bids, the undersigned agrees to execute, within fifteen (15) days, a contract (on a form supplied by the Georgia State Finance and Investment Commission, when a stipulated sum forms the basis of payment) for the Work for the above stated compensation and at the same time to furnish and deliver to the Owner a Performance Bond and Payment Bond in accordance with the forms shown in Exhibit C & D and the General Conditions of the Contract, both in an amount equal to 100% of the Contract sum. The surety must be one which is licensed to do business in the State of Georgia.
- B-05.** Prior to the bid opening date and hour, errors may be stricken or revisions may be made and corrections entered on this proposal form, provided that any such strike-over or revision is signed in ink by the person signing the bid or his agent. **Any revisions made on the outside of the envelope will not be accepted.**
- B-06.** The undersigned agrees to commence actual physical work on the site with an adequate work force and equipment within ten days of the date of the Notice to Proceed and to complete fully all work by not later than \_\_\_\_\_ consecutive calendar days from and including said date.



**B-07.** Enclosed herewith is a bid bond (Bid Bond only, Bonding Company Form is Acceptable; certified checks or other forms of bid security are not acceptable) in the amount of

DOLLARS (\$ \_\_\_\_\_)

(being not less than 5% of the base bid). The undersigned agrees that the above stated amount is the proper measure of liquidated damages which the Owner will sustain by the failure of the undersigned to execute the Contract and to furnish performance and payment bonds in case this proposal is accepted.

**B-08.** The bidder submits the following statement of bidder's qualifications for consideration by the Owner.

**STATEMENT OF BIDDER'S QUALIFICATIONS**  
**(To be subscribed and sworn to before a notary public)**

Firm Name: \_\_\_\_\_  
LEGAL NAME OF BUSINESS (As registered with Secretary of State)

Address: \_\_\_\_\_  
LEGAL BUSINESS ADDRESS (P.O. BOX IS INSUFFICIENT)

\_\_\_\_\_ CITY STATE ZIP

\_\_\_\_\_ MAILING ADDRESS IF DIFFERENT FROM ABOVE

Telephone Number: \_\_\_\_\_  
AREA CODE NUMBER

Contact Person Name and Email Address: \_\_\_\_\_

Georgia Resident: YES \_\_\_\_ NO \_\_\_\_

When Organized: \_\_\_\_\_ Where Incorporated: \_\_\_\_\_

Federal I.D. No.: \_\_\_\_\_ or Social Security No.: \_\_\_\_\_

Number of years engaged in the contracting business under the present firm name: \_\_\_\_\_

Credit Available for This Contract: \_\_\_\_\_

Contracts Now in Hand, Gross Amount: \_\_\_\_\_

Plan of Organization:  Proprietorship  Corporation  Partnership

The bidder has refused to sign a contract at the original bid. YES or NO (Please circle one)

The bidder has been declared in default on a contract. YES or NO (Please circle one)

If answer is Yes to either statement above, please explain:

The foregoing statement of qualifications is submitted under oath.

**B-09.** Under oath I certify that I am a principal or other representative of the firm of \_\_\_\_\_ and that I am authorized by it to execute the foregoing offer on its behalf. I am a principal person of the foregoing with management responsibility for the foregoing subject matter and as such I am personally knowledgeable of all its pertinent matters. The foregoing statement of facts in the foregoing proposal is true.

**B-10.** I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a bid for the same materials, supplies, or equipment, and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of State and Federal law and can result in fines, prison sentences and civil damage awards. I agree to abide by all conditions of this bid and certify that provisions of Georgia O.C.G.A. Section 45-10-20, *et. sec.*, have not and shall not be violated in any respect.

The full names of persons and firms interested in the foregoing bids as principals are as follows:

(1) \_\_\_\_\_  
Check One: President ( ) Partner ( ) Owner ( )

(2) \_\_\_\_\_  
Check One: Vice President ( ) Secretary ( ) Partner ( )

If incorporated, the names of both the President and Corporate Secretary must be indicated. If a partnership, all partners must be indicated.

The legal name of the bidder as registered with the Secretary of State is:

\_\_\_\_\_

DATE: \_\_\_\_\_

BY: \_\_\_\_\_  
Authorized Signature (BLUE INK PLEASE)

\_\_\_\_\_  
Typed/Printed Name Title

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_

**NOTICE TO BIDDERS**

- 1) MAKE SURE YOU HAVE SIGNED THIS PROPOSAL IN THE SPACE PROVIDED ABOVE.
- 2) SUBMIT ORIGINAL OF THE FORM OF PROPOSAL.
- 3) MAKE SURE YOU AND YOUR SURETY HAVE PROPERLY EXECUTED THE BID BOND.

B-12. Please check the box if the definition below applies to your company:

**MINORITY BUSINESS ENTERPRISE (MBE)**. The business is either: a) owner by a member of a minority race or b) a partnership of which a majority of interest is owned by one or more members of a minority race or c) a public corporation of which a majority of the common stock is owned by one or more members of a minority race. A member of a minority race is defined as an individual who is a member of a race which comprises less than 50 percent of the total population of the state of Georgia. This request is made for statistical purposes only.

**SECTION C**  
**INSTRUCTION TO BIDDERS**

- C-01. Basis of Contract.** See Invitation to Bid and Proposal Form. (See also D-45)
- C-02. Bid Security.** See Invitation to Bid and Proposal Form.
- C-03. Interpretations.** No oral interpretation will be made to bidders as to the meaning of the drawings and specifications. Requests for interpretation of drawings and specifications must be made in writing to the Architect and/or the Owner's Representative not later than five (5) days prior to the date set for receipt of the proposals, and failure on the part of the successful bidder to do so shall not relieve him as Contractor of the obligation to execute such work in accordance with a later interpretation by the Architect and/or the Owner's Representative. All interpretations made to bidders will be issued in the form of addenda to the plans and specifications and will be posted on the Georgia Procurement Registry. Such addenda are to be listed in the proposals, and in closing the contract they will become a part thereof. (See also D-45)
- C-04. Proposals**
- a. Bids will be opened and read as stated in the Invitation to Bid.
  - b. All bidders must deliver two (2) complete sets (one original clearly marked or stamped "original", and one (1) copy of the Proposal Form (Section B) and the copy must be signed. All blanks on the Proposal Form must be filled in. Numbers and shall be written in English words and in Arabic numerals. The completed form shall be without interlineation, alteration or erasure. Failure to submit a proposal in the form required or the inclusion of any condition, alternate, limitation or provision not called for will render the proposal irregular and shall be considered sufficient cause for rejection of a proposal. Failure to complete entries in all blanks in the Proposal Form shall be considered sufficient cause for rejection of a proposal.
  - c. Proposals are to be addressed to the Georgia State Finance and Investment Commission, at the address shown in the Invitation to Bid and must be enclosed in an opaque, sealed envelope and marked on the lower left corner with the Bid Date, Bid Time, Bid Number and the Name of Project. Proposals are to reach the address designated in the invitation to bid not later than the hour and date named in the Invitation To Bid. After that time no proposals may be received.
  - d. A bid must be submitted for all alternates. (See D-47)
  - e. Bids together with the full bid security accompanying same may be withdrawn by bidders prior to the time set for official opening. After time has been called, no proposal may be withdrawn for a period of thirty five days after the TIME AND DATE of opening. Negligence or error on the part of any bidder in preparing his proposal confers no right of withdrawal or modification of his proposal after time has been called.
  - f. Bid responses containing provisions for late or interest charges will not be considered for an award. Bidders are instructed to remove or strike through any reference to this provision and to initial changes prior to submitting a bid response to the Georgia State Finance and Investment Commission.
- C-05. Examination of Site.** The bidder's attention is directed to D-15(d).
- C-06. Contract Form and Bonds.** The bidder's attention is directed to B-04.
- C-07. Award.** The Contract will be awarded, if at all, to the lowest responsible, responsive bidder. The lowest bid will be the bid whose price, after incorporating all accepted alternates, is the lowest and most responsive bid which was received.
- C-08. Surety and Insurance Companies.** The contract provides that the surety and insurance companies must be acceptable to the Owner. To avoid inconvenience, any bidder should get in touch with the Owner to determine whether the surety or insurance companies expected to be used on the work are acceptable to the Owner. (See also D-27 and D-30)

- C-09. Employment of Georgia Citizens and Use of Georgia Products.** Since the work provided for in this contract is to be performed in Georgia, it is the wish of the Owner that materials and equipment manufactured or produced in Georgia shall be used in the work and that Georgia citizens shall be employed in the work at wages consistent with those being paid in the general area in which the work is to be performed. This desire on the part of the Owner is not intended to restrict or limit competitive bidding or to increase the cost of the work; nor shall the fulfillment of this desire be asserted by the Contractor as an excuse for any noncompliance or omission to fulfill any obligation under the contract.

**IMPORTANT**

- C-10. Trade Names.** The attention of bidders and all other parties is called to the procedure under D-03 of the general conditions for the submission of trade names, brand names, or names of manufacturers for approval which aforesaid procedure is used in place of what is commonly known as an "or equal" provision. The successful bidder may furnish no products of any trade names, brand names, or manufacturers' names except those designated in the contract documents including published addenda.
- C-11. Georgia State Finance and Investment Commission Policy Statement.** It is the policy of the GSFIC that minority business enterprises shall have the maximum opportunity to participate in the GSFIC purchasing process. Therefore, the GSFIC encourages all minority business enterprises to compete for, win, and receive contracts for goods, services and construction. Also, the State encourages all companies to sub-contract portions on any State contract to minority business enterprises. Any questions regarding statements contained hereunder should be directed to the State Small and Minority Business Coordinator referenced below.
- C-12. Georgia Income Tax Incentive.** Bidders interested in taking advantage of the Georgia income tax incentives provided for by the Official Code of Georgia Annotated 48-7-38 relative to the use of minority subcontractors in the performance of contracts awarded by the State of Georgia should contact the State Small and Minority Business Coordinator at the following address:
- Governor's Small Business and Entrepreneurial Office  
Georgia Department of Economic Development  
75 Fifth Street, NW, Suite 825  
Atlanta, Georgia 30308  
Telephone: (404) 962-4824  
Fax: (404) 962-4829
- C-13. Reciprocal Preference Law.** For the purposes of bid evaluation only, Vendors resident in the State of Georgia will be granted the same preference over Vendors resident in another State in the same manner, on the same basis, and to the same extent that preference is granted in awarding bids for the same goods or services by such other State to Vendors resident therein over Vendors resident in the State of Georgia. NOTE: For the purpose of this law, the definition of a resident vendor is one who maintains a place of business with at least one employee inside the State of Georgia. A post office box address will not satisfy this requirement.

**SECTION D  
GENERAL CONDITIONS**

**D-01. General Conditions.** The General Conditions of the Contract, D-01 thru D-71, inclusive, bound herein and hereafter referred to as the "General Conditions," shall govern in the event of any conflict with any other provisions of the contract documents unless notice to the contrary shall have been issued by the Owner bearing the imprimatur of the Owner as follows:

*"By order of the Owner"*

In the event of conflict, the Supplementary General Conditions control is over the General Conditions, and the Contract control is over the Supplementary and General Conditions. [See E-01 and D-49] The Architect has no authority to amend the General Conditions orally or in writing either expressly or by implication.

**D-02. Legal Compliance.** The Contractor shall comply with all laws, rules, regulations, ordinances, and orders of any government agency having jurisdiction in the performance of the work and shall ensure the compliance of his subcontractors. Without limiting the generality of the foregoing, the following laws are specifically referenced:

- a) The Drug-Free Workplace Act, O.C.G.A. Section 50-24-1, *et. seq.*
- b) Preference for Georgia Supplies, materials, equipment, and agricultural products, O.C.G.A. Sections 50-5-60 through 61.
- c) Preference for Georgia forest products, O.C.G.A. Section 50-5-63.
- d) Preference to local sellers of Georgia products, O.C.G.A. Section 50-5-62.
- e) Standards and Requirements for Construction, Alterations, *etc.*, O.C.G.A. Section 8-2-1 *et. seq.*
- f) Control of Soil Erosion and Sedimentation, O.C.G.A. Section 25-2-1, *et. seq.*
- g) Regulation of Fire and other Hazards, O.C.G.A. Section 25-2-1 *et. seq.* [See Article 12(a)]
- h) Regulation of Blasting Operations, O.C.G.A. Section 25-2-1 *et. seq.* and 25-9-1 *et. seq.*
- i) Providing Safe workplace, O.C.G.A. Sections 34-2-10 and 34-7-20. [See Article D-12(b)]
- j) Underground Gas Pipes, O.C.G.A. Section 25-9-1 *et. seq.* [See Article D-12(f)]
- k) High Voltage Safety Act, O.C.G.A. Section 46-3-30 *et. seq.* [See Article D-12(g)]
- l) Access and Use by Physically Handicapped Persons, O.C.G.A. Section 30-3-1 *et. seq.*
- m) Small and Minority Business Enterprises, O.C.G.A. Sections 50-5-120 *et. seq.* and 50-5-130 *et. seq.*
- n) Trading with the State or State Officials, O.C.G.A. Sections 45-10-20 to 45-10-71.
- o) Title VII of the Civil Rights Act
- p) Age Discrimination in Employment Act
- q) Americans with Disabilities Act
- r) Federal Occupational Safety and Health Act, 29 U. S. C. Section 651 *et. seq.* [See Article D-12(j)]
- s) Federal Emergency Planning and Community Right-to-Know Act, 42 U. S. C. Section 11001 *et. seq.* [See Article D-12(k)]

**D-03. Trade Names**

- a. *No Restriction of Competition.* When reference is made in the contract documents to trade names, brand names, or to the names of manufacturers, such references are made solely to indicate that products of that description may be furnished and are not intended to restrict competitive bidding. If it is desired to use products of trade or brand names or of manufacturers' names which are different from those mentioned in the bidding documents, application for the approval of the use of such products must reach the hands of the Architect and/or the Owner's Representative (hereinafter the "Architect") at least ten days prior to the date set for the opening of bids. The latter provision is a restriction that applies only to the party making a submittal. Therefore, the aforesaid restriction does not inhibit the Owner from adding trade names, brand names or names of manufacturers by addendum.
- b. *Burden of Proof.* The burden of proving acceptability of a proposed product must be accompanied by technical data that the party requesting approval desires to submit in support of his application. The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed product with previous users, evidence of reputation of the manufacturer for prompt delivery, evidence of reputation of the manufacturer for efficiency in servicing its products, or any other written information that is helpful in the circumstances.

The application to the Architect for approval of a proposed product must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the bidding documents. The degree of proof required for approval of a proposed product as acceptable for use in place of a named product or named products is that amount of proof necessary to convince a reasonable person beyond all doubt. To be approved, a proposed product must also meet or exceed all express requirements of the contract documents.

- c. *Issuance of Addenda.* If the submittal is approved by the Architect, an addendum will be issued to all prospective bidders. Issuance of an addendum is a representation to all bidders that the Architect in the exercise of his professional discretion established that the product submitted for approval is acceptable and meets or exceeds all express requirements. In the event a submittal shall have been rejected by the Architect and there shall have been a request for a conference as provided in this article pursuant to which conference the said submittal shall have been found to comply with the requirements of this article, a separate addendum covering the said submittal will be issued prior to the opening of bids. In order for the Architect to prepare an addendum intelligently, an application for approval of a product must be accompanied by a copy of the published recommendations of the manufacturer for the installation of the product together with a complete schedule of changes in the drawings and specifications, if any, which must be made in other work in order to permit the use and installation of the proposed product in accordance with the recommendations of the manufacturer of the product. (See D-43, which requires the Contractor to do all cutting and fitting that may be required to make the several parts of his work come together properly and fit) Unless requests for approvals of other products have been received and approvals have been published by addendum in accordance with the above procedure, the successful bidder may furnish no products of any trade names, brand names, or manufacturers' names except those designated in the contract documents.
- d. *Conference with the Owner.* Any party who alleges that rejection of a submittal is the result of bias, prejudice, caprice, or error on the part of the Architect may request a conference with a representative of the Owner, PROVIDED: That the request for said conference, submitted in writing, shall have reached the Owner at least five days prior to the date set for the opening of bids, time being of the essence.

#### **D-1. Definitions**

- a. *Contract Documents.* The contract documents are as described in the Form of Agreement, D-71 of the general conditions. [See Exhibit E for specimen of form of agreement]
- b. *Parties.* The Owner, the Contractor and the Architect are those mentioned as such in the form of agreement. They are treated throughout the contract documents as if each were of the singular number and masculine gender.
- c. *Subcontractor.* The term subcontractor as employed herein includes only those having direct contract with the Contractor. It includes one who furnishes materials worked to a special design according to the plans and specifications of this work but does not include one who merely furnished materials not so worked.
- d. *Notices.* Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.
- e. *Work.* The term "work" of the Contractor or subcontractor includes labor or materials or both.
- f. *Time Limits.* All time limits stated in the contract documents or shown on the construction progress schedule are of the essence of the contract. (See also D-46)
- g. *Applicable Law.* This contract shall be governed by the law of Georgia.
- h. *Specifications.* The term "Specifications" shall include all written matter in the bound volume or on the drawings and any addenda or modifications thereto. (See D-49)

- i. *Order of Condemnation.* An order of condemnation shall be in writing, shall be dated, shall be signed by the Architect, shall be addressed to the Contractor with a copy to the Owner, and shall contain three elements as follows:

FIRST ELEMENT: Description of work:

1. which has been omitted; or
2. which is unexecuted as of the date of the order of condemnation, the time for its incorporation into the work under the construction progress schedule having expired (See also D-46); or
3. which has not been executed in accordance with the methods and materials designated in the contract documents.

SECOND ELEMENT: Citation of the provision or provisions of the contract documents that has or have been violated.

THIRD ELEMENT: Fixing of a reasonable space of time within which the Contractor shall have made good the deficiency which said space of time shall not be deemed to be an extension of contract time for filing the Notice of Readiness for Final Inspection pursuant to D-41 nor shall it be deemed to be authorization for amendment to the construction progress schedule. (See also D-19, D-20, and D-50)

An order of condemnation may be issued for failure of the Contractor to supply enough workmen or enough materials or proper materials. The order of condemnation in such event being based on D-46, q.v. and upon the definition of work as set forth under D-1(e), q.v. (See also D-26)

- j. *Proceed Order.* The proceed order is a written notice from the Owner pursuant to which the Contractor shall commence physical work on the site. (See D-46) A proceed order is a condition precedent to the execution of any work on the site by the Contractor.
- k. *Work Order.* A work order is a written notice from the Owner issued separately to the Contractor for each subcontractor. A work order is a condition precedent to the execution of any work on the site by a subcontractor.
- l. *Change Order Form.* The change order form is the instrument by which adjustments in the contract sum are effected pursuant to changes made in accordance with D-15. The change order form shall be accompanied by a breakdown in the form prescribed in a specimen which the Owner will supply to any bidder upon request. The Architect shall certify to the amount of the adjustment. The change order form shall be signed by the Contractor and the Owner. The breakdown is only for the purpose of enabling the Architect and the Owner to make a judgment on the dollar amount of the adjustment in the contract sum. No condition, term, qualification, limitation, exception, exemption, modification, or proviso shall appear in the breakdown. The breakdown shall be in the exact form and language of the above-mentioned specimen. In the event any condition, term, qualification, limitation, exception, exemption, modification, or proviso shall appear in a breakdown it shall be invalid unless expressly recited in the change order form under Paragraph 3, "Description of Change". Only such conditions, terms, qualifications, limitations, exceptions, exemptions, modifications and provisos as are recited under Paragraph 3, "Description of Change," are valid. (See also D-15)
- m. *Install, Deliver, Furnish, Supply, Provide and Other Such Words.* Such words mean the work in question shall be put in place by the Contractor ready for use unless expressly provided to the contrary.
- n. *Article Not Plenary.* This article is not entire, plenary, or exhaustive of all terms used in the general conditions which require definition. There are definitions of other terms under articles to which the terms are related.
- o. *Grounds for Issuance of Notice of Declaration of Default.* It shall be a sufficient ground for the issuance of a notice of declaration of default that the Contractor has been unfaithful or delinquent in the performance of the contract or any part of it in any respect. Without limitation of the foregoing and without subtracting from any right or defense of the Owner under other provisions of the contract documents, the Contractor acknowledges and agrees that it is ipso facto ground for issuance of a notice of declaration of default under the performance bond if the Contractor shall have neglected or failed for any reason to remedy a breach of



an order of condemnation within thirty (30) days after the Owner shall have given written notice of said breach to the Contractor and the surety on the performance bond with written demand of the Owner for curing of the delinquency. The Architect does not have authority to declare the Contractor in default.

- p. *Cross-reference and Citations of Articles and Paragraphs of the General Condition.* Cross-references and citations of articles and paragraphs of the general conditions are for the convenience of the Contractor, Architect and the Owner and are not intended to be plenary or exhaustive nor are they to be considered in interpreting the contract documents or any part of the contract documents.
- q. *Meaning of Words and Phrases.* Unless the context or the contract documents taken as a whole indicate to the contrary, words used in the contract documents that have usual and common meanings shall be given their usual and common meanings and words having technical or trade meanings shall be given their customary meaning in the subject business, trade or profession.
- r. *Shop Drawings.* Shop drawings are drawings, schedules, data, catalogue cuts, manufacturers' published recommendations, charts, bulletins, brochures, illustrations, circulars, roughing drawings or formulae distributed by Contractors, subcontractors, manufacturers, material men, or suppliers for use in installing work. (See also D-53)
- s. *Owner.* See Supplementary General Conditions, Section E.
- t. *Architect.* See Supplementary General Conditions, Section E.
- u. *Contractor.* The successful bidder who provides the lowest responsive bid and to whom a contract is awarded. The Contractor will execute a contract based on the specimen found at Exhibit E.

**D-2. Identification, Correlation, and Intent of Documents.** The contract documents are complementary, and what is called for by one shall be as binding as if called for by all. The Contract Documents consist of the Form of Agreement between Owner and Contractor with these General Conditions, Supplementary and other Conditions, the Drawings, the Specifications, all Addenda issued prior to the execution of this Agreement, and all Modifications issued by the Owner after execution of the Contract such as Change Orders, and written interpretations. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Work not covered in the Contract Documents will not be required unless it is necessary to produce the intended results. [See also D-1(m), D-36, D-37, and D-45]

**D-3. Complete, Definite, and Clear Instructions and Schedules of Drawings.**

- a. *Refinement of Documents.* The Contractor shall do no work without complete, definite, and clear drawings and specifications. In the event the contract documents are not complete, definite, and clear the Contractor shall make demand upon the Architect in writing for additional instructions and shall furnish the Owner a copy of the aforesaid demand. With reasonable promptness the Architect shall furnish complete, definite, and clear instructions in writing, or by means of drawings, or in writing and by means of drawings. [See also D-2, D-14, D-18 and D-39] Such additional instructions if given orally shall be confirmed in writing or by drawings or both within a reasonable space of time. Any such additional instructions shall be consistent with the contract documents, true developments thereof, and reasonably inferable therefrom. The work shall be executed in conformity with the aforesaid instructions. The Architect shall furnish the Owner a copy of all additional instructions issued to the Contractor. [See also D-16 and D-39]
- b. *Schedules.* The Contractor and the Architect shall jointly prepare a schedule, subject to change from time to time in accordance with the progress of the work, fixing the dates at which the various detail drawings will be required, and the Contractor shall furnish them in accordance with that schedule. [See also D-5(b)]

**D-4. OMITTED**

**D-5. Shop Drawings.** The Contractor shall review, approve and submit to the Architect all Shop Drawings, Product Data and Samples required by the Contract Documents for approval. The Work shall be in accordance with approved submittals.

- D-6. Drawings and Specifications at the Site.** The Contractor shall keep at the site one copy of all drawings and specifications in good order with all addenda and change orders noted thereon and available to the Architect and to his representative(s).
- D-7. Ownership of Drawings and Models.** All drawings, specifications, and copies thereof furnished by the Architect are the property of the Owner. They are not to be used on other work, and with the exception of one set, are to be returned to the Architect on his request at the completion of the work. All models are the property of the Owner.
- D-8. Samples.** The Contractor shall furnish for approval all samples as directed. The work shall be in accordance with approved samples.
- D-9. Materials, Appliances, and Employees**
- a. *Payment for.* Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary for the proper execution and completion of the work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. (See also D-70)
  - b. *Quality of Materials and Workmanship.* Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of the quality required by the specifications. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials and work. The burden of proof is on the Contractor. (See also D-13)
  - c. *Quality and Discipline of Employees.* The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him. (See also D-14)
- D-10. Royalties and Patents.** The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall hold the Owner harmless from loss on account thereof.
- D-11. Surveys, Permits and Regulations**
- a. *General.* The Owner shall furnish all surveys unless otherwise specified. Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be obtained and paid for by the Owner unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work. If the Contractor observes that the drawings or specifications are at variance therewith, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted as provided in the contract for changes in the work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules or regulations without such notice to the Owner, he shall bear all costs arising therefrom. (See also D-42)
  - b. *Codes*
    - 1) International Building Code, with Georgia State Amendments
    - 2) International Mechanical Code, with Georgia State Amendments
    - 3) International Fuel Gas Code, with Georgia State Amendments
    - 4) International Plumbing Code, with Georgia State Amendments
    - 5) International Electrical Code, with Georgia State Amendments
    - 6) International Energy Conservation Code, with Georgia State Amendments
- The latest edition of the above listed codes with all amendments as of the date of the opening of bids shall govern the installation of all work and is adopted and incorporated into the contract documents and made a part thereof by reference, Provided, however: That the drawings and specifications shall be adhered to in all cases where they call for quality of materials, quality of workmanship, or quality of construction which is equal to or in excess of the quality required by the above state codes and Provided also: That there may be no variances from the drawings and specifications except to the extent that the said variances shall be

necessary in order to comply with the above stated codes. It shall be the responsibility of the Contractor to familiarize himself with the requirements of the above stated codes. If there are any express requirements in the drawings or specifications which are at variance to the above stated codes, all changes in the work necessary to eliminate the said requirements and make the work conform to the above stated codes shall be adjusted as provided in the contract for changes in the work.

#### **D-12. Protection of Work and Property**

- a. *Duty to Protect Property.* The Contractor shall continuously maintain adequate protection of all his work from damage (see also D-24) and shall protect all other property from damage, injury, or loss arising in connection with the work regardless of who may be the Owner of said property. He shall make good any such damage, injury, or loss except such as may be directly the result of errors in the contract documents or such as shall be caused directly by agents or employees of the Owner. (See also D-27)
- b. *Safety Precautions.* The Contractor shall comply with the rules and regulations of OSHA and/or the Department of Labor (O.C.G.A. section 34-2-6), and, where not inconsistent with the foregoing, the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., for safety and prevention of accidents, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work arising out of and in the course of employment on work under the contract. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage that may result from their improper construction, maintenance, or operations. He shall erect and properly maintain at all times as required by the conditions and progress of the work proper safeguards for the protection of workmen and the public and shall post danger warnings against any hazards created by the construction operations. He shall designate a responsible member of his organization on the work whose duty shall be the prevention of accidents. In the absence of notice to the contrary, filed with the Architect in writing with copy to the Owner, this person shall be the superintendent of the Contractor. (See also D-14)
- c. *Emergencies.* In an emergency affecting the safety of life or the work or of adjoining property, the Contractor, without special instruction or authorization from the Architect or Owner, shall act, at his discretion, to prevent such threatened loss or injury. Any remuneration claimed by the Contractor on account of emergency work shall be determined in accordance with allowances permitted on force account under Case (c) of D-15 of the general conditions.
- d. *Blasting.* In the absence of an express provision in the contract permitting blasting, there shall be no blasting. If blasting is permitted under the contract and under the law which is applicable to the premises [including but not limited to O. C. G. A. Sections 25-8-1 *et. seq.* and 25-9-1 *et. seq.*], such blasting shall in all events be done in such manner as to prevent all scattering. [See also Article D-27]
- e. *Rain Water, Surface Water, and Back-up.* The Contractor shall protect all work, including but not limited to excavations and trenches, from rain water, surface water, and back-up of drains and sewers. The Contractor shall furnish all labor, pumps, shoring, enclosures, and equipment necessary to protect and to keep the work free of water. [See D-02(f)]
- f. *Underground Gas Pipe Law.* The Contractor by signing the contract acknowledges that he is fully aware of the contents and requirements of O.C.G.A. Section 25-9-1 *et. seq.*, and any amendments and regulations pursuant thereto, (the preceding requirements being hereinafter referred to as the "underground gas pipe law"), and the Contractor shall comply therewith. The Contractor acknowledges that the Contractor is the "person" defined in the above-mentioned underground gas pipe law (a) who will engage in the activities which are regulated thereby, (b) who is required to examine maps filed pursuant thereto, (c) who is required to give written notices to gas companies in accordance therewith, (d) who is required to receive written statements from gas companies as prescribed thereby, and (e) who is to perform and do certain things referred to therein only after observing the precautions with respect to underground gas pipes and facilities which are prescribed therein. These provisions of the contract do not repeal the restrictions under Subparagraph (d) of D-12 of the general conditions nor do they limit or reduce the duty of the Contractor otherwise owed to the Owner, to other parties, or to both. The Contractor agrees that the foregoing provisions supplement D-12 and D-27 of the general conditions. The Contractor agrees and acknowledges that any failure on his part to adhere to the underground gas pipe law shall not only be a violation of law

but shall also be a breach of contract and a specific violation of the provision under D-12 of the general conditions which pertains to safety precautions.

- g. *High Voltage Act.* The Contractor by signing the contract acknowledges that he is fully aware of the contents and requirements of O.C.G.A. Section 46-3-30 *et. seq.* and any amendments thereto, and Rules and Regulations of the Commissioner of Labor pursuant thereto (the preceding requirements being hereafter referred to as the "high voltage act"), and the Contractor shall comply therewith. The signing of the contract shall also confirm on behalf of the Contractor that he:
1. has visited the premises pursuant to D-15(d) of the general conditions and has taken into consideration the location of all electric power lines on and adjacent to all areas onto which the contract documents require or permit the Contractor either to work, to store materials, or to stage operations; and
  2. has obtained from the Owner of the aforesaid electric power lines advice in writing as to the amount of voltage carried by the aforesaid lines.

The Contractor agrees that he is the "person or persons responsible for the work to be done" as referred to in the high voltage act and that accordingly the Contractor is solely "responsible for the completion of the safety measures which are required by Section 3 of the high voltage act before proceeding with any work." The Contractor agrees that prior to the completion of precautionary measures required by the high voltage act he will neither bring nor permit the bringing of any equipment onto the site (or onto any area or areas onto which the contract documents require or permit the Contractor to work, to store materials, or to stage operations) with which it is possible to come within eight feet of any high voltage line as defined in the high voltage act, and the Contractor assumes complete and sole responsibility for any accident or accidents which may occur as a result of contact with a high voltage line or lines pursuant to operations arising out of performance of the contract. The foregoing provisions apply to power lines located (a) on the site and (b) on any area or areas onto which the contract documents require or permit the Contractor either to work, to store materials, or to stage operations, or (c) within working distance for equipment or materials being used on (a) and (b) above. These provisions of the contract do not limit or reduce the duty of the Contractor otherwise owed to the Owner, to other parties, or to both. The Contractor agrees that the foregoing provisions supplement D-12 and D-27 of the general conditions. The Contractor agrees and acknowledges that any failure on his part to adhere to the high voltage act shall not only be a violation of law but shall also be a breach of contract and a specific violation of the provision under D-12 of the general conditions which pertains to safety precautions. The Contractor is notified that the Rules and Regulations promulgated by the Commissioner of Labor under date of January 11, 1967, contain a statement under Section 12 that...

*"The Division of Inspection of the Department of Labor will act in an advisory capacity to any person, firm, or corporation contemplating any operations near high voltage lines as defined in the Act..."*

- h. *Building Construction Safeguards.* The Contractor acknowledges and agrees that he is the person responsible under the law and that he is the person EMPLOYING or directing others to perform labor within the meaning of O.C.G.A. Section 34-1-1 *et. seq.* He acknowledges and agrees likewise that he will comply with the aforesaid law.
- i. *Dust Control.* Dust-proof enclosures or partitions for protection wherever dusty or dirty work is performed and dampening of debris to avoid dusting when removed shall be provided and included as a cost of the work.
- j. *Occupational Safety and Health Act.* Contractor, by signing the contract, acknowledges that he is aware of and familiar with the contents and requirements of the Federal Occupational Safety and Health Act of 1970, 29 U. S. C. Section 651 *et. seq.*, as amended.
- k. *Emergency Planning and Community Right-to-Know Act.* Contractor, by signing the contract, acknowledges that he is aware of and familiar with the contents and requirements of the Federal Emergency Planning and Community Right-to-Know Act, 42 U.S.C. Section 11001 *et. seq.*, as amended.

### **D-13. Inspection of Work**

- a. *Access to Work.* The Architect and his representatives shall at all times have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection. [See also D-9]
- b. *Notice to Architect from Contractor Prior to Covering Work.* If the specifications, the Architect's instructions (either in the specifications or issued later in writing), laws, ordinances or any public authority require any work to be specially tested or approved, the Contractor shall give the Architect timely notice in writing of its readiness for inspection, and if the inspection is by any authority other than the Architect, of the date fixed for such inspection. (See also D-58) Inspections by the Architect shall be made promptly and where practicable at the source of supply. If any work should be covered without approval or consent of the Architect, it must, if required by the Architect, be uncovered for examination at the Contractor's expense. (See also D-58)
- c. *Re-examination or Re-testing of Work Covered pursuant to Consent of Architect.* Re-examination or re-testing of questioned work covered pursuant to consent of the Architect may be ordered by the Architect, and if so ordered the work must be uncovered by the Contractor. If such work be found in accordance with the contract documents the Owner shall pay the cost of re-examination and replacement or of re-testing. If such work be found not in accordance with the contract documents the Contractor shall pay such cost unless he shall show that the defect in the work was caused by another Contractor, and in that event the Owner shall pay such cost. Re-examination or re-testing under the terms of D-13(c) applies only to work which has been covered with consent of the Architect. Work covered without consent of the Architect must be uncovered for examination as provided under D-13(b).
- d. *Inspection Does Not Relieve Contractor.* Under the contract documents the Contractor has assumed the responsibility of furnishing all services, labor and materials for the entire work in accordance with such documents. No provisions of this article nor any inspection of the work by the Owner, representatives of the Owner, resident engineer inspector, clerk-of-the-works, engineers employed by the Architect, representatives of the Architect, or the Architect shall in any way diminish, relieve, or alter said responsibility and undertaking of the Contractor; nor shall the omission of any of the foregoing to discover or to bring to the attention of the Contractor the existence of any work or materials injured or done not in accordance with said contract documents in any way diminish, relieve, or alter such obligation of the Contractor nor shall the aforesaid omission diminish or alter the rights or remedies of the Owner as set forth in the contract documents. The resident engineer inspector has no power to make decisions, to accept or reject work, or to consent to the covering of work. The resident engineer inspector owes no duty to the Contractor. (See also D-38, D-41, and D-60)
- e. *False Start.* In the event notice of readiness pursuant to D-13(b), above, shall have been issued prematurely by the Contractor, his action shall be deemed to be a "false start", and the Contractor shall be liable for the damage resulting from the aforesaid false start, including but not limited to the salary, professional fees, and travel and living expenses of the person or parties inconvenienced by the aforesaid false start. [See also D-41 for further example of "false start"]

### **D-14. Superintendence and Supervision by Contractor**

- a. *Superintendent of Contractor.* The Contractor shall keep on his work during its progress and until the final certificate has been executed by the Architect a competent superintendent and any necessary assistants, all satisfactory to the Architect. The superintendent shall not be changed except with the consent of the Architect unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor in his absence, and all directions given to the superintendent shall be as binding as if given to the Contractor. [See also D-9, D-12, D-15(c) and D-60]
- b. *Supervision by Contractor.* The Contractor shall supervise and direct the Work, using his best skill and attention and he shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. [See also D-40 and D-41]

## D-15. Changes in the Work

- a. *Owner's Right to Make Changes.* The Owner, without invalidating the Contract, may order Changes in the Work consisting of additions, deletions, or modifications, the Contract Sum and the Contract Time being adjusted accordingly. The Contractor hereby expressly agrees that the Contractor shall have no right to a claim for damages or extended overhead because of changes made by the Owner. Such work is hereinafter designated "change" or "changes". All such changes shall be performed under the conditions of the original contract except that any claim for extension of time caused thereby shall be adjusted at the time of signing of the change order form. All such changes in the Work shall be authorized only by written Change Order signed by the Owner.
- b. *Cost to Owner for Change.* The cost or credit to the Owner from a change in the Work shall be determined in one or more of the following ways:
- Case 1. By estimate and acceptance of a lump sum.
  - Case 2. By Unit Prices named in the Contract or subsequently agreed upon. Unit Prices are NET and include all compensation due the Contractor.
  - Case 3. By force account, which is defined as expenditures allowed under D-15 plus a percentage of percentages as stated hereinafter. [see paragraph (e)]
- c. *Changes Forbidden without Consent of Owner.* Neither the Architect nor the Contractor shall make any change whatsoever in the work without authorization or order of the Owner in writing except in emergency. The Contract Sum and the Contract Time may be changed only by written Change Order.
- d. *Existing Conditions.* By executing the Contract, the Contractor represents that it has visited the site and familiarized itself with the local conditions under which the Work is to be performed. The Owner does not undertake to represent or warrant site or local conditions.
- e. *Cost to Owner, Allowances for Contractor and Allowable Expenditures.* In cases (1) and (3) above, the "allowance for overhead and profit" combined, included in the total cost to the Owner, shall be based upon the following schedule:
- 1. For the Contractor an allowance for work which he performs with his own forces, not to exceed 20% of his "net additional allowable expenditures", if any, for changes.
  - 2. For a subcontractor an allowance for work which he performs with his own forces, not to exceed 20% of his "net additional allowable expenditures", if any, for changes. A subcontractor shall receive no allowance for overhead and profit on work not performed by his own forces. Under this Contract, the forces of a subcontractor are deemed to be and are the forces of the subcontractor. (See also D-36 and D-37)
  - 3. For the Contractor an allowance for work performed by his subcontractors, not to exceed 7 1/2% of the amount, if any, due the subcontractor for changes.

The above percentages shall be applied to the "net allowable expenditures" if any, as limited and defined herein. If the net difference between "allowable expenditures" and savings results in a decrease in expenditures, the amount of credit allowed the owner shall be the net decrease without and credit for profit and overhead. "Net additional allowable expenditures" as used herein shall mean the difference between all "allowable expenditures" and savings. The term "allowable expenditures" is limited to and defined as items of labor or materials, the use of heavy construction equipment and all such items of cost as insurance premiums, social security and old age and unemployment insurance, and (in cases where there is an extension of time) pro rata expenditures for time of foreman employed in the direct superintendence of productive labor in execution of changes. All expenditures not included in the term "allowable expenditures" as limited and defined in this article shall be considered as overhead, including but not limited to insurance other than that which is mentioned in this article, bond premiums, supervision, travel (meals, transportation and lodging), superintendence (except pro rate time of foremen as referred to herein), timekeepers, clerks, watchmen, hand tools, small tools, incidental job burdens and office expense. Any other provisions in the Contract Documents to the contrary notwithstanding, only demonstratable, direct, out-of-pocket expenditures for the changes plus percentages as set forth hereinabove shall be allowable for

changes. The Contractor shall provide to the Owner, upon request, any and all necessary information the Owner may require in order to verify any and all costs associated with "Changes in the Work."

- f. *Breakdown of Expenditures, Cases (a) and (c).* To accompany all change orders, the Contractor shall furnish a breakdown of expenditures for labor and materials by units and quantities in the form prescribed by the Owner, and the breakdown shall be accompanied by the following declaration. "I do solemnly swear, under criminal penalty of a felony for false statement subject to punishment by not less than one year nor more than twenty years of penal servitude, that the costs shown hereinabove do not exceed current costs for like services or materials and do not exceed the actual costs to the Contractor therefore; and that the quantities shown do not exceed actual requirements." For all force account changes the Contractor shall promptly and in no event later than thirty (30) days after receipt of written demand therefore pursuant to D-15(g) submit to the Architect a complete, accurate, and final breakdown and account together with vouchers, showing all expenditures and percentages allowable under Case (c). For all unit price changes the Contractor shall promptly and in no event later than thirty (30) days after receipt of written demand therefore pursuant to D-15(g) submit to the Architect an accurate account of the quantity of work performed under Case (b). In any case, the Architect shall certify to the amount [including under Case (a) and Case (c) the allowance prescribed in the contract for overhead and profit] due the Contractor. [See also D-1(1) and D-50] The Contractor shall obtain and furnish as backup to the Contractor's breakdown a separate breakdown for each subcontractor's charges prepared by each subcontractor on the letterhead of the subcontractor and properly signed by the subcontractor.
- g. *Time of Submission of Claims ["Statement of Claim"].* Budgeting and cash flow being of material importance to the Owner, no claim of the Contractor on account of any change or on account of any alleged negligence of the Architect or Owner whether said claim shall be accrued or prospective, shall be valid unless a "statement of claim" in full accompanied by vouchers and other supporting data shall have been filed with the Owner by the Contractor not later than thirty (30) days after receipt of written request thereof by the Contractor from the Owner, time being of the essence. The "statement of claim" shall contain a concise and clear recital of the ground or grounds on the basis of which the claim is asserted, including a designation of the provision or provisions of the contract documents on which the claim is based. The statement of claim shall indicate the dollar amount of the claim.

#### **D-16. Claims**

- a. *Extra Cost.* If the Contractor maintains that any instructions by drawings or otherwise involve extra cost to the Owner under this Contract, he shall give the Owner and the Architect written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute any change except in emergency endangering life of property. The allowances to the Contractor shall then be as provided under D-15. No claim for extra cost shall be valid unless so made.
- b. *Damages.* If either party to this Contract should suffer damage in any manner because of any wrongful act of neglect of the other party or of anyone employed by the other party, then he shall be reimbursed by the other party for such damage. No claim of the Contractor for damages shall be valid unless written notice thereof shall have been received by the owner by registered mail within fifteen (15) days after occurrence of the event on which the claim is based. (See also D-15, D-39 and D-41)
- c. *Protests.* All reference to arbitration are deleted from the Contract Documents. Decisions of the Architect shall be rendered in all cases where provided for under the General Conditions of the Contract, but no decision of the Architect shall deprive the Owner or the Contractor of any form of redress which may be available under the laws of the State of Georgia to contracting parties. Any decision of the Architect shall be final and binding on the Contractor unless the Contractor shall have given written notice of protest to the Owner by registered mail within ten days of the receipt of the decision.

- D-17. Deductions for Uncorrected Work.** If the Architect and Owner deem it inexpedient to correct work injured or done not in accordance with the contract, an equitable deduction from the contract price shall be made therefore; but there is no duty on the part of the Owner to accept any work injured or done not in accordance with the methods and materials designated in the contract documents, nor does the Contractor have the right to demand that there shall be acceptance of work injured or done not in accordance with the methods and materials designated in the contract documents.

#### **D-18. Delays and Extensions of Time**

- a. *Grounds.* If the Contractor is delayed at any time in the progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control, then the contract time shall be extended by Change Order for such reasonable time as the Architect may determine. The Contractor expressly agrees that the Contractor's sole remedy for such delay shall be an extension of contract time and that the Contractor shall make no demand for damages or extended overhead.
- b. *Filing of Claim.* No such extension shall be made for delay occurring more than ten (10) days before claim thereof is made in writing to the architect with copy to the Owner. In the case of a continuing cause of delay, only one claim is necessary, but no claim for a continuing delay shall be valid unless the contractor, within ten days from the cessation of the delay, shall have given notice in writing to the architect, with copy to the Owner, as to the amount of additional time claimed.
- c. *Delay in Furnishing Drawings (See also D-5).* If no schedule or agreement stating the dates upon which drawings or approval of shop drawings shall be furnished is made, then no claim for delay shall be allowed on account of failure of the architect to furnish drawings or approval of shop drawings until two weeks after demand thereof and not then unless such claim be reasonable.
- d. *No Damages for Delay.* In the event of any delay, not the fault of the Contractor, the Contractor shall be entitled to an extension of time for completion only, and shall not be entitled to any additional payment on account of such delay. Without limiting the foregoing, except as otherwise specifically provided under D-15 or D-22, the Contractor shall not be entitled to payment or compensation of any kind from the Owner for direct, indirect or impact damages, including but not limited to costs of acceleration arising because of hindrance or delay from any cause whatsoever, whether such hindrances or delays be reasonable or unreasonable, foreseeable or unforeseeable, or avoidable or unavoidable; provided, however, that this provision shall not preclude recovery by the contractor of damages for hindrances or delays due solely to fraud or bad faith on the part of the Owner or his agents.

#### **D-19. Correction of Work**

- a. The Contractor shall promptly correct any Work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after Completion and whether or not fabricated, installed or completed, and shall correct any Work found to be defective or nonconforming within a period of one year from the Date of Completion of the Contract or within such longer period of time as may be prescribed by law or the terms of any applicable special warranty required by the Contract Documents. The provisions of this Article apply to Work done by Subcontractors as well as to Work done by direct employees of the Contractor. [See D-1(i)]
- b. *Remedy of the Owner for Breach of Order of Condemnation.* If the contractor does not make good a deficiency within a reasonable space of time fixed in an order of condemnation, the Owner may:
  1. Remove the condemned work and store it at the expense of the contractor. If the contractor does not pay the expenses of such removal and storing within ten days after receipt of written demand of the Owner, the Owner may upon three days' notice in writing to the contractor sell such materials at private sale or at auction and shall account for the net proceeds thereof after deducting all proper costs incurred by the Owner; and
  2. Supply omitted work, perform unexecuted work, replace and re-execute work not done in accordance with the methods and materials designated in the contract documents and deduct the cost thereof from any payment then or thereafter due the contractor, Provided: That the architect shall approve the amount charged to the contractor. (See also D-21)

The remedies stated in this article are in addition to the remedies otherwise available to the Owner, do not exclude such other remedies, and are without prejudice to any other remedies. Time limits stated in orders of condemnation are of the essence of the contract.

- D-20. Correction of Work after Final Payment.** Neither (1) the final certificate, (2) nor any decision of the architect, (3) nor payment, (4) nor any provision in the contract shall relieve the Contractor of responsibility for



faulty materials, faulty workmanship, or omission of contract work, and he shall remedy any defects or supply any omissions resulting there from and pay for any damage to other work resulting there from. The Owner shall give notice of observed defects or omissions with reasonable promptness. The Contractor shall within the space of time designated in orders of condemnation and without expense to the Owner, correct, remedy, replace, re-execute, supply omitted work, or remove from the premises all work condemned by the architect. The Contractor shall give prompt notice in writing to the architect, with copy to the Owner, upon completion of the supplying of any omitted work or the correction of any work condemned by the architect. In the absence of said notice, it shall be and is presumed under this contract that there has been no correction of the condemned work or supplying of omitted work. If the Contractor does not remove, make good the deficiency, correct, or remedy faulty work, or supply any omitted work within the space of time designated in orders of condemnation without expense to the Owner, the Owner, after ten days' notice in writing to the Contractor, may remove the work, correct the work, remedy the work or supply omitted work at the expense of the Contractor. In case of emergency involving health, safety of property, or safety of life the Owner may proceed at once. Correction of defective work executed under the plans and specifications or supplying of omitted work whether or not covered by warranty of a subcontractor or material men, remains the primary, direct responsibility of the Contractor. The foregoing obligation of the Contractor shall remain in effect until the same shall have been extinguished by operation of the statute of limitations. As additional security for the fulfillment of such obligation, but in no way limiting the same, the Contractor warrants and guarantees (1) that all work executed under the plans and specifications shall be free from defects of materials or workmanship for a period of one year from the date of the final certificate of the architect, and (2) that for not less than one year from the date of the final certificate of the architect, or for such greater space of time as may have been designated in the specifications, products of manufacturers shall be free from defects of materials and workmanship. Whenever written guaranties or warranties are called for, the Contractor shall furnish the aforesaid for such period of time as may be stipulated. The aforesaid instruments shall be in such form as to permit direct enforcement by the Owner against any subcontractor, material men, or manufacturer whose guaranty or warranty is called for, and the Contractor agrees that:

- a. The Contractor is jointly and severally liable with such subcontractors, material men, or manufacturers.
- b. The said subcontractors, material men, or manufacturers are agents of the Contractor for purposes of performance under this article, and the Contractor, as principal, ratifies the warranties or guaranties of his aforesaid agents by the filing of the aforesaid instruments with the Owner. The Contractor as principal is liable for the acts or omissions of his agents.
- c. Service of notice on the Contractor that there has been breach of any warranty or guaranty will be sufficient to invoke the terms of the instrument, Provided: That the Owner shall have furnished the Contractor with a copy of notice served on the subcontractor, material men, or manufacturer.
- d. The Contractor will bind his subcontractor, material men, and manufacturers to the terms of this article.

The calling for or the furnishing of written warranties shall in no way limit the contractual obligation of the Contractor as set forth hereinabove. The remedies stated in this article are in addition to the remedies otherwise available to the Owner, do not exclude such other remedies, and are without prejudice to any other remedies. [See also D-1(i), D-25, and D-60]

- D-21. The Owner's Right to Do Work.** If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this contract, the Owner, after three days' written notice to the Contractor may without prejudice to any other remedy he may have (including without limitation remedies against the Contractor's surety), make good the deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor, provided, however, that the Architect shall approve the amount charged to the Contractor. (See also D-19 and D-22)
- D-22. Right of the Owner to Terminate Contract.** If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with Contract Documents or fails to perform any provisions of the Contract, the Owner may, after seven (7) days written notice to the Contractor and without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor or, at its option that sufficient cause exists to justify such action, may terminate the Contract and take possession of the site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method it may deem expedient, and if

the unpaid balance of the Contract Sum exceeds the expense of finishing the Work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner.

**D-23. Contractor's Right to Stop Work or Terminate Contract.** If the Owner fails to make payment for a period of fifteen (15) days after receipt of proper pay request, the Contractor may, upon seven (7) additional days written notice to the Owner, terminate the Contract and recover from the Owner payment for all Work executed.

**D-24. Application for Payments**

- a. *Periodical Estimates and Receipts.* The Contractor shall submit to the Architect in accordance with a form to be supplied by the Owner [specimen of which will be supplied to any bidder on request] an application [sometimes herein designated "periodical estimate"] for each payment, and, if requested by the Owner or Architect, receipts or other vouchers, showing his payments for materials and labor, including payments to subcontractors as required by D-37. (See also D-32 and D-50)
- b. *Initial Breakdown and Periodical Payments.* If payments are made on valuation of work done, such application shall be submitted at least ten days before each payment falls due, and the Contractor shall, before the first application, submit to the Architect a schedule of values of the various parts of the work, including quantities, aggregating the total sum of the contract, divided in such manner as to facilitate payments to subcontractors in accordance with D-37, on a form to be furnished by the Owner with a complete breakdown of the contract price so arranged and so itemized as to meet the approval of the Architect and, if requested, supported by such evidence as to its correctness as the Architect may direct. The schedule designated herein the "initial breakdown" [specimen of which will be supplied to any bidder on request], when approved by the Architect shall be used as a basis for certificates of payment, unless it be found to be in error. In applying for payments, the Contractor shall submit a statement based upon this schedule on a periodical estimate form to be supplied by the Owner [specimen of which will be supplied to any bidder], and, if requested by the Architect or Owner, itemized in such form and supported by such evidence as the Architect or Owner may direct showing the Contractor's right to the payment claimed on the periodical estimate.
- c. *Materials Storage.* If payments are made on account of materials delivered and suitably stored at the site but not incorporated in the work, they shall, if required by the Owner or the Architect, be conditional upon submission by the Contractor of bills of sale or such other procedure as will establish the Owner's title to such material or otherwise adequately protect the Owner's interest. (See also D-28 and D-32) The Contractor is responsible for the existence, protection, and, if necessary, replacement of materials until execution of the final certificate of the Architect. (See also D-12, D-25, and D-41) The Owner shall not pay for any materials stored off site.

**D-25. Certificate of Payments**

- a. *Issuance.* If the Contractor has made application for payment as provided under D-24, the Architect shall not later than the date when each payment falls due issue to the Contractor a certificate for such amount as he decides to be properly due or state in writing his reasons for withholding a certificate.
- b. *Effect.* No certificate issued, nor payment made to the Contractor, nor partial or entire use or occupancy of the work by the Owner shall be an acceptance of any work or materials not in accordance with the contract documents. (See also D-20) The making of the final payment shall constitute a waiver of all claims by the Owner other than those arising from unsettled liens, from faulty work appearing after final payment, or from requirements of the specifications or drawings. Acceptance of the final payment shall operate as and shall be a release to the Owner from all claims of any kind or character under the contract except for such specific amount or amounts as may have been withheld to cover the fair value of any incomplete work which has been certified by the Architect under the provision of Paragraph (d) of Article 5 of the form of agreement as incomplete through no fault on the part of the Contractor.
- c. *Date and Rate of Payment.* Progress payments will be made by the Owner to the Contractor in accordance with Article 4 of the form of agreement. Final payment will be made in accordance with Article 5 of the form of agreement. The date and rate of payment are subject to D-26. Sums retained pursuant to the present article are and remain the property of the Owner until such time as the Contractor shall have

become entitled to receive payment of such retainage by (a) furnishing the remainder of the *quid pro quo* under the contract and (b) complying in full with the terms of the contract.

**D-26. Payments Withheld.** The Architect may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate to such extent as may be necessary to protect the Owner from loss on account of:

- a. Defective work not remedied. (See also D-19)
- b. Claims filed or reasonable evidence indicating probable filing of claims.
- c. Failure of the Contractor to make payments properly to subcontractor or for materials or labor. (See also D-9 and D-37)
- d. A reasonable doubt that the contract can be completed for the balance then unpaid.
- e. Damage to another contractor or to some third party. (See also D-12)
- f. Failure to maintain a rate of progress in accordance with the construction progress schedule. [See also D-1(i), D-25(c), and D-46]
- g. Failure to supply enough skilled workmen or proper materials. (See also D-1 and D-19)

When the above grounds are removed, payment shall be made for amounts withheld because of them. At the option of the Owner adherence to the construction progress schedule shall be a condition precedent to the right of the Contractor to demand payment of a periodical estimate. No omission on the part of the Owner to exercise the aforesaid option shall be construed to be a waiver of breach of the construction progress schedule or acquiescence therein, and the Owner may exercise its option from time to time and as often as may be expedient.

**D-27. Indemnification, Insurance and Hazards**

- a. *Responsibility.* The Contractor shall be responsible to the Owner from the time of the signing the agreement or from the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the work by the Contractor, or any of its subcontractors, its agents, employees or others working at the direction of the Contractor or on its behalf, regardless of who may be the owner of the property. (See also D-12)
- b. *Indemnification Agreement.* Contractor hereby agrees to indemnify and hold harmless the Owner, the State of Georgia and its departments, agencies and instrumentalities and all of their respective officers, members, employees and directors (hereinafter collectively referred to as the "Indemnitees") from and against any and all claims, demands, liabilities, losses, costs or expenses, including attorneys' fees, due to liability to a third party or parties, for any loss *due to* bodily injury (including death), personal injury, and property damage arising out of or resulting from the performance of this contract or any act or omission on the part of the Contractor, its agents, employees or others working at the direction of Contractor or on its behalf, or due to any breach of this contract by the Contractor, or due to the application or violation of any pertinent Federal, State or local law, rule or regulation. This indemnification extends to the successors and assigns of the Contractor. This indemnification obligation survives the termination of the contract and the dissolution or, to the extent allowed by law, the bankruptcy of the Contractor. If and to the extent such damage or loss (including costs and expenses) as covered by this indemnification is paid by the State Tort Claims Trust Fund, the State Authority Liability Trust Fund, the State Employee Broad Form Liability Fund, the State Insurance and Hazard Reserve Fund, and other self-insured funds (all such funds hereinafter collectively referred to as the "Funds") established and maintained by the State of Georgia Department of Administrative Services Risk Management Division (hereinafter "DOAS") the Contractor agrees to reimburse the Funds for such monies paid out by the Funds.
  1. This indemnification applies where the Indemnitees are partially responsible for the situation giving rise to the claim, provided however, that this indemnification does not apply to the extent of the sole negligence of the Indemnitees.
  2. This indemnification does not extend beyond the scope of this contract and the work undertaken there under. Nor does this indemnification extend to claims for loses or injuries or damages incurred directly by the Indemnitees due to breach or default by the Indemnitees under the terms and conditions of this contract.

3. DOAS, Risk Management will endeavor to notify affected insurers of claims made against the State which fall within this indemnity. In the event of litigation, the Attorney General will endeavor to keep the Contractor and its general liability insurer as named on the insurance certificate informed regarding the claims and settlement. [See D-27.2.2(c) below]

c. Insurance Requirements

1. *Insurance Certificates.* The Contractor shall, prior to the commencement of work, procure the insurance coverage identified below at the Contractor's own expense and shall furnish the Owner an insurance certificate listing the Owner as the certificate holder. The insurance certificate must provide the following:
  - a) Name and address of authorized agent
  - b) Name and address of insured
  - c) Name of insurance companies
  - d) Description of policies
  - e) Policy Number(s)
  - f) Policy Period(s)
  - g) Limits of liability
  - h) Name and address of Owner as certificate holder
  - i) Project Name and Number
  - j) Signature of authorized agent
  - k) Telephone number of authorized agent
  - l) Mandatory forty-five day notice of cancellation / non-renewal (See D-27.2(a) below)
  - m) Evidence of Insurance Coverage shall be provided on a form acceptable to the Owner
2. *Policy Provisions.* Each of the insurance coverage required below (i) shall be issued by a company licensed by the Insurance Commissioner to transact the business of insurance in the State of Georgia for the applicable line of insurance, and (ii) shall be an insurer (or, for qualified self-insured or group self insured, a specific excess insurer providing statutory limits) with a Best Policyholders Rating of "A-" or better and with a financial size rating of Class V or larger. Each such policy shall contain the following provisions:
  - a) The insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire until forty-five (45) days after the Owner has received written notice thereof as evidenced by return receipt of registered letter or until such time as other insurance coverage providing protection equal to protection called for in this contract shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the project as shall have been designated by Project Number and Name in said notice.
  - b) The policy shall not be subject to invalidation as to any insured by reason of any act or omission of another insured or any of its officers, employees, agents or other representatives ("Separation of Insured").
  - c) Each Insurer is hereby notified that the statutory requirement that the Attorney General of Georgia shall represent and defend the Indemnities remains in full force and effect and is not waived by issuance of any policy of insurance. In the event of litigation, any settlement on behalf of the indemnities must be expressly approved by the Attorney General. The contractor and its insurance carrier may retain, but are not obligated to retain, counsel to assist with the defense of the Indemnities, in which case there will be mutual cooperation between the Attorney general and such counsel.
  - d) Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed \$100,000.00.
3. *Insurance Coverage.* The Contractor also agrees to purchase and have the authorized agent state on the insurance certificate that the following types of insurance coverage, not inconsistent with the policies and requirements of O.C.G.A. § 50-21-37, have been purchased by the Contractor. The minimum required coverage and liability limits are as follows:

- a) *Workers' Compensation Insurance.* The Contractor agrees to provide Workers' Compensation coverage in accordance with the statutory limits as established by the General Assembly of the State of Georgia. A group insurer must submit a certificate of authority from the Insurance Commissioner approving the group insurance plan. A self-insurer must submit a certificate from the Georgia Board of Worker's Compensation stating the Contractor qualifies to pay its own worker's compensation claims. The Contractor shall require all subcontractors performing work under this contract to obtain an insurance certificate showing proof of Workers' Compensation Coverage and shall submit a certificate on the letterhead of the Contractor in the following language prior to the commencement of work:

*"This is to certify that all subcontractors performing work on this project are covered by their own workers' compensation insurance or are covered by the Contractor's worker's compensation insurance."*

- b) *Employers' Liability Insurance.* The Contractor shall also maintain Employer's Liability Insurance Coverage with limits of at least:

- i. Bodily Injury by Accident – \$1,000,000 each accident; and
- ii. Bodily Injury by Disease – \$1,000,000 each employee.

The Contractor shall require all subcontractors performing work under this contract to obtain an insurance certificate showing proof of Employers Liability Insurance Coverage and shall submit a certificate on the letterhead of the Contractor in the following language prior to the commencement of work:

*"This is to certify that all subcontractors performing work on this project are covered by their own Employers Liability Insurance Coverage or are covered by the Contractor's Employers Liability Insurance Coverage."*

- c) *Commercial General Liability Insurance.* The Contractor shall provide Commercial General Liability Insurance (1993 ISO Occurrence Form or equivalent) which shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The Commercial General Liability Insurance shall provide at minimum the following limits:

<b>Coverage</b>	<b>Limit</b>
1. Premises and Operations.....	\$ 1,000,000.00 per Occurrence
2. Products and Completed Operations.....	\$ 1,000,000.00 per Occurrence
3. Personal Injury.....	\$ 1,000,000.00 per Occurrence
4. Contractual.....	\$ 1,000,000.00 per Occurrence
5. General Aggregate .....	\$ 2,000,000.00 per Project

Additional Requirements for Commercial General Liability Insurance:

- i. The policy shall name as additional Insured the officers, members, and employees of the Owner and the State of Georgia, but only with respect to claims that arise out of contractor's negligence in performing the work or the additional insured's general supervision of such operations, including completed operations under this contract, but only for such claims for which the Georgia Tort Claims Act, O.C.G.A. 50-21-20 *et seq.* is not the exclusive remedy.
- ii. The coverage extended to the additional insured for any claims not covered by the Georgia Tort Claims Act shall be no broader than the coverage extended to the Contractor and is not expanded to cover claims and losses that are not insurable under the contractor's policy.
- iii. The policy or policies must be on an "occurrence" basis.

- iv. The policy must include separate aggregate limits per project.
- d) *Commercial Business Automobile Liability Insurance.* The Contractor shall provide Commercial Business Automobile Liability Insurance which shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than \$1,000,000 Combined Single Limits for each occurrence.

Additional Requirements for Commercial Business Automobile Liability Insurance:

- i. The policy shall name as additional Insured the officers, members, and employees of the Owner and the State of Georgia, but only with respect to claims that arise out of contractor's negligence in performing the work or the additional insured's general supervision of such operations under this contract, but only for such claims for which the Georgia Tort Claims Act, O.C.G.A. 50-21-20 *et seq.* is not the exclusive remedy.
  - ii. The coverage extended to the additional insured for any claims not covered by the Georgia Tort Claims Act shall be no broader than the coverage extended to the Contractor and is not expanded to cover claims and losses that are not insurable under the contractor's policy.
- e) *Commercial Umbrella Liability Insurance.* The Contractor shall provide a Commercial Umbrella Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employers' Liability to satisfy the minimum limits set forth herein. The minimum amount of Umbrella limits required above the coverage and minimum limits state in D-27.2.3(a), (b), (c) and (d) shall be:

Minimum Combined Primary Liability and Excess Umbrella Limits of:  
\$2,000,000 per Occurrence  
\$2,000,000 Aggregate

Additional Requirements for Commercial Umbrella Liability Insurance:

- i. The policy shall name as additional Insured the officers, members, and employees of the Owner and the State of Georgia, but only with respect to claims that arise out of contractor's negligence in performing the work or the additional insured's general supervision of such operations under this contract, but only for such claims for which the Georgia Tort Claims Act, O.C.G.A. 50-21-20 *et seq.* is not the exclusive remedy.
  - ii. The coverage extended to the additional insured for any claims not covered by the Georgia Tort Claims Act shall be no broader than the coverage extended to the Contractor and is not expanded to cover claims and losses that are not insurable under the contractor's policy.
  - iii. The policy must be on an "occurrence" basis.
- Builders Risk Insurance.* Contractor shall provide a builder's risk policy to be made payable to the Owner and the Contractor, as their interest may appear. The policy shall be equal to 100% of the contract sum and written on a 1991 Cause of Loss—Special Form, or revised equivalent. All deductibles shall be the sole responsibility of the Contractor and in no event shall the amount of any deductible exceed \$1,000.
- g) *Disposition of Insurance Documents.* Prior to commencing work, one certificate of insurance with all endorsements attached must be deposited with Owner for each insurance policy required.

4. *Termination of Obligation to Insure.* Unless otherwise expressly provided to the contrary, the obligation to insure as provided herein shall not terminate until the Architect shall have executed the final certificate. (See D-20, D-24, D-29, and D-71 and Article 5, Form of Contract)
  5. *Failure of Insurers.* The Contractor is responsible for any delay resulting from the failure of his insurance carriers to furnish proof of proper coverage in the prescribed form.
- D-28. Affidavits.** Before receiving any portion of the retainage (see also D-24 and D-32), the Contractor will be required to furnish a non-influence affidavit as shown in Exhibit A and a statutory affidavit in the exact form as shown in Exhibit B.
- D-29. Bonds on Roofs and Walls.** *Not applicable.*
- D-30. Performance Bond and Payment Bond.** The Bid Documents require the Contractor to furnish both a performance bond and a payment bond, said bonds shall be provided on the forms as set forth in Exhibit C and Exhibit D. The surety must be one which is licensed to do business in the State of Georgia, and the surety must in addition be acceptable to the Owner. [NOTE: To avoid inconvenience, the Contractor should get in touch with the Owner to determine whether the surety he expects to use is acceptable to the Owner.]
- D-31. Employment of Georgia Citizens and Use of Georgia Products.** Since the work provided for in this contract is to be performed in Georgia, it is the wish of the Owner that materials and equipment manufactured or produced in Georgia shall be used in the work and that Georgia citizens shall be employed in the work at wages consistent with those being paid in the general area in which the work is to be performed. This desire on the part of the Owner is not intended to restrict or limit competitive bidding or to increase the cost of the work; nor shall the fulfillment of this desire be asserted by the Contractor as an excuse for any noncompliance or omission to fulfill any obligation under the contract.
- D-32. Liens.** Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens or claims arising out of this contract, or receipts in full in place thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all labor and materials for which a lien or claim could be filed; but the Contractor may, if any subcontractor or claimant refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify the Owner against any lien or claim. If any lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien or claim, including all costs and a reasonable attorney's fee. (See also D-24, D-25, and D-28)
- D-33. Assignment.** Neither party to the contract shall assign the contract or sublet it as a whole nor shall the Contractor assign any moneys due or to become due to him hereunder.
- D-34. Mutual Responsibility of Contractors.** Should the Contractor cause damage to any separate Contractor on the work the Contractor agrees, upon due notice, to settle with such Contractor by agreement if he will so settle. If such separate Contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at his own expense, and if any judgment against the Owner shall arise there from, the Contractor shall pay or satisfy it and pay all costs incurred by the Owner.
- D-35. Separate Contracts.** The Owner reserves the right to perform work related to the Project with its own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly regulate, schedule, connect, and coordinate his work with theirs.
- D-36. Subcontractors, Materialmen, Suppliers and Employees**
- a. *Subcontractor.* A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site.

- b. *Submission of List.* Unless otherwise required by the Contract Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner in writing the names of Subcontractors for each of the principal portions of the Work. The Contractor shall not employ any Subcontractor to whom the Owner may have a reasonable objection. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection. The contract requires each Subcontractor, to the extent of the Work to be performed by the Subcontractor, (1) to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor, all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner, and (2) allow to the Subcontractor the benefit of all rights, remedies and redress afforded to the Contractor by these Contract Documents.
- c. *Warranty of Contractor.* The Contractor warrants that the subcontractors selected by him are reputable, skilled, reliable, competent, qualified in the trade or field in which they are to perform on the project, and thoroughly familiar with applicable codes.
- d. *Certification On Account Of.* The Architect shall, on request furnish to any subcontractor, wherever practicable, evidence of the amounts certified on his account.
- e. *Contractor Responsible for Acts and Omissions of Subcontractors, Materialmen, Suppliers and Employees.* The Contractor agrees that he is as fully responsible for the acts and omissions of his subcontractors, materialmen, suppliers, and employees and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.
- f. *No Contract Between Owner and Any Subcontractor, Materialman, Supplier or Employee.* Nothing contained in the contract documents shall create any contractual relation between the Owner and any subcontractor or between the Owner and any materialman, supplier, or employee of the Contractor or his subcontractors. [See also Article D-02, D-37, D-45, and D-60]

**D-37. Relationship of Contractor and Subcontractors**

- a. *Obligations of Each.* The Contractor agrees to bind every subcontractor and every subcontractor agrees to be bound by the terms of the contract documents insofar as they are applicable to his work.
- b. *Owner Not Obligated to Any Subcontractor.* There is no obligation on the part of the Owner to pay to or to see to the payment of any sums to any (1) subcontractor, (2) materialman, (3) supplier, (4) laborer, (5) employee, or (6) claimant as defined in the payment bond. [See also D-36(d)]
- c. *Incorporation of Terms in Subcontracts.* The Contractor agrees that failure on his part to incorporate in all subcontracts an express provision in accordance with D-37(a) above, shall be deemed to be and is a breach of an essential covenant.

**D-38. Architect**

- a. *Supervision.* The Architect shall have general supervision and direction of the work except in respect to safety as stated under D-12 and except as qualified by D-13 and D-60 of the general conditions. He is the agent of the Owner only when in special instances he is authorized in writing by the Owner so to act, and in such instances he shall, upon request, show the Contractor written authority. He has authority to stop the work whenever such stoppage may be necessary to ensure the proper execution of the contract.
- b. *Interpreter and Impartial Judge.* As the Architect is, in the first instance, the interpreter of the conditions of the contract and the judge of its performance, he shall side neither with the Owner nor with the Contractor but shall use his powers under the contract to enforce its faithful performance by both.

**D-39. Architect's Decisions**

- a. *Promptness.* The Architect shall make decisions with reasonable promptness after presentation of evidence on (1) any claim of the Owner or Contractor, (2) a demand of the Owner or Contractor for a decision on any



matter relating to the execution or progress of the work, or (3) a demand of the Contractor or Owner for interpretation of or additional instructions with respect to the contract documents.

- b. *On Artistic Effect.* The Architect's decisions in matters relating to artistic effect shall be final if within the terms of the contract documents.

**D-40. Measurements and Dimensions.** Before ordering material or doing work which is dependent upon coordination with building conditions, the Contractor shall verify all dimensions, elevations, grades, and pitch by taking measurements at the building and shall be responsible for the correctness of same. No consideration will be given to any claim based on differences between the actual dimensions and those indicated on the drawings. Any discrepancies between the drawings and/or the specifications and the existing conditions shall be referred to the Architect for additional instructions before any work affected thereby is given.

**D-41. Notice of Readiness for Final Inspection.** When the Contractor is ready for a final inspection, he shall give notice to the Architect and a copy to the Owner in the following words:

*"The work on the contract for the [show name of improvement or project as it appears in the form of agreement] having been fully completed except as stipulated hereinbelow, it is requested that a final inspection be made promptly by the Architect in accordance with Article 5 of the form of agreement. The following work is incomplete through no fault of the Contractor [list any work which the Contractor regards as a proper exception under Subparagraph (d) of Article 5 of the form of agreement] "*

No final inspection shall be made until such time as the Architect has received a letter in the exact form indicated above and a copy thereof has been received by the Owner. In the event the Contractor shall have issued the "Notice of Readiness for Final Inspection" prematurely [hereinafter referred to as "false start"] he shall be liable for the damage resulting from the aforesaid false start including but not limited to the salaries, professional fees, and travel and living expenses of the persons or parties inconvenienced by the aforesaid false start. The Contractor agrees that he may not defend or excuse any deviation from the contract documents on the ground (a) that the deviation was not brought to his attention by another person or party or other persons or parties or (b) that a subcontractor is or subcontractors are at fault.

**D-42. Use of Premises.** The Contractor shall confine his plant, his apparatus, the staging and storage of materials, the operations of his forces, and the work to limits indicated by law, ordinances, permits, or the contract documents and shall not unreasonably encumber the premises with his materials. The Contractor shall not load or permit any part of the work to be loaded with weight that will endanger its safety. The Contractor shall enforce the Architect's instructions regarding signs, advertisements, fires and smoking. (See also D-11)

**D-43. Cutting, Patching and Fitting.** The Contractor shall do all cutting, fitting, or patching of his work that may be required to make its several parts come together properly and fit. (See also D-03, D-40, and D-53)

**D-44. Cleaning Up.** The Contractor shall at all time keep the premises free from accumulations of waste material or rubbish caused by his employees or work. At the completion of the work he shall remove all his rubbish from and about the building and all his tools, scaffolding, and surplus materials and shall leave his work "broom-clean" or its equivalent, unless more exactly specified. In case of dispute the Owner may remove the rubbish and charge the cost to the Contractor as the Architect shall determine to be just. (See also D-12 and D-27)

**D-45. Specification Arrangement.** The specifications are separated into numbered and titled divisions for convenience of reference. Neither the Owner nor the Architect assumes any responsibility for defining the limits of any subcontracts on account of the arrangement of the specifications. Notwithstanding the appearance of such language in the various divisions of the specifications as, "The Plumbing Contractor", "The Electrical Contractor", "The Roofing Contractor", etc., the Contractor is responsible to the Owner for the entire contract and the execution of all of the work referred to in the contract documents. No partial sets of bidding documents shall be issued by the Architect. (See also C-03, D-02, D-36, and D-37)

**D-46. Commencement, Prosecution and Completion.** The Contractor will be required (a) to commence work under this contract within ten days after date of written notice from the Owner to proceed [See D-1(j)], (b) to prosecute the work with faithfulness and energy (c) to install the various parts of the work with equal steps shown on the construction progress schedule and at the same rate shown on the construction progress schedule

to be furnished pursuant to D-50 and (d) to complete the work within the time stipulated in the proposal form as adjusted by any extensions of time provided for under D-15 and D-18. Commencement of work shall mean actual physical work on the site. [See Also D-1(f) and D-1(i)] In the event the Contractor shall be delinquent in respect to compliance with the time limits established in the construction progress schedule, he shall, within seven days after receipt of written demand of the Owner, commence working not less than a twelve hour day and no less than six days a week until such time as he shall have brought the amount of work in place into compliance with the construction progress schedule. Fulfillment of this requirement as to overtime work (hereinafter referred to as "recovery of lost time required of the Contractor for his breach of covenant as to time") shall not relieve the Contractor from liability for breach of the covenant as to time [Article D-1(f) of general conditions]. For account of recovery of lost time required of the Contractor for his breach of covenant as to time the Contractor shall be entitled to no claim against the Owner for any payment, repayment, reimbursement, remittance, remuneration, compensation, profit, cost, overhead, expense, loss expenditure, allowance, charge, demand, hire, wages, salary, tax, cash, assessment, price, money, bill, statement, dues, recovery, restitution, benefit, recoupment, exaction, injury or damages. (See also D-25 and D-26)

- D-47. Alternates.** Unless otherwise stipulated all alternates are deductive. If a price is not provided for all alternates the Contractor's bid may be determined non-responsive and not considered for award.
- D-48. Drug-Free Work Place Act.-** The Contractor acknowledges that he is fully aware of the contents and requirements of O.C.G.A. 50-24-1 *et. seq.* The Contractor, upon submission of a bid in connection with this contract, does thereby certify that he and his subcontractors are and will remain in compliance with the aforesaid act.
- D-49. Conflicts.** The following principles shall govern the settlement of disputes which may arise over conflicts in the contract documents: (a) as between figures given on drawings and the scaled measurements, the figures shall govern; (b) as between large-scale drawings and small-scale drawings, the larger scale shall govern; (c) as between drawings and specifications, the requirements of the specifications shall govern; and (d) as between the form of agreement and the specifications, the requirements of the form of agreement shall govern. Conflicts noted shall be reported to the Architect. The principles set forth herein shall not alter provisions of D-2 of the general conditions.
- D-50. Progress Reports.** Within such reasonable space of time as the Owner shall designate in writing, the Contractor shall submit to the Owner such schedule of quantities and costs, construction progress schedules, payrolls, bills, vouchers, correct copies of all subcontracts, statements, reports, correct copies of all agreements, correspondence, and written transactions with the surety on the performance bond which have any relevance to the work, estimates, records, and other data as the Owner may request concerning work performed or to be performed under this contract. When requested by the Owner, the Contractor shall give the Owner access to accounts relating to the foregoing. The above reports shall include but are not limited to (a) written notice of dates by which specified work will have been completed, (b) written notice of dates by which condemned work shall have been made good, (c) written notice that condemned work has been made good, (d) written notice as to the date or dates by which work which has not been performed with equal steps and at the same rate required by the construction progress schedule shall have been brought into conformity with the construction progress schedule, (e) date by which any undisputed claim of a subcontractor, materialman, or laborer shall have been paid, (f) written advice regarding the nature and amount of any disputed claim of a subcontractor, materialman, or laborer, and (g) information regarding work performed upon demand of the Owner pursuant to D-15. Prior to submitting the first periodical estimate (see D-24), the Contractor shall have furnished to the Owner and the Architect a construction progress schedule (based on work in place only) in accordance with the style and format of a specimen to be furnished by the Owner [copies of which specimen will be furnished to any bidder on request]. (See also D-1(i), D-19, D-20, D-26, and D-46)
- D-51. OMITTED**
- D-52. Trading with the State Statute.-**In submitting a bid, the bidder certifies that the provisions of law contained in O. C. G. A. Sections 45-10-20 to 45-10-71 prohibiting officials and employees of the state from engaging in certain transactions with the state and state agencies, have not and will not be violated in any respect in regard to this contract.
- D-53. Manufacturer's Recommendations.** In the event the contract shall require that given work or materials shall be installed in accordance with the manufacturer's recommendations or requirements, the Contractor shall

obtain for his use at the site in executing the work copies of the bulletin, circular, catalogue, or other publication of the manufacturer bearing the title, number, edition, date, etc., [hereinafter referred to as the "doctrine"] designated in the contract.

- D-54. Keys.** Keys with tags indicating number and/or description of door or room each key is intended to fit attached to each key shall be delivered to the Owner. Contractor shall prepare and furnish with the keys an itemized key schedule in quintuplicate listing the door or room number and/or description, serial number of key, and number of keys being delivered for each door or lock.
- D-55. Operation and Maintenance Data and Instructions.** The Contractor shall furnish proper instructions to the lessee of the Owner in the presence of the Architect concerning operation and maintenance of all mechanical and electrical equipment. The Contractor shall give notice in writing to the Architect with copy to the Owner at least fifteen days prior to the date on which it is proposed to give instructions to the lessee.
- D-56. Space Conditions.** All pipes passing through floors, walls, and ceilings shall be installed with sufficient space between them to permit installation of pipe insulation and floor, wall, and ceiling plates without cutting of insulation or plates. The Contractor shall locate all equipment that must be serviced, operated, or maintained in fully accessible positions.
- D-57. Cash Allowances.** The Contractor shall include in the contract sum all allowances named in the contract documents.
- D-58. Testing Services.** Laboratories for testing services shall be selected by, engaged by, and responsible to the Architect. This article does not apply to verification of design mix on concrete. (See also D-13 and D-65)
- D-59. Drilling Samples and Log of Drilling Wells.** Not used.
- D-60. Contractor's Warranty as to Performance.** The Contractor warrants that he is familiar with the codes applicable to the work and that he has the skill, knowledge, competence, organization, and plant to execute the work promptly and efficiently in compliance with the requirements of the contract documents. The Contractor having the obligation to keep a competent superintendent on the work during its progress, to employ only skilled mechanics, and to enforce strict discipline and good order among his employees, the Contractor, himself, is responsible for seeing that the work is installed in accordance with the contract documents. The Contractor warrants to the Owner that all materials and equipment incorporated in the Work will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements may be considered defective. (See also D-09, D-13, D-14, D-15, D-20, D-36, D-38, and D-39)
- D-61. Employment of Georgia Citizens and Use of Georgia Products and Georgia Forest Products.** Not used.
- D-62. Mechanical Systems, Retainage Pending Balancing of.** Not used.
- D-63. Water Heaters.** Not used.
- D-64. Effect of Addenda, Amendments, Bulletins, Deletions, Omissions, and Change Orders.** No special implication, interpretation, construction, connotation, denotation, import, or meaning shall be assigned to any provision of the contract documents because of changes created by the issuance of any (1) addendum, (2) amendment, (3) bulletin, (4) notice of deletion, (5) notice of omission, or (6) change order other than the precise meaning that the contract documents would have had if the provision thus created had read originally as it reads subsequently to the (1) addendum, (2) amendment, (3) bulletin, (4) notice of deletion, (5) notice of omission, or (6) change order by which it was created.
- D-65. Concrete Specifications.** "Standard Minimum Concrete Specifications," October 1963, revised May 1976, revisions approved jointly by the Georgia Branch, The Associated General Contractors of America, and Georgia Concrete and Products Association, Inc., successors to Georgia Ready-Mix Concrete Association are adopted as a minimum requirement.
- D-66. Omitted.**

- D-67. Certificates of Manufacturers for Major Components.** Not used.
- D-68. Forms and Specimens.** - The forms and specimens attached as exhibits are incorporated by reference herein and shall be executed in substantial conformance as required or convenient in describing obligations under the contract documents.
- D-69. Copies of Notices to Owner.** Wherever the general conditions provide that a copy of any notice, request, or demand filed with the Architect by the Contractor shall be furnished to the Owner, such notice, request or demand shall not become effective until the Owner's copy shall have been received by the Owner. No notice in writing or orally to the Architect or to the resident engineer inspector is notice to the Owner unless copy of the aforesaid notice in writing shall have been properly served upon the Owner at the address shown in Article E-01 of the Supplementary General Conditions. [See also D-01(d), D-15, D-18, and D-39]
- D-70. Utilities.** Except for the cost of connection, the Owner shall furnish without cost to the Contractor all water and electricity as presently available at the site required to do the work. The Contractor shall make connection to utilities at locations agreeable to the Owner. The Contractor shall pay all costs for connections and extending these to the area where it proposes to use them. (See also D-09)
- D-71. Form of Agreement.** The form of agreement shall be executed on the form of agreement supplied by the Owner. Specimen of which is shown in Exhibit E. [See also Article D-1]
- D-72. Contractor Performance Evaluation Questionnaire.** (See Exhibit G)
- a. The Contractor Performance Evaluation Questionnaire is a method the State of Georgia intends to use to encourage contractors to perform their contractual responsibilities to complete contracts in a timely manner and at the quality level specified in the Contract Documents.
  - b. The Contractor's retainage on the current contract could be affected by the performance rating the contractor is issued. A performance evaluation of unsatisfactory may result in the contractor's retainage remaining at 10% or being reinstated to 10% from the lump sum. Upon correction of the deficiencies which led to the unsatisfactory rating, the Contractor's retention may be reduced to a lump sum or reinstated back to a lump sum.
  - c. Performance evaluations will be issued, depending upon project duration, when 50% completion has been attained, at the time of final acceptance of the project or at any time that the Owner determines that the Contractor's performance is deemed to be unsatisfactory.
  - d. Performance evaluation ratings of outstanding, satisfactory and unsatisfactory can be issued.
  - e. The issuance or failure to issue a performance evaluation questionnaire does not affect the State's right to seek redress from the Contractor for work not in compliance with the Contract Documents or for latent defects.

**SECTION E**  
**SUPPLEMENTARY GENERAL CONDITIONS**

**E-01.** Section D, General Conditions are amended / clarified as follows:

a. *Article D-1. Definitions.*

1. Sub-paragraph (s), Owner, is defined as follows:

- a) The Owner as referred to herein is "Department of Natural Resources" an Agency of the State of Georgia.
- b) The address of the Owner to which all correspondence regarding this Project should be addressed is:

Department of Natural Resources  
2 Martin Luther King, Jr. Drive, Suite 1352 East  
Atlanta, Georgia 30334

c) The address of the Owner to which all deliveries regarding this Project should be addressed is:

Robert Emery, Manager  
Tugaloo State Park  
1763 Tugaloo State Park Road  
Lavonia, Georgia 30533  
(706) 356-4362

2. Sub-paragraph (t), Architect is defined as follows:

Whenever the terms architect, engineer, or owner's authorized representative appear in the plans or specifications, it shall mean:

Erick Dickman  
Department of Natural Resources  
P. O. Box 1029  
Helen, Georgia 30545  
(706) 878-4750

**E-02. Sales Tax.** Unless otherwise provided in the Contract Documents, the Contractor shall pay all sales, consumer, use and other similar taxes, which are legally enacted at the time bids are received.

**E-03. Hazardous Material.** A Hazardous Material is any substance or material identified as of the date of the Agreement as hazardous under any governmental law, rule, or regulation, or otherwise subject to governmental requirements concerning handling, disposal, and/or cleanup. Unless provided by Change Order, the Contractor shall not be required to perform any work related to hazardous materials encountered at the Site. The Contractor is fully responsible for any Hazardous Materials brought on the Site by any party, other than the Owner, who has a contractual relationship with the Contractor to perform Work under the Contract Documents. If the Contractor knows of the presence of hazardous materials in any form existing on or delivered to the Site, the Contractor shall immediately notify the Architect and the Owner as to the quantity and nature of the hazardous material.

**E-04. Article D-5, Shop Drawings, is amended to add the following:**

- 1. For all submissions, a minimum of four prints of each drawing shall be submitted. Two prints of each drawings of the various submissions will be retained by the architect.
- 2. One print of each drawing bearing the architect's final approval stamp shall be kept at the project office and shall be maintained in good condition. Only prints bearing the architect's final approval stamp will be recognized.

3. In checking shop drawings, the architect shall not be required to check dimensions and/or quantities, these being the responsibility of the contractor.

**E-05. Article D-28, Affidavits, is amended to add the following:**

Before final acceptance of the work, the contractor will be required to furnish the owner one original of both a completed Consent of Surety to Final Payment and a one-year warranty and guaranty, copies of which are included herein as Exhibits H and J.

**E-06. Article D-46 Commencement, Prosecution, and Completion, is amended to add the following:**

1. Substantial Completion. For the purposes of this contract, the term substantial completion shall be defined as acceptance by the Architect on the Owner's behalf for the Owner to occupy said facility in the normal uninterrupted use for which the facility was designed and constructed and without interference from the Contractor.
2. Liquidating Damages. For each calendar day in excess of the established completion date that the work remains incomplete, the Contractor shall pay to the Owner the sum of \$100.00 as liquidating damages, which are reasonably estimated in advance to cover losses to be incurred by the Owner by reason of failure of the Contractor to complete the work on time, time being of the essence of the contract and a material consideration thereof; provided, however, no such liquidating damages shall be payable if, in the sole discretion of the owner, no losses have occurred.

**E-07. Article D-55 Operation and Maintenance Data and Information, is substituted by the following:**

Contractor shall, at completion of the work, deliver to the Architect two (2) copies of a manual, assembled and bound, with full details for care and maintenance of all equipment included in the contract.

Where the above-described manuals and data are called for under separate sections of the specifications, they are to be included in the bound manual described in this Article.

**E-08. Article D-57 Cash Allowances, is amended to add the following:**

Any overhead and profit associated with a cash allowance must be included elsewhere in the base bid. The entire amount of the allowance must be available for the use for which it is intended. If actual costs are over or under this amount, it will be adjusted by change order.

**E-09. Overhead and Profit on Sub-Contract Work.**

The general contractor's overhead and profit on all sub-contract work that forms part of any change order must not exceed 7.5% of the sub-contractor's total cost. The Owner may negotiate a lower overhead and profit based on the particular circumstances of the change order.

**E-10. Contractor Licensing.**

All General Contractors, Residential-Light Commercial Contractors or Sub-Contractors performing general construction, plumbing, electrical, conditioned air or low voltage work as defined in OCGA 43-14 and 43-41 must possess a valid license from the State of Georgia for the type of work they are performing.

**E-11. Article D-58 Testing Services, is amended to add the following:**

All testing except re-tests as included in Article D-58 shall be paid for by the Owner. Where testing services are included under a cash allowance, the fees shall be paid directly by the Contractor, after approval by the Architect. The Contractor shall give notice to the Architect when he is ready for testing to be done.

- E-12. Pre-bid Meeting.** A mandatory pre-bid meeting will be held at the time and place listed in Section A - Invitation to Bid. **All bidders are required to attend the mandatory pre-bid meeting.** A time for access to the project site will be scheduled at the mandatory pre-bid meeting and a general discussion of the project will take place. The GSFIC reserves the right to disqualify bidders arriving late to the pre-bid conference.

**E-13. Immigration Reform Compliance.** Pursuant to the Georgia Security and Immigration Compliance Act of 2006, the Contractor understands and agrees that compliance with the requirements of O.C.G.A. § 13-10-91 and Georgia Department of Labor Rule 300-10-1-.02 are conditions of this Agreement. The Contractor hereby warrants that Contractor has complied with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act, O.C.G.A. § 13-10-90 *et. seq.*, by registering at <https://www.vis-dhs.com/EmployerRegistration> and verifying information of all new employees; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 *et. seq.*

The Contractor warrants that, in the event the Contractor employs or contracts with any subcontractor(s) in connection with this Agreement, the Contractor shall include a similar provision in all written agreements with any such subcontractor(s). The Contractor agrees to maintain records of any such written subcontractor agreements for inspection by the Owner at any time.

**SECTION F  
SPECIAL CONDITIONS**

There are no special conditions



SECTION G  
EXHIBIT A  
SPECIMEN

NON-INFLUENCE AFFIDAVIT

COUNTY OF \_\_\_\_\_

STATE OF \_\_\_\_\_

I do solemnly swear on my oath that as to the contract dated \_\_\_\_\_, 20\_\_\_\_,

between \_\_\_\_\_ and  
(NAME OF CONTRACTOR)

the Owner I have no knowledge of the exertion of any influence or the attempted exertion of any influence on the firm on behalf of which this affidavit is made in any way, manner, or form in the purchase of materials, equipment, or other items involved in construction, manufacture, or employment of labor under the aforesaid contract by any employee, officer, or agent of the Owner, or any person connected with the State Government of Georgia in any way whatsoever.

This \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(L.S.)  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Firm

COUNTY OF \_\_\_\_\_

STATE OF \_\_\_\_\_

Personally before me, the undersigned authority, appeared \_\_\_\_\_  
(NAME OF PERSON SIGNING THE AFFIDAVIT)

who is known to me to be an official of the firm of \_\_\_\_\_ who, after being duly  
(NAME OF CONTRACTOR)

sworn, stated on his oath that he had read the above statement and that the same is true and correct.

\_\_\_\_\_  
Notary Public

My Commission expires \_\_\_\_\_

This \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

EXHIBIT B  
**SPECIMEN**  
STATUTORY AFFIDAVIT

COUNTY OF \_\_\_\_\_ STATE OF \_\_\_\_\_

FROM: \_\_\_\_\_  
Contractor

TO: \_\_\_\_\_  
Owner

Re: Contract entered into the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, between the above-mentioned parties for the construction of Project No. \_\_\_\_\_ located at \_\_\_\_\_

**KNOW ALL MEN BY THESE PRESENTS:**

1. The undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all material men, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character [including disputed claims or any claims to which the Contractor has or will assert any defense] arising out of the performance of the contract which have not been paid and satisfied in full except as listed herein below:

**[Instructions-ENTER THE WORD "NONE" OR LIST THE NAMES OF CLAIMANTS AND THE AMOUNT CLAIMED BY EACH]**

2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the Owner.

3. The undersigned makes this affidavit for the purpose of receiving final payment in full settlement of all claims against the Owner arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the Owner from any and all claims arising under or by virtue of the contract.

This \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature (L.S.)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Firm

COUNTY OF \_\_\_\_\_ STATE OF \_\_\_\_\_

Personally before me, the undersigned authority, appeared \_\_\_\_\_, who  
(NAME OF PERSON SIGNING AFFIDAVIT)

is known to me to be an official of the firm of \_\_\_\_\_ who, after being duly  
(NAME OF CONTRACTOR)  
sworn, stated on his oath that he had read the above statement and that the same is true and correct.

\_\_\_\_\_  
Notary Public, My commission expires \_\_\_\_\_

This \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

EXHIBIT C  
SPECIMEN  
**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS:

That \_\_\_\_\_ as  
(Legal Name and Address of Contractor)

principal (hereinafter referred to as "Contractor") and

\_\_\_\_\_  
(Legal title and address of Surety) as

surety (hereinafter referred to as "Surety"), are held and firmly bound unto {Insert Name of Owner} as Obligee (hereinafter referred to as "Owner"), in the amount of \$ \_\_\_\_\_, to which payment Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with Owner bearing date of \_\_\_\_\_, for PROJECT NO. \_\_\_\_\_ in accordance with drawings and specifications prepared by \_\_\_\_\_, which said contract is incorporated herein by reference and made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform and comply with the terms and conditions of said contract; and shall indemnify and save harmless the Owner against and from all costs, expenses, damages, injury or loss to which said Owner may be subjected by reason of any wrongdoing, including patent infringement, misconduct, want of care or skill, default or failure of performance on the part of said Principal, his agents, subcontractors or employees, in the execution or performance of said contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

1. The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work to be performed thereunder, or the specifications or drawings accompanying same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work or to the specifications or drawings.

2. If pursuant to the contract documents the Contractor shall be declared in default by the Owner under the aforesaid Contract, the Surety shall promptly remedy the default or defaults or shall promptly perform the Contract in accordance with its terms and conditions. It shall be the duty of the Surety to give an unequivocal notice in writing to the Owner within twenty-five (25) days after receipt of a declaration of default of the Surety's election either to remedy the default or defaults

promptly or to perform the contract promptly, time being of the essence. In said notice of election, the Surety shall indicate the date on which the remedy or performance will commence, and it shall then be the duty of the Surety to give prompt notice in writing to the Owner immediately upon completion of (a) the remedy and/or correction of each default, (b) the remedy and/or correction of each item of condemned work, (c) the furnishing of each omitted item of work, and (d) the performance of the contract. The Surety shall not assert solvency of its Principal as justification for its failure to give notice of election or for its failure to promptly remedy the default or defaults or perform the contract.

3. Supplementary to and in addition to the foregoing, whenever the Owner shall notify the Surety that the Owner has notice that the Contractor has failed to pay any subcontractor, materialman, or laborer for labor or materials certified by the Contractor as having been paid for by the Contractor, the Surety shall, within 30 days of receipt of such notice, cause to be paid any unpaid amount for such labor or materials.

4. It is expressly agreed by the Principal and the Surety that the Owner, if he desires to do so, is at liberty to make inquiries at any time of subcontractors, laborers, materialmen, or other parties concerning the status of payments for labor, materials, or services furnished in the prosecution of the work.

5. The Surety agrees that other than as is provided in this bond it may not demand of the Owner that the Owner shall (a) perform any thing or act, (b) give any notice, (c) furnish any clerical assistance, (d) render any service, (e) furnish any papers or documents, or (f) take any other action of any nature or description which is not required of the Owner to be done under the contract documents.

6. No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the legal successors of the Owner.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ A. D. 20\_\_\_\_\_.

IN THE PRESENCE OF:

\_\_\_\_\_  
(Principal) (SEAL)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety) (SEAL)

\_\_\_\_\_  
(Title)

**EXHIBIT D  
SPECIMEN  
PAYMENT BOND**

THIS BOND IS EXECUTED TOGETHER WITH ANOTHER BOND IN FAVOR OF THE  
OWNER AS OBLIGEE CONDITIONED UPON PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS:

That \_\_\_\_\_ as  
(Legal Title and Address of Contractor)

Principal (hereinafter referred to as "Contractor"), and

\_\_\_\_\_ as Surety  
(Legal title and address of Surety)

(hereinafter referred to as "Surety"), are held and firmly bound unto {Insert Name of Owner} as obligee

(hereinafter referred to as "Owner"), for the use and benefit of claimants defined, hereinafter, in the amount of

(\$ \_\_\_\_\_), to which payment Principal and Surety bind themselves, their heirs, executors,  
(Insert Contact Price)

administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with Owner dated \_\_\_\_\_ for

Project No. \_\_\_\_\_ in accordance with drawings and specifications prepared by

\_\_\_\_\_ which contract is incorporated herein by reference and made a part  
hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials supplied in the prosecution of the work provided for in said Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. The said Surety to this bond, for value received, hereby stipulates and agrees that no change or changes, extension of time or extensions of time, alterations or addition or additions to the terms of the contract or to the work to be performed there under, or the specifications or drawings accompanying same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change or changes, extension of time or extensions of time, alteration or alterations or addition or additions to the terms of the contract or to the work or to the specifications or drawings.
2. A claimant is defined as any subcontractor and any person supplying labor, materials, machinery, or equipment in the prosecution of the work provided for in said contract.
3. Every person entitled to the protection hereunder and who has not been paid in full for labor or materials furnished in the prosecution of the work referred to in said bond before the expiration of a period of ninety days after the day on which the last of the labor was done or performed by him, or materials or equipment or machinery was furnished or supplied by him for which such claim is made, or when he has completed his subcontract for which claim is made, shall have the right to sue on such payment bond for the amount, or the balance thereof, unpaid at the time of the commencement of such action and to prosecute such action to final execution and judgment for the sum or sums due him; provided, however, that any person having direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the contractor furnishing said payment bond, shall have the right of action upon the said payment bond upon

giving written notice to said contractor within ninety days from the day on which such person did or performed the last of the labor, or furnished the last of the materials or machinery or equipment for which such claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished or supplied or for whom the labor was performed or done; provided further that nothing contained herein shall limit the right of action to said 90-day period. Notice may be served by depositing a notice, registered mail, postage prepaid, duly addressed to the contractor at any place he maintains an office or conducts his business, or his residence, in any post office or branch post office or any letter box under the control of the Post Office Department, or notice may be served in any manner in which the sheriffs of Georgia are authorized by law to serve summons or process. Every suit instituted under this section shall be brought in the name of the claimant without the Owner being made a party thereto. The official who has the custody of said bond is authorized and directed to furnish, to any person making application therefore who submits an affidavit that he has supplied labor or materials for such work and payment therefore has not been made, or that he is being sued on any such bond, a copy of such bond and the contract for which it was given, certified by the official who has custody of said bond; this copy shall be primary evidence of said bond and contract and shall be admitted in evidence without further proof. Applicants shall pay for such certified copies and such certified statements such fees as the official fixes to cover the cost of preparation thereof, but in no case shall the fee exceed the fees which the clerks of the superior courts are permitted to charge for similar copies.

4. No action can be instituted on this bond after one year from the date of the final certificate of the architect.

5. Further, this bond shall be considered the same as a bond furnished under Section 13-10-1 *et seq.*, of the Code of Georgia, as amended, and all provisions of law pertaining to bonds furnished under said Section shall pertain hereto.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 20\_\_\_\_\_.

IN THE PRESENCE OF:

\_\_\_\_\_(SEAL)

(Principal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_(SEAL)

(Surety)

\_\_\_\_\_  
(Title)

EXHIBIT E  
SPECIMEN  
CONSTRUCTION CONTRACT

Contract No: \_\_\_\_\_

**THIS AGREEMENT** is made the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, by and between the Department of Natural Resources, an agency of the State of Georgia, (hereinafter, called the "Owner"), whose address is 2 Martin Luther King, Jr. Drive, Suite 1352 East, Atlanta, Georgia 30334 and (Contractor name), a corporation duly authorized by law to transact business in the State of Georgia (hereinafter, called the "Contractor"), whose mailing address is (Contractor address).

**WITNESSETH:**

**WHEREAS**, Owner has had prepared drawings, plans, specifications and addenda describing certain construction work it requires, the originals of which are on file and of record in the owner's offices, and are, by this reference, specifically incorporated herein; and

**WHEREAS**, Contractor, having obtained an exact copy of said drawings, plans, specifications and addenda, has submitted the bid for such work that is the most beneficial to the State of Georgia.

**NOW, THEREFORE**, the Owner and the Contractor in consideration of the mutual promises and benefits flowing to the parties hereto as hereinafter stated, agree as follows:

1. **SCOPE OF WORK** - The Contractor shall furnish all labor, materials, tools and equipment to perform all the Work shown on the drawings and called for in the specifications entitled: (name of project), as prepared by: \_\_\_\_\_, who is referred to in the Contract Documents as the Architect. It is the intent and it is hereby agreed that the Contractor shall perform all work covered by this Contract and the Contract Documents.
2. **TIME OF COMPLETION** - This Contract shall be commenced within ten (10) days after notice to proceed is issued by the Owner and shall be fully completed in \_\_\_\_\_ days from and including the date of the Notice to Proceed, time being of the essence.
3. **CONTRACT SUM** - The Owner shall pay the Contractor the sum of (Bid Amount in numbers and in writing) , which represents the base bid price plus/less alternates \_\_\_\_\_ and is subject to adjustment by additive or deductive Change Orders.
4. **PROGRESS PAYMENTS** -
  - (a) The Owner shall make progress payments on account of the contract as follows: On or about the 15th day of each month 90 per cent of the value, based on the contract prices, of labor and materials incorporated in the work and of materials suitably stored at the site thereof up to the 1st day of that month, as estimated by the Architect, less the aggregate of previous payments, until one-half of the contract sum is due.
  - (b) At any time after one-half of the contract sum, including change orders, becomes due and the work is: (1) on or ahead of the construction progress schedule; (2) there are no breaches of orders of condemnation; (3) there is no delinquency in the filing of the final breakdown and accounting, together with vouchers, on force account work as referred to in Article D-15 of the general conditions; and (4) there are no unsatisfactory performance evaluations, if the Contractor requests and the Owner and Architect approve, the sum being withheld as retainage will be converted to a lump sum and held by the Owner until final completion.

EXHIBIT E

PAGE 2

(c) No further retainage will be withheld by the Owner from payments to the Contractor unless: (1) the percentage of work complete falls behind the percentage required by the construction progress schedule by as much as 15 per cent, or; (2) the Contractor breaches an order of condemnation, or; (3) there are no unsatisfactory performance evaluations, or; (4) the Contractor becomes delinquent in

regard to the filing of the final breakdown and accounting, together with vouchers, on force account work as referred to in Article D-15 of the general conditions, in which event or events the Owner shall reinstate the 10 per cent retainage on all periodical estimates due to be paid while one or more of the events continues to exist. The Contractor will be given written notice of the reinstatement of the retainage.

(d) If the Contractor (1) recovers all lost time and puts the work back on schedule; and (2) remedies all breaches of orders of condemnation; and (3) corrects the deficiencies which caused the unsatisfactory performance evaluations, and (4) supplies a proper breakdown and accounting on force account work the sums withheld while either or all of the events existed will be converted to an additional lump sum and held by the Owner until final completion, and no further retainage will be withheld unless: (1) recurs, or; (2) recurs, or; (3) recurs or; (4) recurs in which event or events the Owner shall reinstate the 10 per cent retainage on all subsequent periodical estimates.

(e) At the discretion of the Owner, the retainage of each subcontractor may be released separately as he completes his work. An application for release of a subcontractor's retainage shall bear the original certificate of the subcontractor, the Contractor, and the Architect that the subcontractor's work has been fully performed and that the sum for which payment is requested is due by the Contractor to the subcontractor. Checks releasing a subcontractor's retainage shall be made payable to the Contractor, the Contractor's surety, and the subcontractor and shall be mailed to the Contractor's surety. This article does not create any contractual relationship between the Owner and the subcontractor or any duty of the Owner to any subcontractor. All warranties shall run from the date of the final certificate of the Architect unless otherwise expressly provided in the contract. Payments pursuant to this article shall in no way diminish, change, alter or affect the rights of the Owner under the contract documents.

**5. FINAL PAYMENT -**

(a) Final payment under this Contract will be due to the Contractor thirty (30) days after the issuance of the final certificate by the Architect. The Contractor agrees that before applying for final payment, he will furnish to the Owner the Statutory Affidavit, and the warranties and guarantees called for in the specifications.

(b) Upon receipt of written notice from the Contractor pursuant to Article D-41 of the general conditions that the work is ready for final inspection, the Architect shall promptly make such inspection, and when he finds the work complies with the contract and when the contract shall have been fully performed he shall promptly issue a final certificate, over his own signature, stating that the work provided for in this contract has been completed under the terms and conditions thereof, and that the entire balance found to be due the Contractor, and noted in said final certificate, is due and payable.

(c) Before issuance of final certificate, the Contractor shall submit evidence satisfactory to the Architect that all payrolls, material bills, and other indebtedness connected with the work have been paid.

(d) If full completion of the work is materially delayed through no fault of the Contractor, and the Architect so certifies, the Owner shall, upon certificate of the Architect, and without terminating the contract, make payment of the balance due for that portion of the work fully completed. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.



EXHIBIT E  
PAGE 3

6. **THE CONTRACT DOCUMENTS** - The Contract Documents which form the basis of this Contract shall be the plans and specifications as enumerated below, together with any other documents so listed and enumerated, and it is expressly understood that these documents are specifically made a part of this Contract.

PROJECT MANUAL: Entitled:

Dated:

Addendum (a):

CONTRACT: This form of AGREEMENT dated \_\_\_\_\_ by and between the parties written above.

7. The Owner and the Contractor hereby agree to the full performance of the conditions and stipulations contained herein.
8. This Agreement and all rights, privileges and responsibilities shall be interpreted and construed according to the laws of the State of Georgia. Any lawsuit or other action based on claims arising from this Contract shall be brought in a court or the forum of competent jurisdiction in Fulton County, in the State of Georgia.
9. The Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance required under this Agreement. The Contractor further covenants that in the performance of this Agreement, no person having any such interest shall be employed or contracted with.
10. The parties hereto certify that the provisions of law contained in the Act prohibiting full-time appointive officials and employees of the State from engaging in certain transactions affecting the State as defined in Section 45-10-20 through 45-10-26 of the O.C.G.A. have not and will not be violated in any respect in regard to this Agreement.
11. This Agreement and the proceeds of this Agreement may not be assigned nor may the performance there under be assigned, except with the prior written consent of the Owner.
12. The failure of the Owner at any time to require performance by the Contractor of any provision hereof, shall in no way affect the right of the Owner thereafter to enforce any provision or any part of the Contract, nor shall the failure of the Owner to enforce any breach of any provision hereof to be taken or held to be a waiver of such provision, or as a waiver, modification or recession of the Contract itself
13. If the Contractor is a nonprofit Contractor as defined in Section 50-20-2 of the O.C.G.A., then the Contractor agrees to comply with the provision of said Act, and in particular requirements of Section 3 thereof, and with such further instructions and requirements as the State of Georgia may subsequently require in the implementation of said Act.
14. **IMMIGRATION REFORM COMPLIANCE.** Pursuant to the Georgia Security and Immigration Compliance Act of 2006, the Contractor understands and agrees that compliance with the requirements of O.C.G.A. § 13-10-91 and Georgia Department of Labor Rule 300-10-1-.02 are conditions of this Agreement. The Contractor hereby warrants that Contractor has complied with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act, O.C.G.A. § 13-10-90 *et. seq.*, by registering at <https://www.vis-dhs.com/EmployerRegistration> and verifying information of all new employees; and by executing

any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 *et. seq.*

The Contractor warrants that, in the event the Contractor employs or contracts with any subcontractor(s) in connection with this Agreement, the Contractor shall include a similar provision in all written agreements with any such subcontractor(s). The Contractor agrees to maintain records of any such written subcontractor agreements for inspection by the Owner at any time.

15. No amendment to this Contract shall be effective unless it is in writing and signed by duly authorized representatives of the parties. **NO REPRESENTATION, REQUEST, INSTRUCTION, DIRECTIVE OR ORDER, MADE OR GIVEN BY ANY OFFICIAL OF ANY AGENCY OF THE STATE OF GEORGIA, WHETHER VERBAL OR WRITTEN SHALL BE EFFECTIVE TO AMEND THIS CONTRACT OR EXCUSE OR MODIFY PERFORMANCE HEREUNDER UNLESS REDUCED TO A FORMAL AMENDMENT AND EXECUTED AS SET FORTH ABOVE. CONTRACTOR SHALL NOT BE ENTITLED TO ADDITIONAL COMPENSATION, DELAY IN PERFORMANCE, OR OTHER BENEFIT CLAIMED FOR RELYING UPON OR RESPONDING TO ANY SUCH REPRESENTATION, REQUEST, INSTRUCTION, DIRECTIVE, OR ORDER.**
  
16. This Contract, including all documents incorporated herein, constitutes the entire agreement between the parties with respect to the subject matter; hereby superseding all other prior and contemporaneous agreements, representations, statements, negotiations, and undertakings whether oral or written.

EXHIBIT E  
PAGE 5

THE PERSON SIGNING ON BEHALF OF EACH PARTY REPRESENTS THAT SUCH PERSON IS DULY AUTHORIZED AND FULLY EMPOWERED TO ENTER INTO THIS CONTRACT ON BEHALF OF SUCH PARTY. EACH PARTY WARRANTS THAT SUCH PARTY HAS FULL POWER AND AUTHORITY TO ENTER INTO AND PERFORM THIS CONTRACT. THE PARTIES HERETO ACKNOWLEDGE THAT THEY HAVE READ AND UNDERSTAND THIS CONTRACT, AND AGREE TO BE BOUND BY ALL TERMS AND CONDITIONS OF THIS CONTRACT, AS INDICATED BY THE SIGNATURES OF THEIR DULY AUTHORIZED REPRESENTATIVES SET OUT BELOW.

EXECUTED AS OF THE DAY AND YEAR FIRST WRITTEN ABOVE

**DEPARTMENT OF NATURAL RESOURCES  
AN AGENCY OF THE STATE OF GEORGIA**

**(Contractor name)**

Chris Clark

Printed Name: \_\_\_\_\_

Commissioner

Title: \_\_\_\_\_

By: \_\_\_\_\_  
*(Signature)*

By: \_\_\_\_\_  
*(Signature)*

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ENCLOSURES:**

- Exhibit A: Bid of Contractor (Proposal Form)
- Exhibit B: Section D – General Conditions
- Exhibit C: Section E – Supplemental Conditions
- Exhibit D: Section F – Special Conditions
- Exhibit E: Drawings and Specifications

INSTRUCTIONS TO PRODUCING AGENT: COMPLETE THE SHADED PORTIONS OF THIS CERTIFICATE AND RETURN TO THE INSURED. NO CONDITION, TERM, QUALIFICATION, LIMITATION, EXCEPTION, EXEMPTION, MODIFICATION, OR PROVISO SHALL APPEAR ON THE CERTIFICATE.

### Certificate of Insurance

<b>Name, Address and Telephone Number of Producing Agent</b>	<b>PROJECT NO.:</b>
	<b>PROJECT NAME:</b>
<b>Name and Address of Insured Contractor</b>	<b>Certificate Holder(Owner):</b> Department of Natural Resources Parks & Historic Sites Division 2 Martin Luther King, Jr. Drive, Suite 1352 Atlanta, Ga. 30334

Type of Insurance	Policy No.	Company Affording Coverage	Policy Expiration Date	Limits
<b>Commercial General Liability(1993 ISO Occurrence Form or its equivalent);</b> Includes XCU Coverage includes contractual liability				General Aggregate (per project) \$2,000,000.00 Products-Co./Op Agg \$1,000,000.00 Personal & Adv injury \$1,000,000.00 Contractual \$1,000,000.00 Each Occurrence \$1,000,000.00
<b>Commercial Business Automobile Liability</b> Including, but not limited to, owned, hired and non-owned autos				Combined Single Limit \$1,000,000.00 OR Bodily Injury (per person) \$1,000,000.00 Property Damage \$1,000,000.00
<b>Workers Compensation</b> The Proprietor/Partners/ Executive Officers are included				W C Statutory Limits
<b>Employers' Liability</b>				Each Accident \$1,000,000.00 Disease - Policy Limit \$1,000,000.00 Disease - Each Employee \$1,000,000.00
<b>Commercial Umbrella Liability</b>				Each Occurrence \$2,000,000.00 Aggregate \$2,000,000.00
<b>Builders Risk written on 1991 Cause of Loss-Special Form or its equivalent(See endorsement below)</b> OR <b>Installation Floater</b> (for other than new construction)				

Such insurance as is herein certified (i) applies to all in connection with the work required by the provisions of the documents forming the contract, (ii) applies whether or not the contract documents between the insured contractor and the Owner have been executed, (iii) is written in accordance with the company's regular policies and endorsements, subject to the company's applicable manuals or rules and rates in effect, as modified by this certificate and the insurance article of the contract, (iv) have been issued to the insured named above, and (v) are in force at this time.

The Officers, Members, Agents, & Employees of the Owner and the State of Georgia are included as additional insureds as their interests may appear. Each Insurer is hereby notified that the statutory requirement that the Attorney General of Georgia shall represent and defend the Indemnities remains in full force and effect and is not waived by issuance of any policy of insurance.

The Builders Risk policy has been endorsed as follows: "The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy: (i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; and (ii) Partial or complete occupancy by Owner; and (iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other contractors of Owner, or by contractors or the lessee of the Owner."

Each policy has been endorsed to provide that the policy shall not be canceled, changed, allowed to lapse, or allowed to expire for any reason, including without limitation non-payment of premiums, until thirty (30) days after Owner has received written notice thereof as evidenced by return receipt of registered letter.

Authorized Representative: \_\_\_\_\_ Date: \_\_\_\_\_

Typed Name: \_\_\_\_\_

EXHIBIT G

CONTRACTOR PERFORMANCE EVALUATION QUESTIONNAIRE

FINAL REPORT  INTERIM REPORT, \_\_\_\_\_% COMPLETE

Facility (Owner): Georgia Department of Natural Resources Project Number: \_\_\_\_\_

Project: \_\_\_\_\_

Description: \_\_\_\_\_

Contractor: \_\_\_\_\_

Legal Name and Address

When Organized \_\_\_\_\_ State Incorporated \_\_\_\_\_ Type \_\_\_\_\_ Corporation., Partnership,

Sole Proprietorship

Federal I.D. No. \_\_\_\_\_ or S. S. No. \_\_\_\_\_ Georgia Resident: YES \_\_\_ NO \_\_\_

The full names of persons interested in the foregoing project as principals are as follows:

(1) \_\_\_\_\_  
Check One: President ( ) Partner ( ) Owner ( )

(2) \_\_\_\_\_  
Check One: Vice President ( ) Secretary ( ) Partner ( )

Original Contract Amount: \$ \_\_\_\_\_ Date of Award: \_\_\_\_\_

# of CO's \_\_\_\_\_ Total CO's \$ \_\_\_\_\_ Original Contract Completion Date: \_\_\_\_\_

Final Contract Amount \$ \_\_\_\_\_ Revised Contract Completion Date: \_\_\_\_\_

Owner Acceptance Date: \_\_\_\_\_

Punch List Completion Date: \_\_\_\_\_

Final Payment Date: \_\_\_\_\_

Contractor's Overall Performance Rating:

4 = Outstanding  2 = Satisfactory  0 = Unsatisfactory

Remarks: (Attach additional sheets or documentation if necessary)

\_\_\_\_\_  
\_\_\_\_\_

EVALUATED BY: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_

Name and Title \_\_\_\_\_

Name and Title \_\_\_\_\_

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

EXHIBIT G  
PAGE 2

PERFORMANCE EVALUATION OF CONTRACTOR			
	PERFORMANCE CATEGORY	RAT	REMARKS
1	Project Mobilization		
2	Environmental Protection		
3	Compliance / Submission of Labor Reports		
4	Job Site Safety		
5	Knowledge and Compliance with Applicable Codes		
6	Contract Management		
7	Adherence to Project Schedule		
8	Quality of Superintendence/Supervision		
9	Coordination of Trades/Subcontractors		
10	Submittal Reviews by Contractor		
11	Submittal Timeliness		
12	Subcontractor Management/Scheduling		
13	Mechanical Systems		
14	Electrical Systems		
15	Adherence to Plans/Specifications		
16	Maintenance/Operation Manuals		
17	O&M Equipment Demonstrations		
18	Cooperation with Inspectors		
19	As Built Drawings		
20	Cooperation with Owner/User		
21	Change Orders		
22	Job Site Appearance/Clean-up		
23	Project Status at Punch List Inspection		
24	Completion of Punch List		
25	Punch List Size		
26	Timeliness of Project Completion		
27	Quality of Construction		
28	Submission of Close Out Data		

CODE RATING: 4 = Outstanding 2 = Satisfactory 0 = Unsatisfactory (Explain all outstanding or unsatisfactory ratings)

PERFORMANCE EVALUATION OF CONTRACTOR'S SUB-CONTRACTOR S		
SUB-CONTRACTOR (NAME AND WORK PERFORMED)	RATING	REMARKS
A.		
B.		
C.		
D.		
E.		

CODE RATING: 4 = Outstanding 2 = Satisfactory 0 = Unsatisfactory (Explain all outstanding or unsatisfactory ratings)

1. This evaluation of the contractor's performance should be completed upon completion of the project. At the Agency's discretion, a report of the contractor's performance can be done at any time during the project.
2. Copies of all performance evaluations (pages 1, 2 & 3) are to be sent to the Department of Administrative Services, State purchasing, to the attention of the Construction Project Analyst.
3. Interim and Final Unsatisfactory Evaluation Reports will be used to determine whether contractors are responsible bidders on future bids and in possible suspension or debarment proceedings.

# CONSENT OF SURETY COMPANY TO FINAL PAYMENT

AIA DOCUMENT G707

OWNER  
ARCHITECT  
CONTRACTOR  
SURETY  
OTHER

PROJECT:  
(name, address)

TO (Owner)

ARCHITECT'S PROJECT NO:  
CONTRACT FOR:

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the  
(here insert name and address of Surety Company)

, SURETY COMPANY,

on bond of (here insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not  
relieve the Surety Company of any of its obligations to (here insert name and address of Owner)

, OWNER

as set forth in the said Surety Company's bond.

IN WITNESS WHEREOF,  
the Surety Company has hereunto set its hand this

day of

19

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Signature of Authorized Representative

Attest:  
(Seal):

\_\_\_\_\_  
Title

NOTE: This form is to be used as a companion document to AIA DOCUMENT G706, CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS, Current Edition



WARRANTY AND GUARANTY

RE:

TO: DEPARTMENT OF NATURAL RESOURCES  
AN AGENCY OF THE STATE OF GEORGIA

Witnesseth that \_\_\_\_\_  
guarantees that all work executed under the plans and these  
Specifications will be free from defects of materials and  
workmanship for a period of one year from the date of final  
acceptance and that all defects occurring within that period  
shall be replaced at no cost to the Owner.

Where guaranty or guaranties are written in any section for  
a period of more than one year, such longer terms shall apply.

Nothing in the above shall be deemed to imply that this guaranty  
shall apply to work which has been abused or neglected by the  
Owner.

It is specifically understood that the terms of the guaranties  
called for in the Specifications, the compliance therewith,  
and the fulfillment of all obligations thereunder are fully  
protected by the performance bond furnished by the General  
Contractor.

DATE OF FINAL ACCEPTANCE:

\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Title

**SECTION 011000  
SUMMARY**

**PART 1 GENERAL**

**1.1 PROJECT**

- A. Project Name: Tugaloo State Park.  
Owner's Name: State of Georgia, Department of Natural Resources.
- B. The Project consists of the construction of a comfort station building.

**1.2 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

**1.3 OWNER OCCUPANCY**

- A. Department of Natural Resources intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Department of Natural Resources to minimize conflict and to facilitate Department of Natural Resources's operations.
- C. Schedule the Work to accommodate Department of Natural Resources occupancy.

**1.4 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Department of Natural Resources:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

**End of Section 011000**

**SECTION 013000  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Progress photographs.
- E. Submittals for review, information, and project closeout.
- F. Submittal procedures.

**1.2 PROJECT COORDINATION**

- A. Project Coordinator: representative of the Department of Natural Resources.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for utilities access, traffic, and parking facilities.
- C. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- D. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- E. Coordinate field engineering and layout work under instructions of the Project Coordinator.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.1 PRECONSTRUCTION MEETING**

- A. Department of Natural Resources will schedule a meeting after Notice of Award.
- B. Agenda:
  - 1. TBD

- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Gerding Collaborative, LLC, Department of Natural Resources, participants, and those affected by decisions made.

### 3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Maintenance of progress schedule.
  - 7. Corrective measures to regain projected schedules.
  - 8. Planned progress during succeeding work period.
  - 9. Maintenance of quality and work standards.
  - 10. Effect of proposed changes on progress schedule and coordination.
  - 11. Other business relating to Work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Department of Natural Resources, participants, and those affected by decisions made.

### 3.3 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

### 3.4 PROGRESS PHOTOGRAPHS

- A. Submit new photographs at least once a month, within 3 days after exposure.

- B. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- C. Photography Type: Digital; electronic files.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
  - 1. Completion of site clearing.
  - 2. Excavations in progress.
  - 3. Foundations in progress and upon completion.
  - 4. Structural framing in progress and upon completion.
- E. Views:
  - 1. Provide non-aerial photographs from four cardinal views at each specified time, until Date of Substantial Completion.
  - 2. Consult with DNR for instructions on views required.
  - 3. Provide factual presentation.
  - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
  - 1. Delivery Medium: Via email.
  - 2. File Naming: Include project identification, date and time of view, and view identification.
  - 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

### **3.5 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
  - 2. Shop drawings.
  - 3. Samples for selection.
  - 4. Samples for verification.
- B. Submit to Georgia Department of Natural Resources for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below

### **3.6 S SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. LEED submittals and reports.

3. Certificates.
4. Test reports.
5. Inspection reports.
6. Manufacturer's instructions.
7. Manufacturer's field reports.
8. Other types indicated.

B. Submit for Department of Natural Resources. No action will be taken.

### **3.7 SUBMITTALS FOR PROJECT CLOSEOUT**

A. When the following are specified in individual sections, submit them at project closeout:

1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

B. Submit for Department of Natural Resources's benefit during and after project completion.

### **3.8 NUMBER OF COPIES OF SUBMITTALS**

A. Documents for Review:

1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that TBD requires, plus two copies that will be retained by DNR.

B. Documents for Information: Submit two copies.

C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

D. Samples: Submit the number specified in individual specification sections; one of which will be retained by DNR.

1. After review, produce duplicates.
2. Retained samples will not be returned to TBD unless specifically so stated.

### **3.9 SUBMITTAL PROCEDURES**

A. Transmit each submittal with AIA Form G810.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, TBD, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply TBD's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination

- of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and coordinate submission of related items.
  - F. For each submittal for review, allow 15 days excluding delivery time to and from the TBD.
  - G. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
  - H. When revised for resubmission, identify all changes made since previous submission.
  - I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
  - J. Submittals not requested will not be recognized or processed.

**End of Section 013000**

## SECTION 013330 STRUCTURAL SUBMITTALS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Structural submittals include shop drawings, design calculations, diagrams, illustrations, schedules, performance charts, nomenclature charts, samples, brochures and other data prepared by the Contractor or any subcontractor, manufacturer, supplier, fabricator, or distributor and which illustrate some portion of the Project.
- B. Submittals by the Contractor are not a part of the Contract Documents.

#### 1.2 RELATED SECTIONS

- A. Section 013300 – Submittals

#### 1.3 SUBMITTAL PROCEDURES

- A. Prior to the initial submittal, Contractor shall submit to the Architect/Structural Engineer a completed *Submittal Information and Schedules* form given in Appendix I.
- B. Submittals shall be accompanied by a transmittal letter with the following information:
  - 1. Project name.
  - 2. Contractor's name.
  - 3. Date submitted.
  - 4. Description of items submitted; identify work and product by Specification Section.
  - 5. Number of drawings and other pertinent data.
- C. Provide blank space on each submittal for the Architect/Structural Engineer's review stamp.
- D. The type and number of submittals for each item shall be in accordance with Section 013300.
- E. Contractor shall direct specific attention on the submittal to any deviation from the Contract Documents.

#### 1.4 CONTRACTOR RESPONSIBILITY

- A. Contractor shall make all submittals in advance of installation or construction to allow the Architect/Structural Engineer sufficient time for review.



- B. Contractor shall stamp and sign each sheet of shop drawings and product data, and sign or initial each sample to certify compliance with requirements of Contract Documents. SUBMITTALS RECEIVED WITHOUT THE CONTRACTOR'S STAMP OF REVIEW WILL BE RETURNED TO THE CONTRACTOR FOR REVIEW AND RESUBMITTAL.
- C. Contractor shall understand that the submittal of the required documents does not constitute compliance with the requirements of the Contract Documents; only submittals reviewed by the Architect/Structural Engineer constitute compliance.
- D. It is the Contractor's responsibility to furnish equipment, materials, and labor for the Project which meets the requirements of the codes and authorities quoted as well as the Contract Documents. Proprietary items specified herein only establish a minimum functional and aesthetic standard and it is incumbent upon the Contractor to ascertain conformance of these proprietary items or any proposed substitution with the codes and authorities.
- E. By reviewing, approving and submitting shop drawings, product data, or samples, Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, member sizes catalog numbers, and similar data and that he has checked and coordinated shop drawings with the requirements of the Project and of the Contract Documents.
- F. Work requiring shop drawings, whether called for by the Contract Documents or requested by the Contractor, shall not commence until the submission has been reviewed by the Architect/Structural Engineer. Work may commence if the Contractor verifies the accuracy of the Architect/Structural Engineer's corrections and notations and complies with them without exception and without requesting change in Contract Sum or Contract Time.

#### **1.5 ARCHITECT/STRUCTURAL ENGINEER REVIEW**

- A. Architect/Structural Engineer will review submittals with reasonable promptness.
- B. Architect/Structural Engineer's review or corrections refer only to the general arrangement and conformance of the subject of the submittals with the design concept of the project and with the information given in the Contract Documents. Under no conditions should the Contractor consider the review to include the dimensions, quantities, and details of the items nor the approval of an assembly in which the item functions.
- C. Architect/Structural Engineer's review shall not relieve the Contractor from responsibility for errors or omissions in the submittals.
- D. Architect/Structural Engineer's review of submittals shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has directed specific attention to the deviation at the time of submission and the Architect/Structural Engineer has given written approval to the specific deviation.

- E. Architect/Structural Engineer's review of submittals shall not be construed as authorizing any change in the Contract Sum or Contract Time.

#### **1.6 SHOP DRAWINGS**

- A. Present in a clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail of Contract Documents.
- B. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
- C. Identify field dimensions; show relationship to adjacent or critical features of Work or products.
- D. A copy of the marked structural shop drawings with the Architect/Structural Engineer's review stamp is to be maintained at the job site.

#### **1.7 PRODUCT DATA**

- A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
- B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information which is not applicable.
- C. Provide manufacturer's preparation, assembly, and installation instructions.

#### **1.8 SAMPLES**

- A. Submit full range of manufacturer's standard finishes except where more restrictive requirements are specified, indicating colors, textures, and patterns.
- B. Submit samples to illustrate functional characteristics of products, including parts and attachments as required by Architect/Structural Engineer.
- C. Approved samples which are of proper size may be incorporated in Work.
- D. Label each sample with identification.
- E. Field Finishes: Provide full samples at Project, at location acceptable to Architect/Structural Engineer, as required by individual Specification Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed work.

#### **1.9 RESUBMITTALS**

- A. When submittals are returned to the Contractor with the Architect/Structural Engineer's corrections the Contractor shall make the required corrections. Upon request, resubmit one corrected set.
- B. Contractor shall direct specific attention on the resubmittal to all revisions including those requested by the Architect/Structural Engineer on previous submission.

**1.10 DISTRIBUTION**

- A. Distribute reproductions of shop drawings, copies of product data, and samples which bear the Architect/Structural Engineer's review stamp to job site file, Record Documents file, subcontractors, suppliers, other affected contractors, and other entities requiring information.
- B. Work shall be in accordance with and performed from the reviewed drawings.

**PART 2 - PRODUCTS**

Not Used.

**PART 3 - EXECUTION**

Not Used.

**END OF SECTION 013330**

APPENDIX I  
SUBMITTAL INFORMATION AND SCHEDULES

PROJECT \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

CONTRACTOR'S ADDRESS \_\_\_\_\_  
\_\_\_\_\_

PROJ. MANAGER \_\_\_\_\_ PHONE(\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_) \_\_\_\_\_

SUPERINTENDENT \_\_\_\_\_ PHONE (\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_) \_\_\_\_\_

MOBILIZATION DATE \_\_\_\_\_

PROJECTED SUBMITTAL DATES

FOUNDATION, CONCRETE & REINFORCING		STRUCTURAL STEEL		MASONRY	
SUBMITTAL DATE	DATE	SUBMITTAL DATE	DATE	SUBMITTAL DATE	DATE
Site preparation & Equipment Information		Fabricator / Erector Qualifications		Grout & Mortar Mix	
Concrete Mix Design		Anchor Bolt & Embedded Items		Block Prism & Comp. Strength	
Foundation Reinforcing		Erection & Detail Drawings		Reinforcing	
Structural Frame Reinforcing				Written Proceures	
Miscellaneous Frame Reinforcing		Joists			
Post Tensioning		Deck		WOOD	DATE
Precast		Cooling Tower, Elevator & Stair Drawings		Trusses	

END OF APPENDIX

## **PART 1 - GENERAL**

### **1.1 SCOPE**

- A. Work described in this section includes the containment of sediment transport, containment and control of all soil erosion and containment and treatment of all pollutants including dust and petroleum, prior to, during and throughout all construction operations; establishment of permanent vegetative cover and stabilization and continued maintenance of said measures in accordance with subparagraph 4 of Part III, paragraph. 3.4 of this section. Work includes removal of all devices at the completion of the project as further described in part 3.5 of this section.
- B. Contractor is solely responsible for protection of all affected downstream properties from encroachment or damage from soil erosion and/or the discharge of pollutants by water, air or dust to any areas off the project site.
- C. The Erosion Sediment and Pollution Control Plan (ESPC) and these Specifications together form the Landscape Architect/Engineer's "program" for Best Management Practices which are more fully described in the latest edition of the "Manual for Erosion and Sediment Control in Georgia- Vegetative and Structural Best Management Practices (BMPs) for Land Disturbing Activities" as published by the Georgia Soil and Water Conservation Commission. All control measures shown on the ESPC or described in these Specifications are to be considered the minimum required. However, additional measures may be required. Provide same as required either through observation of obvious conditions which threaten the environs of the site and/or other properties; the Contractor or his sub-contractors; the public's safety health or welfare; or by the directives from governing authorities after approval by the Owner.
- D. The disturbed area of the site is less than 1 acre and therefore is exempted from requiring a NPDES permit. However, the Contractor shall be responsible for all daily, weekly, monthly or any other on-site inspections and maintenance of the Erosion, Sediment and Pollution Control measures as required to assure that the escape of sediment from the immediate construction site is controlled in a manner acceptable to the owner. All inspections shall be documented and copies of the documentation will be submitted to the Program Manager on a weekly basis. The contractor shall keep all records of inspections, repairs, maintenance, reinspections and any other documentation on site and available for review by the regulating authorities. Any punitive or other enforcement actions levied by any regulating authority for failure to comply with the erosion and pollution control requirements are the responsibility of the Contractor and will be paid by the Contractor.

Failure to properly install and maintain all erosion controls, or failure to conduct and document all inspections required by the owner may result in stop work orders (other than erosion and sediment control related items) and withholding of payment

to the contractor until all permit conditions are met. The contractor will not be compensated for delays resulting from stop work orders due to failure to comply with the permit.

**2 ■**

- A. Schedule of Operations: Submit schedule of exact dates operations including program for erosion, sediment and pollution control measures, maintenance of all said measures including control facilities, structures and devices and vegetative practices. Show anticipated starting and completion dates for land-disturbing activities including excavation, filling and rough grading, finished grading, construction of temporary and permanent control measures, and disposition of temporary erosion sediment and pollution control measures.
- B. Submit a sample of erosion control blanket material to the owner, such as "Curlex", "Bon Terra-CS2" or "Ero-Mat" by Verdyol for all disturbed areas of the site.
- C. Submit a sample to the owner of the synthetic polymer such as "SiltStop" or approved equal.
- D. Submit Notice-of-Termination to Georgia DNR-EPD, along with the Owner, at such time as the site meets the Permit requirement for same.

**1.3 PROJECT CONDITIONS**

- A. Furnish and install all control measures prior to or concurrent with any land disturbance activity. The Contractor is responsible for the initial provision and installation of all control measures and then the continued provision and installation and maintenance of all measures throughout all construction operations and all sequences of construction operations.
- B. Schedule grading operations to allow permanent erosion control to take place in the same construction season. Avoid or minimize exposure of soils to winter weather. Maintain all controls until vegetative cover has been established.
- C. Construct and maintain temporary control measures until such time as permanent measures are effective in control of erosion, sediment and pollution from the site. Extent of measures shall be responsibility of Contractor.
- D. Stop all erosion, sediment, dust or other pollution from leaving the site and encroaching on downstream or surrounding properties.
- E. Temporary grassing shall be applied to all disturbed areas left idle for 72 hours.
- E. Contractor is responsible for all quantities of all BMPs regardless if shown on the ESPC. The extent of soil erosion control measures shown on the ESPC should be considered minimum.

**1.4 QUALITY CRITERIA**

- A. Procedures shall comply with the "Manual for Erosion and Sediment Control in Georgia", latest edition published by the Georgia Soil and Water Conservation Committee." Acquire and keep on-site throughout construction a copy of the latest edition of the "Field Manual for Erosion and Sediment Control in Georgia-Vegetative and Structural Best Management Practices (BMP's) for Land Disturbing Activities" as published by the Georgia Soil and Water Conservation Commission sometimes referred to as the "little green book". The Contractor is required to keep a log book on site documenting his inspection of all BMP's (minimum once/week and within 24 hrs of any storm event) and noting any corrections or modifications.
- B. Reference the ESPC for any other procedural manuals, publications, permits or other field guidelines required for the Contractor to obtain, understand and utilize in the performance of his work. By reference of same, said materials are made a part of these Specifications.
- C. The contractor must employ and utilize Certified Personnel as required by the Permit.

## **PART 2 - PRODUCTS**

### **2.1 FILTER FABRIC**

- A. Filter fabric for silt fences shall be a 36" Georgia DOT approved pervious sheet of synthetic polymer filaments non-woven from continuous filaments with wire fence backing. Filter fabric shall be of type recommended by its manufacturer for the intended application. The filter fabric shall meet the following requirements:
  - 1. Minimum average thickness: 30 mil (by ASTM D1777).
  - 2. Air permeability: 250 to 550 C.F.M./Sq. Ft.
  - 3. Minimum grab strength: 110 lbs. (by ASTM D1682).

### **2.2 STONE FOR EXIT/ENTRANCE PAD**

- A. Stone shall comply with ASTM D448 size #1 (1 1/2" to 3 1/2").

### **2.3 EROSION CONTROL BLANKET**

- A. All areas of disturbance:
  - 1. Biodegradable netting impregnated with excelsior wood fiber such as manufactured by "Curlex";
  - 2. "Ero-Mat" by Verdyol;
  - 3. "Bon Terra CS2";

### **2.4 SYNTHETIC POLYMERS**

- A. For all newly disturbed, graded or exposed soil surfaces, apply 1.5 gals/acre of approved erosion control polymer. Erosion control polymer is a water soluble synthetic polyacrylamide polymer suitable to be applied to disturbed soil surfaces

where the polymer will chemically bind to fine clay particles and prevent clay from going into solution, such as:

1. APS 600 Series Silt Stop, as manufactured by Applied Polymer Systems
  2. Or approved equal.
- B. Polymer shall be applied utilizing a hydro seeder mix of appropriate seed, fertilizer, lime and mulch for the same acre or without seed/fertilizer/lime/mulch mix.
- C. Follow all manufacturer's instructions and recommendations. Do not mechanically disturb treated areas after application. *(This does not include foot traffic as necessary to install erosion control blanket.)*
- D. Contractor shall furnish and install as necessary a minimum 200 lbs. of erosion control polymer for incidental "touch-up" or point source erosion areas."
- E. Furnish two (2) forms of synthetic polymer:
1. Emulsion polymer for hydro seeder application with an active strength of 30%.
  2. Powder polymer for hand spreading with an active strength of 95%.

## 2.6 RIP RAP

- A. Rip Rap shall be granite stone with a minimum weight of one hundred fifty pounds (150 lbs.) per piece.

## PART 3 – EXECUTION

### 3.1 MEETING WITH SITE INSPECTOR

- A. The contractor must have a preconstruction conference with the site inspector assigned to the project by the GA Department of Natural Resources, Parks and Historic Sites prior to starting any land disturbing activities. Notify the Program Manager of the date and time of the meeting and the Program Management inspector will also attend.

### 3.1 TEMPORARY EROSION CONTROL DEVICES

- A. Construct temporary sediment barriers of silt fence or other Structural Control Measures indicated on the ESPC at all points where surface water flows from construction area or as otherwise indicated on ESPC or as deemed necessary by inspectors.
- B. Install temporary sediment traps and temporary sediment basins in accordance with the location and details shown on the ESPC. Remove accumulated sediment when they are one-third full of silt continually until permanent vegetative cover is established and the transportation and depositing of sediment has been eliminated.
- C. Install construction exit(s) as indicated in the locations shown on the ESPC with geotextile fabric underlayment. Maintain construction exit(s) to prevent tracking and flow of mud onto public roads. If the contractor wishes to install construction exit(s) in location(s) other than the location(s) indicated on the ESPC, he must notify the



Design Professional (see the Permit for definition) who prepared the ESPC. The design professional will approve or reject the proposed alternate location(s). If alternate locations are approved, the design professional will prepare and issue a new plan.

- D. Construct diversion berms, dikes or diversion ditches at the tops of all slopes or as otherwise indicated on the ESPC. Machine compact these elements and plant temporary seed until permanent vegetative cover can be established.
- E. Maintain temporary barriers until permanent erosion control measures are established and the transportation and depositing of sediment has been eliminated. Repair and replace all Structural Control Measures damaged or displaced by construction activity and surface water generated by run off.
- F. Contractor shall clean out and/or adjust temporary sediment basin(s)/facility elevations to specified depth throughout duration of project after stabilization of all disturbed areas. Compact dam of sedimentation basin to minimum 95% Standard Proctor to the grade elevations shown on the ESPC.

### 3.2 SEDIMENTATION FACILITIES

- A. Construct temporary sedimentation facility prior to or concurrent with rough grading of site. Permanent sedimentation control measures shall be constructed concurrently with fine grading or partial fine grading of site and vegetative stabilization. Direct surface water into completed portions of sedimentation facility.
- B. Maintain temporary sediment traps at all drainage structures (both on-site and/or off-site) until permanent vegetative cover or stabilization has been established to prevent washing of sediment into storm drainage system. Utilize "pigs-in-a-blanket" temporary sediment traps at all completed or partially completed single wing or double wing catch basins, drop inlets and yard inlets unless other Structural Control Measures are shown on the ESPC.
- C. Flush drainage lines between manholes and drainage structures as required during construction and after establishment of permanent erosion control measures to remove collected debris and sediment. Protect downstream areas when flushing debris and sediment from drainage structures and lines.
- D. Install rip rap at all locations indicated on the ESPC or other drawings as soon as feasible. It shall be reasonably well-graded granite stone sized from smallest to maximum size specified. Stones smaller than smallest size specified is not permitted. Control gradation of rip rap by visual inspection to assure thickness of rip rap conforms to contract document requirements. Provide geotextile filter fabric under rip rap.
- E. After land disturbance operations of any kind, survey the sediment facility and determine that sediment volume that is available. If specified volume is not available, disassemble control measures as necessary, excavate sediment from facility and install control measures. Dispose of excavated sediment from facility, spread over slopes in accordance with contours shown on the Grading and Drainage

Plan and stabilize facility with permanent vegetation. Prepare and submit a certified statement of correct sediment facility volume. Do not dispose of any excavated sediment into any drainage way which might lead said material off-site onto adjacent downstream properties.

- F. Any existing creeks and ponds shall not be used in any manner for Erosion, Sediment or Pollution Control measures. Protect same from all erosion, sediment or pollutants of any kind.

### **3.3 GROUND COVER**

- A. Protect all exposed soils with mulching (temporary measure) and vegetative ground cover (permanent measure).
- B. Install "Curlex", "Bon Terra CS2" or "Ero-Mat" by Verdyol blanket on all slopes greater than 3:1 along with vegetative cover unless otherwise indicated on the ESPC.
- C. Temporary Seeding consists of ground cover of temporary plant material on all graded areas which will not receive final grading or permanent planting within three (3) days.
- D. All grassing or planting operations shall include mulching as stabilization until ground cover by planting is effective.
- E. Reseed as required until full vegetative coverage is established.

### **3.4 INSPECTION AND MAINTENANCE**

- A. Inspect all control elements and Structural Control Measures after each rainfall event and at the minimum intervals defined by the Permit if no rainfall event(s) occur. Clear all debris and accumulated sediment from behind barriers when one third full so their functional capacity is not reduced. Repair and replace any and all damaged measures of any kind.
- B. If the contractor feels that the BMPs and/or structural control measures are not sufficient as designed, he shall notify the Design Professional who will review the areas in question

### **3.5 REMOVAL OF TEMPORARY EROSION CONTROL DEVICES**

- A. As soon as permanent vegetative cover is established, Contractor shall remove temporary devices, including sediment barriers, berms, silt traps and similar devices. Contractor to remove retrofit structure and clean out all accumulated silt and debris in detention ponds to restore finished grades indicated on the ESPC.
- B. Contractor shall remove all excess silt from behind all silt fences and other filter devices and utilize it to repair erosion features if necessary. If silt is not needed for repairs, it shall be removed from the site by the contractor.
- C. Contractor shall remove silt fence in such a manner as to minimize damage to surrounding vegetative cover. All fence fabric, wire and posts shall be removed

completely, and removed from the site after permanent vegetation or stabilization as defined by the Permit has been established.

- D. All disturbed areas created by removal of silt fence shall be immediately fine graded, stabilized and seeded with permanent grass to match surrounding areas. All rocks and debris shall be removed from the site. Stabilization of disturbed areas may require the use of a "geo-jute" fabric to prevent erosion and allow for mowing of same area. Erosion control fabrics with netting that will be entangled in mowers is not acceptable in areas where mowing will occur.
- E. In the event seasonal considerations prevent establishment of permanent grass, Contractor shall establish temporary grass and return the following season to establish permanent grass.
- F. Remove all debris resulting from temporary erosion control from project site.
- G. Control dust from disturbed areas by means of mulching, irrigation or other method subject to the Landscape Architect's review. Use of irrigation is limited to that allowed by any applicable drought restrictions.
- H. Should site conditions dictate that it is not prudent to remove all temporary erosion control devices at the time of Contractor demobilization, the Contractor must remobilize personnel and equipment to complete removal as soon as conditions allow. The Contractor will be responsible for the complete and timely removal of all temporary erosion control devices as soon as adequate permanent vegetative cover or stabilization is established.



**SECTION 017419  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.

**1.2 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

**1.3 QUALITY ASSURANCE**

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

**1.4 WASTE MANAGEMENT PLAN**

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements of this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 PLAN IMPLEMENTATION**

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### **3.2 SALVAGING DEMOLITION WASTE**

- A. Salvaged Any Items Specified by Owner for Reuse in the Work:
  1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until installation.
  4. Protect items from damage during transport and storage.
  5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale: Not permitted on Project site.
- C. Salvaged Items for Owner's Use:
  1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

### 3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

**END OF SECTION 017419**

**SECTION 024116  
STRUCTURE DEMOLITION**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Demolition and removal of buildings and site improvements.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and removing site utilities.

**1.3 DEFINITIONS**

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.

**1.4 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

**1.5 SUBMITTALS**

- A. Schedule of Building Demolition Activities: Indicate the following:
  - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  - 2. Temporary interruption of utility services.
  - 3. Shutoff and capping or re-routing of utility services.
  - 4. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by demolition operations.

**1.6 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

## 1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Owner assumes no responsibility for buildings and structures to be demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Hazardous Materials: Contractor is responsible for identifying hazardous materials and disposing of them in accordance with local and state regulations.
  - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner.
- D. On-site storage or sale of removed items or materials is not permitted.

## 1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 31 Section "Earth Moving."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.

### 3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
  - 1. Arrange to shut off indicated utilities with utility companies.
  - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.



3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- C. Existing Utilities: See Divisions 22 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  1. Strengthen or add new supports when required during progress of demolition.

### 3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
  1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
  2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
    - i) Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 01 Section "Temporary Facilities And Controls."
  1. Protect adjacent buildings and facilities from damage due to demolition activities.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.

- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

### **3.4 DEMOLITION, GENERAL**

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  - 2. Maintain fire watch during and for at least 24 hours after flame cutting operations.
  - 3. Maintain adequate ventilation when using cutting torches.
  - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

### **3.5 DEMOLITION BY MECHANICAL MEANS**

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
  - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.

- D. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

### **3.6 SITE RESTORATION**

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

### **3.7 REPAIRS**

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

### **3.8 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

### **3.9 CLEANING**

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
  - 1. Clean roadways of debris caused by debris transport.

**END OF SECTION 024116**

**SECTION 031000  
CONCRETE FORMWORK**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes the design and erection of formwork, shoring and reshoring for cast-in-place concrete and accessories.

**1.2 RELATED SECTIONS**

- A. Section 013300 - Structural Submittals.
- B. Section 032000 - Concrete Reinforcement.
- C. Section 033000 - Cast-in-Place Concrete.

**1.3 REFERENCES**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Standard Specifications for Structural Concrete.
- C. ACI 318 - Building Code Requirements for Structural Concrete.
- D. ACI 347 - Recommended Practice for Concrete Formwork.
- E. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- F. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

**1.4 SUBMITTALS**

- A. Submit locations of construction joints for approval.
- B. Submit manufacturer's data for waterstops.

**1.5 DESIGN OF FORMWORK**

- A. Design of formwork, shoring, and reshoring and its removal is the Contractor's responsibility.
- B. Design of formwork, shoring, and reshoring shall conform to ACI 117, ACI 301, ACI 318, and ACI 347.

- C. Design formwork in a manner such that existing or new construction is not overloaded.

## **PART 2 - PRODUCTS**

### **2.1 FORM MATERIALS**

- A. Construct forms with wood, plywood, metal, fiberglass or a combination of these.
- B. Form materials shall have sufficient strength to prevent distortion.

### **2.2 FORMWORK ACCESSORIES**

- A. Formwork accessories that are embedded in concrete, including ties and hangers, shall be commercially manufactured products. Do not use nonfabricated wire form ties.

### **2.3 FORM RELEASE AGENT**

- A. Form release agent shall not bond with, stain, nor adversely affect concrete surfaces.

### **2.4 VAPOR BARRIER**

- A. Vapor barrier shall consist of polyethylene sheet, not less than ten mils thick.

### **2.5 ISOLATION JOINT FILLER**

- A. Asphalt impregnated premolded fiberboard isolation joint filler shall conform with ASTM D1751 and be 1/2-inch thick by full thickness of slab or joint, unless indicated otherwise on the Drawings.

### **2.6 CONSTRUCTION JOINTS**

- A. Provide key type steel forms by Vulcan screed joints, Burke Keyed Kold joint form or Heckmand Tongue and Groove joint #95.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Erect formwork in accordance with ACI 301, ACI 318, and ACI 347.
- B. Maintain formwork and shoring to support loads until such loads can be supported by concrete structure.

### **3.2 TOLERANCES**

- A. Finished work shall comply with ACI 117 tolerances.

### **3.3 CAMBER**

- A. Camber formwork for slabs and beams to compensate for anticipated deflections in formwork prior to hardening of concrete to maintain tolerances specified by ACI 117.

### **3.4 SURFACE PREPARATION**

- A. For concrete exposed to view, seal form joints to prevent leakage.
- B. Before reinforcement is placed, coat contact surfaces of form with form release agent in accordance with manufacturer's recommendations. Do not allow excess form release agent to accumulate in forms or come in contact with concrete surfaces against which fresh concrete will be placed.

### **3.5 CHAMFERS**

- A. Provide 3/4-inch chamfer at all corners.

### **3.6 FOUNDATION ELEMENTS**

- A. Form foundation elements if soil or other conditions are such that earth trench forms are unsuitable.
- B. Sides of exterior grade beams, foundation walls, and turned-down slabs shall be formed.
- C. Maintain minimum coverage of reinforcing steel as indicated on Structural Drawings.

### **3.7 INSERTS**

- A. Install and secure in position required inserts, hangers, sleeves, anchors, and nailers.
- B. Locate anchor bolts by using templates with two nuts to secure in position.

### **3.8 EMBEDS**

- A. Set and secure embedded plates, bearing plates, and anchor bolts in accordance with approved setting drawings and in such a manner to prevent displacement during placement of concrete.

### **3.9 VAPOR BARRIER**

- A. Where indicated on Drawings, place vapor barrier over sewer, piping, and granular subbase, but below conduits and ducts, and behind insulation and expansion joints at sidewalls.
- B. Lap vapor barrier six inches minimum and tape at splices.
- C. Do not puncture vapor barrier.

### **3.10 FORM REMOVAL**

- A. Remove forms carefully in such manner and at such time as to ensure complete safety of structure. Do not remove forms shoring, or reshoring until members have acquired sufficient strength to support their weight and the load thereon safely.

### **3.11 PROVISIONS FOR OTHER TRADES**

- A. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings and recesses from trades providing such items.
- B. Accurately place and securely support items built into forms. Obtain approval for openings not shown on Drawings.

### **3.12 CLEANING**

- A. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed.

### **3.13 FORM SURFACES**

- A. Coat contact surfaces of forms with a formcoating compound before reinforcement is placed. Apply in accordance with manufacturer's recommendations. Rust-stained steel formwork is not acceptable.

### **3.14 CONSTRUCTION JOINTS**

- A. Provide construction joints in accordance with ACI 318.
- B. Obtain Architect/Structural Engineer's prior approval for use and location of joints.
- C. Provide 1-1/2 inch deep key type construction joints at end of each placement for slabs, beams, walls, and footings. Bevel forms for easy removal.
- D. Remove loose particles and latency from surface prior to placing the next lift. Chip the surface to a depth sufficient to expose sound concrete.

**End of Section 031000**

**SECTION 03 2000  
CONCRETE REINFORCEMENT**

**PART 1 - GENERAL**

**1.1 RELATED SECTIONS**

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.
- C. Section 031000 - Concrete Formwork.
- D. Section 033000 - Cast-in-Place Concrete.

**1.2 REFERENCES**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Standard Specifications for Structural Concrete.
- C. ACI 315 - Details and Detailing of Concrete Reinforcement.
- D. ACI 318 - Building Code Requirements for Structural Concrete.
- E. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- F. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- G. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.
- H. AWS D12.1 - Recommended Practices for Welding Reinforcing Steel Metal Inserts, and Connections in Reinforced Concrete Construction.
- I. AWS D1.4 - Structural Weld Code - Reinforcing Steel.
- J. CRSI - Manual of Practice, and Documents 63 and 65.

**1.3 SUBMITTALS**

- A. Submit shop drawings as follows:
  - 1. Notify the Design Professional prior to detailing reinforcing steel shop drawings.
  - 2. Indicate size, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules, splice lengths, stirrup spacing, supporting and spacing devices. Detail reinforcing steel in accordance with ACI 315 and CRSI Standards.



3. Written description of reinforcement without adequate sections, elevations, and details is not acceptable.
  4. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
- B. Submit a certification from each manufacturer or supplier stating that materials meet the requirements of the ASTM and ACI standards referenced.
  - C. Submit mill test reports.
  - D. Submit manufacturer's data for tensile and compressive splicers.

#### **1.4 QUALITY ASSURANCE**

- A. Coordinate and schedule in a timely manner with the Structural Testing/Inspection Agency the following quality related items:
  1. Verify reinforcing steel for quantity, size, location, and support.
  2. Verify proper reinforcing steel concrete coverage.

#### **1.5 STORAGE AND PROTECTING**

- A. Store reinforcing steel above ground so that it remains clean. Maintain steel surfaces free from materials and coatings which might impair bond.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Deformed reinforcing steel shall conform to ASTM A615, refer to Structural Drawings for grade (Grade 60 minimum).
- B. Welded steel wire fabric shall conform to ASTM A185. Welded wire fabric should be supplied in flat sheets.

#### **2.2 ACCESSORY MATERIALS**

- A. Annealed steel tie wire shall be 16-1/2 gage minimum.
- B. Bar supports shall be plastic-tipped steel Class I bar supports conforming to CRSI Specifications. Concrete brick may be used to support reinforcement to obtain proper clearance from earth.

#### **2.3 SPLICERS**

- A. Tensile splicers shall be capable of developing 125% of the reinforcing steel ASTM specified minimum yield strength.
- B. Compression splicers shall be the mechanical type such that the compression stress is transmitted by end bearing held in concentric contact.

## **2.4 DOWEL ADHESIVE**

- A. Adhesive for dowels in existing concrete shall be either EPCON System Ceramic 6 Epoxy adhesive supplied by ITW Ramset/Red Head, HIT HY150 injection adhesive supplied by Hilti Fastening Systems, Epoxy-Tie Set epoxy supplied by Simpson Strong-Tie Company, or Power-Fast epoxy injection gel supplied by Powers Fasteners.

## **PART 3 - EXECUTION**

### **3.1 FABRICATION**

- A. Fabricate steel in accordance with ACI 318 and CRSI standards.
- B. Bend bars cold. Do not heat or flame cut bars. No field bending of bars partially embedded in concrete is permitted, unless specifically approved by the Design Professional and the concrete is checked by Testing and Inspection Agency for cracks.
- C. Weld only as indicated. Perform welding in accordance with AWS D12.1 and or AWS D1.4.
- D. Tag reinforcing steel for easy identification.

### **3.2 INSTALLATION**

- A. Before placing concrete, clean reinforcement of foreign particles and coatings.
- B. Place, support, and secure reinforcement against displacement in accordance with ACI 318 and CRSI standards. Do not deviate from alignment or measurement.
- C. Place concrete beam reinforcement support parallel to main reinforcement.
- D. Locate welded wire fabric in the top third of slabs. Overlap mesh 8" at side and end joints.
- E. Furnish and install dowels or mechanical splices at intersections of walls, columns and piers to permit continuous reinforcement or development lengths at such intersections.
- F. Maintain cover and tolerances in accordance with ACI and CRSI Specifications, unless indicated otherwise on Structural Drawings.

### **3.3 SPLICES**

- A. Do not splice reinforcement except as indicated on Structural Drawings.
- B. Tension couplers may be used and installed in accordance with manufacturer's specifications.

**3.4 DOWELS IN EXISTING CONCRETE**

- A. Install dowels and dowel adhesive in accordance with manufacturer's recommendations.
- B. Minimum embedment length shall be 12 bar diameters, unless noted otherwise.

**End of Section 032000**

**SECTION 033000  
CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes cast-in-place concrete work indicated in the Contract Documents or otherwise required for proper completion of the work.

**1.2 RELATED SECTIONS**

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.
- C. Section 031000 - Concrete Formwork.
- D. Section 032000 - Concrete Reinforcement.
- E. Section 036000 - Non-Shrink Grout.

**1.3 REFERENCES**

- A. ACI 214 - Recommended Practice for Evaluation of Strength Test Results of Concrete.
- B. ACI 301 - Specifications for Structural Concrete for Buildings.
- C. ACI 302.1 - Guide for Concrete Floor and Slab Construction.
- D. ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete.
- E. ACI 305 - Hot Weather Concreting.
- F. ACI 306 - Cold Weather Concreting.
- G. ACI 308 - Standard Practice for Curing Concrete.
- H. ACI 309 - Guide for Consolidation of Concrete.
- I. ACI 318 - Building Code Requirements for Structural Concrete.
- J. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- K. ASTM C33 - Standard Specification for Concrete Aggregates.
- L. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

- M. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
- N. ASTM C138 - Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
- O. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- P. ASTM C150 - Standard Specification for Portland Cement.
- Q. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
- R. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- S. ASTM C230 - Standard Specification for Flow Table or Use in Tests of Hydraulic Cement.
- T. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- V. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
- W. ASTM C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
- X. ASTM E1155 - Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System.
- Y. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

#### 1.4 NOTICE

- A. Notify the Design Professional and Structural Testing/Inspection Agency not less than 48 hours prior to placing concrete.

#### 1.5 QUALITY ASSURANCE

- A. Structural Testing/Inspection Agency shall perform the following quality related items:
  - 1. Examine concrete in truck to verify that concrete appears properly mixed.
  - 2. Perform a slump test as deemed necessary for each concrete load. Record if water or admixtures are added to the concrete at the job site. Perform additional slump tests after job site adjustments.
  - 3. Mold four specimens per set for compressive strength testing; one set for each 75 cubic yards of each mix design placed in any one day. For each set molded, record:
    - a. Slump
    - b. Air content
    - c. Unit weight
    - d. Temperature, ambient and concrete
    - e. Location of placement

- f. Any pertinent information, such as addition of water, addition of admixtures, etc. Perform one 7-day and two 28-day compressive strength tests. (Use one as a spare to be broken as directed by the Design Professional if compressive strengths do not appear adequate.)
- B. The ready-mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mix Concrete Association.
- C. The Structural Testing / Inspection Agency shall provide special inspections as required by Chapter 17 of the building code as required in Table 3300-1.

## 1.6 CONCRETE MIX DESIGN

- A. Establish concrete mix design proportions in accordance with ACI 318, Chapter 5.
- B. Submit concrete mix designs. Include the following:
  - 1. Type and quantities of materials.
  - 2. Slump.
  - 3. Air content.
  - 4. Fresh unit weight.
  - 5. Aggregates sieve analysis.
  - 6. Design compressive strength.
  - 7. Location of placement in structure.
  - 8. Method of placement.
  - 9. Method of curing.
  - 10. Seven-day and 28-day compressive strengths.
- C. Concrete supplier shall submit certifications that the materials used meet applicable ASTM Specifications. Mix designs not conforming to the above will be rejected.

## 1.7 SLUMP

- A. Design concrete with a maximum slump of five inches.
- B. If a slump greater than five inches is desired it shall be achieved with a high-range water reducer. Design the concrete mix with a high range water reducer slump of two and one-half inches plus or minus one and one-half inches. The maximum slump after high-range water reducers are added shall be eight inches.

## 1.8 FRESH UNIT WEIGHT

- A. Normal weight concrete shall have a fresh unit weight of 140 to 152 pcf.

## 1.9 AIR CONTENT

- A. No entrained air content is required in concrete placed in the foundation.
- B. For normal weight concrete, entrained air content shall be five percent plus or minus one and one-half percent, unless specified otherwise.

- C. For normal weight concrete with required compressive strength equal to or greater than 5000 psi, entrained air content shall be three percent plus or minus one percent.

#### **1.10 WATER/CEMENT RATIO**

- A. Concrete elements shall have a maximum water cement ratio of 0.5, unless noted otherwise.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Materials designated by specific manufacturer's trade names are approved, subject to compliance with the quality and performance indicated by the manufacturer. Instructions and specifications, published by the manufacturer of such materials are included in and are a part of these specifications. Upon request, provide certification from manufacturer or supplier that materials designated by reference to ASTM and ACI standards meet the requirements of these standards.

#### **2.2 CONCRETE STRENGTH**

- A. Provide concrete strengths indicated on the Structural Drawings.

#### **2.3 CEMENT**

- A. Portland cement shall conform to ASTM C150, Type I, unless noted otherwise. Use one brand only.

#### **2.4 AGGREGATE**

- A. Fine aggregate shall conform to ASTM C33.
- B. Coarse aggregate of gravel or crushed stone shall conform to ASTM C33. Size coarse aggregate in accordance with ACI 318.

#### **2.5 WATER**

- A. Water shall be potable and free of deleterious substances in accordance with ACI 318.

#### **2.6 AIR ENTRAINING AGENT**

- A. Air entraining agent shall conform to ASTM C260.

#### **2.7 WATER REDUCER**

- A. Water reducing agent shall conform to ASTM C494.

#### **2.8 HIGH-RANGE WATER REDUCER**

- A. High-range water reducers (superplasticizers) shall conform to ASTM C494.

**2.9 CHLORIDE**

- A. Use no chlorides of any form in concrete.

**2.10 CURING COMPOUND**

- A. An acrylic curing compound meeting the requirements of ASTM C1315 and all local, state and federal Volatile Organic Carbon regulations may be used at the Contractor's option.

**2.11 FLY ASH**

- A. Fly ash shall be Class F fly ash with a loss on ignition of less than five percent or Class C fly ash with a loss on ignition of less than one percent in accordance with ASTM C618.

**2.12 ACCELERATORS**

- A. Non-chloride accelerators shall conform to ASTM C494.

**2.13 RETARDERS**

- A. Retarders shall conform to ASTM C494.

**PART 3 - EXECUTION**

**3.1 HIGH-RANGE WATER REDUCERS**

- A. High-range water reducers are to be added at dosage recommended by the manufacturer. The slump of the concrete shall be one to four inches at the time the high-range water reducers are added. Do not permit fresh concrete containing superplasticizers to come in contact with fresh concrete not containing superplasticizers.

**3.2 ADDITION OF WATER AT JOB SITE**

- A. Water may be added to the batch only if neither the maximum permissible water/cement ratio nor the maximum slump is exceeded.
- B. Batch tickets should state if additional water was added or withheld.

**3.3 PLACEMENT OF CONCRETE**

- A. Deposit concrete as near as practical to final position to prevent segregation of concrete.
- B. Do no flowing of concrete with vibrators.
- C. Place floors and slabs in accordance with ACI 302.
- D. Do not use aluminum equipment in placing and finishing concrete.
- E. Place thickened slabs for partitions integral with floor slabs.



- F. Prepare place of deposit, mix, convey, place, and cure concrete in accordance with ACI 301, ACI 304, and ACI 318. Wet forms before placing concrete.

### **3.4 TIME LIMIT**

- A. Deposit concrete within one and one-half hours after batching.

### **3.5 VIBRATION**

- A. Consolidate concrete in accordance with ACI 301 and ACI 309.

### **3.6 CURING**

- A. Begin curing procedures immediately following the commencement of the finishing operation.
- B. Cure concrete in accordance with ACI 308. Keep the concrete surface moist. If an acrylic curing compound is used, apply in accordance with manufacturer's recommendations to surfaces of concrete not protected for five days by formwork. Do not use curing compounds in areas to receive material that does not adhere to concrete cured with a curing compound unless the curing compound is water soluble.
- C. Moist cure concrete elements within aggressive environments as follows:
  - 1. Place burlap and polyethylene curing blankets on the surface and keep them continuously moist with sprinklers for seven days.
  - 2. In hot weather or wind conditions, prevent rapid mix water evaporation and possible plastic shrinkage cracking by using evaporation retarders or fog sprays.
  - 3. In cold weather, follow recommended procedures in ACI 306 and ACI 308.
  - 4. After the curing blankets are removed, if a sealer is not specified to be applied, spray on a two-coat application of liquid membrane curing compound. If a sealer is to be applied a curing compound is not required.

### **3.7 ENVIRONMENTAL PROVISIONS**

- A. Perform cold weather concreting in accordance with ACI 306.
- B. Perform hot weather concreting in accordance with ACI 305.
- C. Protect concrete from drying and excessive temperature for the first seven days.
- D. Protect fresh concrete from wind.

### **3.8 CONTRACTION JOINTS**

- A. Obtain Architect/Structural Engineer's approval for location of contraction joints.
- B. Do not place contraction joints in framed floors, composite slabs, or shear walls.

- C. Place contraction joints in slabs-on-grade with a maximum spacing of approximately 25'-0" to form a regular grid. The long dimension of the grid shall not exceed 1.5 times the short dimension of the grid. Contraction joints may be saw cut if cut within 24 hours after placement of concrete. Saw cuts shall be a depth equal to one-fourth the slab thickness by one-eighth inch wide. Alternately, in areas to receive carpeting or wood flooring contraction joints may be provided by preformed plastic strip inserts.

### **3.9 CUTTING CONCRETE**

- A. Obtain Architect/Structural Engineer's written approval prior to cutting concrete for installation of other work.

### **3.10 PATCHWORK AND REPAIRS**

- A. Notify Architect/Structural Engineer of any defective areas in concrete to be patched or repaired. Repair and patch defective areas with non-shrink grout. Cut out defective areas over two inches in diameter to solid concrete, but not less than a depth of one inch. Make edges of cuts perpendicular to the concrete surface.

### **3.11 CONCRETE FINISHES**

- A. Finish concrete in accordance with ACI 301.
- B. Finish concrete slabs to flatness and levelness tolerances which correspond to FF 25/FL 20 minimum overall for composite of all measured values and FF 17/FL 12 minimum for any individual floor section.
- C. For concrete slabs to receive wood flooring, finish to flatness and levelness tolerances which correspond to FF 45/FL 30 minimum overall for composite of all measured values and FF 30/FL 20 minimum for any individual floor section.
- D. For shored construction, FL values do not apply if slab is tested after shoring is removed.
- E. Slabs, which do not meet the flatness and levelness criteria shall be repaired or replaced.

**End of Section 033000**

TABLE 3300-1  
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD	BUILDING CODE REFERENCE
1. Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased.	X	-	-	1912.5
2. Verifying use of required design mix.	-	X	ACI 318: Ch. 4, 5.2-5.4	1904, 1905.2-1905.4, 1914.2, 1914.3
3. Sampling fresh concrete and performing slump, air content and determining the temperature of fresh concrete at the time of making specimens for strength tests.	X	-	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1905.6, 1914.10
4. Inspection of concrete and shotcrete placement for proper application techniques.	X	-	ACI 318: 5.9, 5.10	1905.9, 1905.10, 1914.6, 1914.7, 1914.8
5. Inspection for maintenance of specified curing temperature and techniques.	-	X	ACI 318: 5.11-5.13	1905.11, 1905.13, 1914.9
6. Inspection of pre-stressed concrete: a. Application of pre-stressing forces. b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.	X X	-	ACI 318: 18.18 ACI 318: 18.16.4	-
7. Erection of precast concrete members.	-	X	ACI 318: Chapter 16	-
8. Verification of in-situ concrete strength, prior to stressing of tendons in post tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	-	X	ACI 318: 6.2	1906.2

**SECTION 03 6200  
NON-SHRINK GROUT**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes non-shrink grout under base plates, bearing plates, and where specified in Contract Documents.

**1.2 RELATED SECTIONS**

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.

**1.3 REFERENCES**

- A. CRD C621 - Specification for Non-Shrink Grout.
- B. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).

**1.4 QUALITY ASSURANCE**

- A. Structural Testing/Inspection Agency shall perform the following quality related items:
  - 1. Perform compressive strength tests in accordance with ASTM C109 with 2-inch x 2-inch cubes. Test one cube at three days, two cubes at seven days and three cubes at 28 days. Perform one test for each ten bags of grout used or one test in accordance with day of grouting.

**1.5 SUBMITTALS**

- A. Submit product data sheets for review.

**PART 2 - PRODUCTS**

**2.1 GROUT**

- A. Provide a non-shrink, non-metallic grout that complies with Corps of Engineers Specification CRD-C-621.
- B. Grout shall have a minimum compressive strength of 5000 psi at 28 days.

**2.2 WATER**

- A. Provide clean, potable water.

**PART 3 - EXECUTION**

**3.1 HANDLING**

- A. Store and protect non-shrink grout from moisture and contamination.

### **3.2 PREPARATION**

- A. Remove mud, dirt and other foreign materials from areas to be grouted.

### **3.3 MIXING**

- A. Mix grout to its fluid, self-leveling consistency in accordance with manufacturers recommendations. Do not retemper grout. Do not exceed manufacturer's maximum limit on water content or use at a consistency which produces free bleeding. Mix grout in a paddle-type mortar mixer. Do not mix by hand.

### **3.4 PLACEMENT**

- A. Consolidate grout to provide uniformity. Do not vibrate grout.
- B. Use forms to contain grout.

### **3.5 PROTECTION**

- A. Protect grout and areas to be grouted from excessive heat and cold in accordance with manufacturer's specifications. Protect grout from excessive drying shrinkage resulting from wind or direct sunlight. Protect areas grouted from excessive vibrations for three days.

**End of Section 036200**

**SECTION 040511  
MASONRY MORTARING AND GROUTING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Mortar for masonry.

**1.2 RELATED REQUIREMENTS**

- A. Section 04 2000 - Unit Masonry: Installation of mortar and grout.
- B. Section 04 4301 - Stone Masonry Veneer: Installation of mortar.

**1.3 REFERENCE STANDARDS**

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements For Masonry Structures; American Concrete Institute International; 2005.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification for Masonry Structures; American Concrete Institute International; 2005.
- C. ASTM C 91 - Standard Specification for Masonry Cement; 2005.
- D. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.
- E. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2007a.
- F. ASTM C 387/C 387M - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete; 2006a.
- G. ASTM C 1142 - Standard Specification for Extended Life Mortar for Unit Masonry; 1995 (Reapproved 2007).

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

**1.5 QDELIVERY, STORAGE, AND HANDLING**

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

**1.6 FIELD CONDITIONS**

- A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- A. Masonry Cement: ASTM C 91, Type N.
- B. Packaged Dry Mortar: ASTM C 387/C 387M, Type N, using gray color cement.
- C. Water: Clean and potable.

## **2.2 MORTAR MIXES**

- A. Ready Mixed Mortar: ASTM C 1142, Type RM.
- B. Mortar for Unit Masonry: ASTM C 270, Property Specification.
  - 1. Exterior, loadbearing masonry: Type N.
  - 2. Exterior, non-loadbearing masonry: Type N.

## **2.3 MORTAR MIXING**

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

## **2.4 GROUT MIXING**

- A. Mix grout in accordance with ASTM C 94/C 94M.
- B. Do not use anti-freeze compounds to lower the freezing point of grout.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

### **3.2 INSTALLATION**

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

**End of Section 045111**

**SECTION 042000  
UNIT MASONRY**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Concrete Block.
- B. Accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 04 0511 - Masonry Mortaring and Grouting.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- D. Section 07 9005 - Joint Sealers: Backing rod and sealant at control and expansion joints.

**1.3 REFERENCE STANDARDS**

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2005.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2005.
- C. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- D. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Maintenance Materials: Furnish the following for Department of Natural Resources's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.

**1.5 MOCK-UP**

- A. Locate where directed.
- B. Mock-up may remain as part of the Work.



## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depth of 8 inches.

### **2.2 MORTAR AND GROUT MATERIALS**

- A. Mortar and grout: As specified in Section 04 0511.

### **2.3 FLASHINGS**

- A. Metal Flashing Materials: Galvanized Steel, as specified in Section 07 6200.

### **2.4 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding.
- C. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.2 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

### **3.3 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

### **3.4 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: coursed ashlar.
  - 2. Mortar Joints: Concave.

### **3.5 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners.

### **3.6 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- B. Place continuous joint reinforcement in first and second joint below top of walls.

### **3.7 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

### **3.8 CONTROL AND EXPANSION JOINTS**

- A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- B. Form expansion joint as detailed.

### **3.9 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

**3.10 CLEANING**

- A. Clean soiled surfaces with cleaning solution.

**End of Section 042000**

**SECTION 042200**  
**STRUCTURAL CONCRETE MASONRY**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes structural concrete masonry shown on the Architectural Drawings, including the precast concrete lintels.

**1.2 RELATED SECTIONS**

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.
- C. Section 032000 - Concrete Reinforcement.
- D. Section 033000 - Cast-in-Place Concrete.

**1.3 REFERENCES**

- A. ACI 530.1/ASCE 6/TMS 602 - Specifications for Masonry Structures.
- B. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
- C. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- D. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- E. ASTM C90 - Standard Specification for Load-Bearing Concrete Units.
- F. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
- G. ASTM C140 - Standard Methods of Sampling and Testing Concrete Masonry Units.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- I. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- J. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- K. ASTM C476 - Standard Specification for Grout for Masonry.
- L. ASTM C1019 - Standard Method of Sampling and Testing Grout.

- M. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.
- N. ASTM E447 - Standard Test Methods for Compressive Strength of Masonry Prisms.

#### **1.4 S UBMITTALS**

- A. Submit coarse grout mix design.
- B. Upon request, submit material certificates signed by the material supplier that the masonry units, mortar, reinforcement, and joint material complies with specification requirements.
- C. Submit shop drawings for masonry reinforcement in accordance with Section 032000.
- D. Submit procedures for construction of masonry walls to be filled with coarse grout. Procedures should include high lift or low lift grouting as applicable to project.

#### **1.5 QUALITY ASSURANCE**

- A. Structural Testing/Inspection Agency shall perform the following quality related items:
  - 1. Verify reinforcing steel for quantity, size, and location.
  - 2. Verify placement of coarse grout as indicated in high or low lift procedure.
  - 3. Verify compressive strength of concrete masonry units, mortar, coarse grout, or masonry prisms for each 5,000 sq. ft. of surface area as follows:
    - a. Three (3) concrete masonry units shall be tested in accordance with ASTM C140.
    - b. Six (6) mortar cube specimens shall be tested, three (3) at 7-days and three (3) at 28-days, in accordance with ASTM C109.
    - c. Four (4) coarse grout specimens shall be tested, two (2) at 7-days and two (2) at 28-days, in accordance with ASTM C1019.
    - d. In lieu of individual tests of masonry units, mortar, and grout, if directed by the Architect/Structural Engineer, perform one (1) prism test (which consists of three prisms) in accordance with ASTM E447.
- B. The Structural Testing / Inspection Agency shall provide special inspection as required by Chapter 17 of the building code as required in Table 4220-1 shown in Appendix I.

#### **1.6 HANDLING OF MATERIALS**

- A. Package, handle, and store materials to protect from elements and prevent contamination.

## **PART 2 - PRODUCTS**

### **2.1 CONCRETE MASONRY**

- A. Concrete masonry shall have the minimum compressive strength (f'm) specified on the Drawings.

### **2.2 CONCRETE MASONRY UNITS**

- A. Concrete masonry units shall conform to ASTM C90, Type II (moisture controlled).
- B. Provide normal weight concrete masonry units.
- C. Concrete masonry units shall have, as a minimum, the net area compressive strength listed in Table 1.6.2.2 of ACI 530.1/ASCE 6/TMS 602 required for the specified f'm.
- D. Provide standard units with face dimensions of 16" long x 8" high nominal, unless indicated otherwise.
- E. Provide special shapes where indicated on the Drawings.

### **2.3 MORTAR**

- A. Mortar shall be Type M or Type S in accordance with ASTM C270. Refer to Drawings for locations.
- B. Do not use admixtures that contain chlorides.

### **2.4 COARSE GROUT**

- A. Coarse grout shall conform to ASTM C476.
- B. Coarse grout shall have the minimum compressive strength specified on the Drawings.
- C. Mix grout to a consistency which has a slump between 8 and 10 inches.
- D. Do not use admixtures that contain chlorides.

### **2.5 WATER**

- A. Provide clean potable water free of deleterious substances.

### **2.6 REINFORCEMENT**

- A. Horizontal and vertical reinforcing bars shall comply with Section 032000.

### **2.7 HORIZONTAL JOINT REINFORCEMENT**

- A. Horizontal joint reinforcement shall be manufactured with longitudinal parallel, deformed side wires in accordance with ASTM A496 and of the size specified on the Drawings. Cross wires shall be No. 9 gage, plain, in accordance with ASTM A82.
- B. Provide as a minimum, one side wire for each face shell of hollow masonry units. Provide additional side wires or eye sections for adjustable wall ties as specified for multiwythe wall construction.
- C. Provide truss type joint reinforcement, except ladder type reinforcement shall be used for walls with vertical reinforcement.
- D. Horizontal joint reinforcement shall be hot-dipped galvanized in accordance with ASTM A153, Class B-2.
- E. Provide prefabricated corner and tee shape corner accessories.

## **2.8 CONTRACTION JOINT MATERIAL**

- A. Contraction joint material shall comply with ASTM D2000, M2AA-805 with rubber shear keys with a minimum durometer hardness of 80.

## **PART 3 - EXECUTION**

### **3.1 MIXING**

- A. Except as otherwise approved for small batches, mix in mechanically operated batch mixers of drum type in which water can be accurately and uniformly controlled. Allow five minutes maximum mixing time, two minutes for dry mixing and three minutes for continued mixing after water has been added. Do not permit volume of batch to exceed manufacturer's rated capacity of mixer drum. Empty drum completely before placing next batch. Keep mixers and wheelbarrows clean. Do not deposit mortar upon or permit contact with ground.
- B. Do not use anti-freeze compounds.

### **3.2 CONSTRUCTION**

- A. Use dry masonry units. No frozen or wet units shall be used.
- B. Discard cracked, chipped, and spalled masonry units.
- C. Deliver mortar to mason's board at point of use within 45 minutes after mixing. Do not retempering. Use no admixtures. Use pre-hydrated mortar for tuck points. Prepare pointing mortar with as dry consistency as will produce mortar sufficiently plastic to be worked into joints.
- D. During erection cover top of wall with strong waterproof membrane at end of each day when shutdown. Cover partially completed walls when work is not in progress. Extend and secure cover a minimum of 24 in. down both sides. Do not apply uniform floor or roof loading for at least 12 hours after building masonry columns or

walls. Do not apply concentrated loads for at least 3 days after building masonry columns or walls.

- E. Provide temporary bracing during erection as required to stabilize erected masonry.
- F. Except where otherwise indicated, lay block in running bond.

### 3.3 PLACING AND BONDING

- A. Lay masonry in full beds of mortar on mating surfaces, and properly jointed with other work. Buttering corners of joints, deep or excess furrowing of mortar joints is not permitted.
- B. Fully bond external corners of concrete block. Where interior block partitions intersect other block walls or partitions, provide control joints with mortar raked back 1/4 inch.
- C. Isolate masonry partitions from vertical structural framing members with control joints, with mortar raked back 1/4 inch.
- D. Where non-bearing masonry partitions extend to underside of floor, roof deck or structural system, stop masonry short 3/8 to 1/2 inch to allow for live load deflection. Fill gap with soft joint filler.
- E. Where masonry chase walls are constructed, one wall can be stopped above ceiling to provide access space.

### 3.4 CONTRACTION JOINTS

- A. Install contraction joints at locations indicated on the Drawings in all masonry walls. Do not run masonry reinforcement through contraction joints.

### 3.5 TOLERANCES

- A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
- B. Variation from Plan of Wall: Maximum 1/4 inch in 10 feet, and 1/2 inch in 20 feet or more.
- C. Variation from Plumb: +/- 1/4 inch in 10 feet, +/- 3/8 inch in 20 feet; +/- 1/2 inch maximum.
- D. Variation in Level Coursing: +/- 1/4 inch in 10 feet; +/- 1/2 inch maximum.
- E. Variation in Joint Thickness: +/- 1/8 inch Maximum.

### 3.6 CLEANING AND POINTING

- A. Clean space as it is completed, but in every case, clean at least once each week. All debris shall be removed to appropriate container and hauled off the site as required to avoid over filling.



- B. Dry brush masonry surfaces before mortar has set hard to remove mortar crumbs and accumulation.
- C. Clean masonry with commercial brick cleaner approved by brick manufacturer. Protect other work from cleaning materials.
- D. Cut out defective mortar and repoint.

### 3.7 HORIZONTAL JOINT REINFORCEMENT

- A. Place horizontal joint reinforcement in the horizontal mortar beds at spacings as noted in the Drawings, except as specified herein.
- B. For masonry below grade, space horizontal joint reinforcing at 8 inches vertically.
- C. Above lintels and below sills at openings, place a continuous run of horizontal joint reinforcement in the first two bed joints, 8 inches apart. Extend joint reinforcement two feet beyond opening.
- D. Joint reinforcement shall be continuous, except it shall not pass through vertical masonry contraction joints. Lap joint reinforcement a minimum of 6 inches.

### 3.8 ENVIRONMENTAL PROVISIONS

- A. Cold weather masonry construction shall comply with the International Masonry All-Weather Councils' "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction, Section 04200."

**End of Section 042200**

TABLE 4220-1  
REQUIRED VERIFICATION AND INSPECTION OF MASONRY CONSTRUCTION

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCE FOR CRITERIA		
	Continuous during task listed	Periodically during task listed	Building Code section	ACI 530/ASCE 5/TMS 402a	ACI 530.1/ASCE 6/TMS 602a
1. As masonry construction begins, the following shall be verified to ensure compliance:	-		-	-	
a. Proportions of site prepared mortar.		X			Art. 2.6A
b. Construction of mortar joints.		X			Art. 3.3B
c. Location of reinforcement and connectors.		X			Art 3.4
2. The inspection program shall verify:					
a. Size and location of structural elements.		X			3.3G
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X		Sec. 1.15.4, 2.1.2	
c. Specified size, grade and type of reinforcement.		X		Sec. 1.12	
d. Welding of reinforcing bars.		X			Art. 2.4,3.4
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).	X		Sec. 2108.9.2 .11 Item 2 Sec. 2104.3, 2104.4	Sec. 8.5.7 & Sec.8.5.7.2	Art. 1.8

<p>3. Prior to grouting, the following shall be verified to ensure compliance:</p> <ul style="list-style-type: none"> <li>a. Grout space is clean.</li> <li>b. Placement of reinforcement and connectors.</li> <li>c. Proportions of site-prepared grout</li> <li>d. Construction of mortar joints.</li> </ul>		<p>X X  X X</p>	<p>-</p>	<p>Sec.1.12</p>	<p>Art. 3.2D Art. 3.4  Art. 2.6B Art. 3.3B</p>
<p>4. Grout placement shall be verified to ensure compliance with code and construction document provisions</p>	<p>X</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>Art. 3.5</p>
<p>5. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.</p>	<p>X</p>	<p>-</p>	<p>Sec. 2105.3, 2105.4, 2105.5</p>	<p>-</p>	<p>Art.1.4</p>
<p>6. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.</p>	<p>-</p>	<p>X</p>	<p>-</p>	<p>-</p>	<p>Art. 1.5</p>

**SECTION 06100  
ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes wood framing and sheathing to form the superstructure of a wood framed building as indicated on the Drawings.

**1.2 RELATED SECTIONS**

- A. Section 061753 - Fabricated Wood Trusses.

**1.3 REFERENCES**

- A. AFPA (American Forest and Paper Association) - National Design Specification for Wood Construction.
- B. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- C. ANSI A208.1 - Mat-Formed Wood Particleboard.
- D. ANSI/AHA A135.4 - Basic Hardboard.
- E. APA: American Plywood Association.
- F. AWWA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- G. AWWA C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.
- H. RIS: Redwood Inspection Service.
- I. SPIB: Southern Pine Inspection Bureau.
- J. WCLIB: West Coast Lumber Inspection Bureau.
- K. WWPA: Western Wood Products Association.

**1.4 DEFINITIONS**

- A. Structural Panel is a panel product composed primarily of wood and meeting the requirements of United States Voluntary Product Standard PS 2-92. Performance Standard for Wood-Based Structural-Use Panels". Structural panels include all-veneer plywood, composite panels containing a combination of veneer and wood-based material, and malformed panels such as oriented strand board and waferboard.

## **1.5 SUBMITTALS**

- A. For treated materials, submit certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards.

## **1.6 QUALITY ASSURANCE**

- A. Comply with National Design Specification For Wood Construction.
- B. Perform work in accordance with the following agencies:
  - 1. Lumber Grading Agency: Certified by ALSC.
  - 2. Plywood Grading Agency: Certified by APA.
- C. Identify all structural panels by official grade mark.
  - 1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
  - 2. Structural Panel: Panel grade, span rating, exposure durability classification, product standard thickness, and mill number.

## **1.7 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Pressure treated material - American Wood Preservers Bureau Standards.
- B. Span tables - National Forest Products Association.
- C. Working stresses - Softwood Lumber, National Design Specification, National Forest Products Association.

## **1.8 PROTECTION**

- A. Deliver, store, and handle all materials in such a manner to protect against damage and the weather.
- B. Use all means necessary to protect the installed work and materials of all other trades.

## **1.9 REPLACEMENTS**

- A. In the advent of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

## **PART 2 - PRODUCTS**

### **2.1 LUMBER**

- A. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual size as required by PS 20, for moisture content specified for each use.
- B. Provide dressed lumber, S4S, unless otherwise indicated.

- C. Provide seasoned lumber No. 2, Southern Pine with 15% maximum moisture content at time of dressing unless noted otherwise on the Drawings.
- D. Lumber Grading Rules and Wood Species to be in conformance with Voluntary Product Standard PS 20: Grading rules of the following associations apply to materials furnished under this section:
  - 1. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
  - 2. Southern Pine Inspection Bureau (SPIB).
  - 3. West Coast Lumber Inspection Bureau (WCLIB).
  - 4. West Wood Products Association (WWPA).

## **2.2 STRUCTURAL PANEL**

- A. Roof Sheathing: 1/2" APA (Rated Sheathing) Span Rating 40/20.
- B. Wall Sheathing: 7/16" APA (Rated Sheathing).
- C. Floor Sheathing: 3/4" tongue and groove Sturd-I-Floor Span rating 24".
- D. For backing panels for electrical or telephone equipment, provide fire-retardant treated structural panel with exterior glue.

## **2.3 PARALLEL STRAND LUMBER**

- A. Provide Parallel Strand Lumber (PSL) as specified on Drawings as manufactured by Trus Joist MacMillan.

## **2.4 FASTENERS AND ANCHORAGES**

- A. Provide size and type as indicated and as recommended by National Forest Products Association "National Design Specification for Stress-Grade Lumber and Its Fastenings" complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.
- B. Use galvanized fasteners with pressure treated lumber or high humidity conditions, unfinished steel elsewhere.

## **2.5 PRESERVATIVE TREATMENT**

- A. All exterior lumber and structural panels are to be pressure treated.
- B. Where lumber or structural panel is indicated as "treated", or is specified herein to be treated, comply with the applicable requirements of the AWPB. Mark each treated item with the AWPB Quality Mark requirements.
- C. Pressure-treat above-ground items with water-borne preservatives complying with AWPB LP-2. Treat indicated items and the following:
  - 1. Wood cants, nailers, curbs, 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.

- D. Complete fabrication of treated items prior to treatment, wherever possible. If cut after treatment, apply one coat of same chemical used for treatment in accordance with manufacturer's instructions.
- E. Allow preservative to dry prior to erecting members. Inspect each piece of lumber or structural panel after drying and discard damaged or defective pieces.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Discard unit of material with defects which might impair quality of work, and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
- D. Installer must examine the substrate structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- E. Coordinate carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

#### **3.2 JOIST FRAMING**

- A. Provide framing of sizes and spacings shown.
- B. Install with crown edge up and support ends of each member with not less than 1-7/8 inches of bearing on support.
- C. Attach to wood bearing members by toe nailing or galvanized metal connectors. Provide blocking of joist at ends of joists unless nailed to header or supported by metal joist hanger.
- D. Do not notch joists.
- E. Do not bore holes in PSL which violate manufacturer's recommendations.
- F. Provide bridging between joists as noted on drawings.

### 3.3 STRUCTURAL PANELS

- A. Secure roof sheathing perpendicular to framing member with ends staggered and sheet ends over firm bearing. Provide solid edge blocking between sheets. Secure to wood framing with nails of size and spacing shown on Drawings.
- B. Secure wall sheathing with long dimension parallel to wall studs, with ends over firm bearing. Provide solid blocking at ends of sheets. Secure to wood framing with nails of size and spacing shown on Drawings.
- C. Secure floor sheathing perpendicular to framing members with ends staggered and sheet ends over firm bearing. Attach to framing with subfloor glue and drywall screws.
- D. Oriented strand board with laminated face shall be attached to wood with laminated face against wood framing.

### 3.4 WOOD GROUND, NAILERS, BLOCKING AND SLEEPERS

- A. Provide wherever shown and where required for screening or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
- B. Attach to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" (38mm) wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

### 3.5 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work.

### 3.6 MISCELLANEOUS FRAMING

- A. Firestops:
  - 1. Stud walls: Two inches thick by depth of member blocking at each floor level, top story ceiling level, and soffits as required.
  - 2. Floor and ceiling framing: Two inches thick by depth of wood member blocking, fitted to fill openings from one space to another to prevent drafts.
- B. Framing for mechanical work:
  - 1. Frame members for passage of pipes and ducts to avoid cutting structural members.
  - 2. Reinforce framing members where damaged by cutting.



- C. Blocking: Locate blocking to facilitate installation of finish materials, casework, fixtures, specialty items and trim railings.

**End of Section 061000**

**SECTION 061500  
WOOD DECKING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Softwood lumber structural wood decking.
- B. Plywood structural wood decking.
- C. Preservative treatment of wood.

**1.2 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Bearing support.
- B. Section 04 2000 - Unit Masonry: Bearing support.
- C. Section 06 1000 - Rough Carpentry: Bearing support.
- D. Section 09 9000 - Painting and Coating: Field finishing.

**1.3 REFERENCE STANDARDS**

- A. ASTM D 2559 - Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions; 2004.
- B. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association; 2003.
- C. PS 1 - Structural Plywood; 2007.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Plywood Decking:
  - 1. Georgia-Pacific Corporation: [www.gp.com](http://www.gp.com).
  - 2. Weyerhaeuser Co: [www.weyerhaeuser.com](http://www.weyerhaeuser.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.2 WOOD MATERIALS**

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide wood harvested within a 500 mile radius of the project site.

- C. Plywood Decking: PS 1 veneer plywood; APA Rated Sheathing, Span Rating 24/16; Exterior grade; 1 A interior veneer appearance grade; sanded.
- D. Radiant Barrier: provide as indicated in Architectural Drawings. Install per manufacturer's instructions.

### **2.3 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Fastener Type and Finish: Hot-dipped galvanized steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of decking.

### **2.4 WOOD TREATMENT**

- A. Preservative Pressure Treatment:
  - 1. Preservative Pressure Treatment of Lumber Decking: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that support framing is ready to receive decking.

### **3.2 PREPARATION**

- A. Coordinate placement of bearing items.

### **3.3 INSTALLATION - PANEL DECKING**

- A. Install decking perpendicular to framing members, with ends staggered over firm bearing. On sloped surfaces, lay decking with tongue upward.
- B. Engage plywood tongue and groove edges.
- C. Allow expansion space at edges and ends.

### **3.4 INSTALLATION - BOARD DECKING**

- A. Install decking perpendicular to framing members, with ends staggered over firm bearing. On sloped surfaces, lay decking with tongue upward.
- B. Engage decking tongue and groove edges.
- C. Secure with fasteners. Side spike planks together, through pre-drilled holes.

**3.5 TOLERANCES**

- A. Surface Flatness of Decking Without Load: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

**End of Section 061500**

**SECTION 061753  
FABRICATED WOOD TRUSSES**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section includes fabricated wood trusses consisting of metal plate connected members which are fabricated from dimension lumber and which have been cut and assembled prior to delivery to the job site.

**1.2 RELATED SECTIONS**

- A. Section 013330 - Structural Submittals.
- B. Section 014525 - Structural Testing/Inspection Agency Services.
- C. Section 061000 - Rough Carpentry.

**1.3 REFERENCES**

- A. AFPA - National Design Specification for Wood Construction.
- B. ANSI/TPI 1 – National Design Standard for Metal-Plate-Connected Wood Truss Construction
- C. ASTM A446 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- D. ASTM A525 - Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. TPI - Design Specification for Metal Plate Connected Wood Trusses.
- G. TPI HIB – Commentary and Recommendations for Handling Installing and Bracing Metal Plate Connected Wood Trusses.
- H. TPI DSB – Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses.
- I. TPI - Quality Control Manual.

**1.4 DESIGN REQUIREMENTS**

- A. Design of wood trusses, including header truss units at openings or change of framing, is the sole responsibility of the Contractor.

- B. Fabricated wood trusses shall be designed by a Structural Engineer licensed in the project state for the loads shown on the Drawings.
- C. Design shall comply with the National Design Specification for Wood Construction (NDS) published by American Forest and Paper Association (AFPA), the Design Specifications for Metal Plate Connected Wood Trusses published by the Truss Plate Institute (TPI), and the requirements of the Building Code.

## 1.5 SUBMITTALS

- A. Submit shop drawings (sealed by an engineer licensed in the project state) showing loads, species, sizes and stress grades of lumber to be used; pitch, span camber configuration and spacing for each type of truss required; type, size, material, finish, design value, and location of metal connector plates; bearing and anchorage details; and temporary bracing requirements.
- B. Submit fabricator's specification and installation instructions for required work, covering lumber, metal plates, hardware, fabrication process treatment (if any), handling and erection.
- C. Submit certification, signed by an officer of fabricating firm, indicating that trusses to be supplied for the project comply with indicated requirements.
- D. Submit certification by treating plant that required treatment complies with specified standards, if applicable.

## 1.6 FABRICATOR'S QUALIFICATIONS

- A. Minimum of three years experience in successful fabrication of trusses comparable to type indicated for this project.

## 1.7 STORAGE AND HANDLING

- A. Handle and store trusses with care and in accordance with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning or other cause for which truss is not designed to resist or endure.

## PART 2 - PRODUCTS

### 2.1 LUMBER

- A. Lumber used for truss members shall be in accordance with published values of lumber rules writing agencies approved by the board of review of American Lumber Standards Committee. Lumber shall be identified by Grade mark of a lumber inspection bureau or agency approved by the Board, and shall be as shown on the Drawings.
- B. Provide seasoned lumber with no less than 7 percent moisture content nor greater than 19 percent moisture content at time of fabrication.

- C. Any softwood, at Fabricator's option, as required to comply with loading requirements unless noted otherwise on the Drawings.

## 2.2 CONNECTOR PLATES

- A. Connector plates with National Design Specification for Wood Construction, published by the American Forest and Paper Association and the Design Specification for Metal Plate Connected Wood Trusses, published by the Truss Plate Institute.
- B. Connector plates shall have a minimum thickness of 0.036 inch (20 gage).
- C. Steel shall conform to ASTM A446, Grade A, and shall be hot-dip galvanized in accordance with ASTM A525, G60, unless noted otherwise.

## 2.3 FIRE RETARDANT TREATMENT

- A. Where "FR-S" lumber for trusses is indicated provide materials which comply with AWPA Standard C20 for pressure impregnation with fire-retardant chemicals, and which have a flame spread rating of not more than 25 when tested in accordance with UL Test 723 or ASTM E84, and show no increase in flame spread and significant progressive combustion upon continuation of test for additional 20 minutes.
- B. Redry treated lumber to comply with AWPA C20.
- C. Provide UL label on each piece of fire-retardant lumber.
- D. Inspect each piece of treated lumber after drying and discard damaged or defective pieces.
- E. Provide stainless steel connector plates with fire retardant lumber.

## PART 3 - EXECUTION

### 3.1 FABRICATION

- A. Cut truss members to accurate lengths, angles and sizes to produce close fitting joints with proper wood-to-wood bearing in assembled units.
- B. Fabricate metal connector plates to size, configuration, thickness and anchorage details required for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated on the structural drawings using jigs or other means to ensure uniformity and accuracy of assembly with close fitting joints. Position members to produce design camber indicated.
- D. Connect truss members by means of metal connector plates accurately located and securely fastened to wood members by means indicated or approved.

### **3.2 ERECTION**

- A. Erect and brace trusses to comply with recommendations of manufacturer and the Truss Plate Institute.
- B. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
- C. Hoist units in place by means of proper lifting equipment suited to sizes and types of trusses required, applied at proper lift points as recommended by fabricator, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

### **3.3 BRACING**

- A. Provide erection bracing as required to maintain trusses plumb, parallel and in proper location, until permanent bracing is installed.
- B. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with Bracing Wood Trusses Commentary and Recommendations (BWT-76) published by Truss Plate Institute.

### **3.4 BEARING**

- A. Anchor trusses securely at all bearing points to comply with methods and details indicated.

### **3.5 CUTTING**

- A. Cutting or altering of truss members is not permitted.

**End of Section 061753**



**SECTION 068200  
GLASS FIBER REINFORCED PLASTIC**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Fiberglass Reinforced Panels (FRP)

**1.2 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples, 4" x 4" in size, illustrating color, texture and finish.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. FRP Panel:
  - 1. Georgia Pacific Corporation: [www.gp.com](http://www.gp.com).
  - 2. Substitutions: See Section 016000 - Product Requirements.
- C. Any softwood, at Fabricator's option, as required to comply with loading requirements unless noted otherwise on the Drawings.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as instructed by the fabricator.

**3.2 INSTALLATION**

- A. Install fabrications in accordance with shop drawings and fabricator's instructions.

**3.3 TOLERANCES**

- A. Maximum variation from true position: 1/4" inch (6 mm).
- B. Maximum offset from true alignment: 1/8" (3 mm).

**3.4 CLEANING**

- A. Clean components of foreign material without damaging finished surface.
- B. Hand rub smooth surfaces with polishing cream.

- C. Clean fabrications in accordance with fabricator's instructions.

### 3.5 PROTECTION

- A. Place protective structural covering over installed units.

**End of Section 068200**

**SECTION 072100  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at underside of floor slabs and roofs.
- B. Batt insulation in exterior wall, ceiling, and roof construction.

**1.2 RELATED REQUIREMENTS**

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 1000 - Rough Carpentry: Supporting construction for batt insulation.
- C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.

**1.3 REFERENCE STANDARDS**

- A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2007.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

**1.5 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.1 APPLICATIONS**

- A. Insulation under Roofing Materials: Extruded polystyrene board.
- B. Insulation in Wood Framed Walls: Batt insulation with separate vapor retarder.

**2.2 BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene Board Insulation: ASTM C 578, Type X; Extruded polystyrene board with either natural skin or cut cell surfaces; with the following characteristics:
  - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.

2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
3. Manufacturers:
  - a. Dow Chemical Co: [www.dow.com](http://www.dow.com).
4. Substitutions: See Section 01 6000 - Product Requirements.

### **2.3 BATT INSULATION MATERIALS**

### **2.4 ACCESSORIES**

- A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- B. Nails or Staples: Steel wire; electroplated, or galvanized; type and size to suit application.
- C. Adhesive: Type recommended by insulation manufacturer for application.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.2 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.
- F. Tape seal tears or cuts in vapor retarder.
- G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

**3.3 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**End of Section 072100**

**SECTION 072119  
FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Foamed-in-place insulation at roof decks, exterior walls.

**1.2 RELATED REQUIREMENTS**

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

**1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

**1.4 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame and smoke limitations.

**1.5 FIELD CONDITIONS**

- A. Do not install insulation when ambient temperature is lower than 70 degrees F.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Foamed-In-Place Insulation:
  1. BASF Polyurethane Foam Enterprises LLC: [www.foamenterprises.com](http://www.foamenterprises.com).
  2. Substitutions: See Section 01 6000 - Product Requirements.

**2.2 MATERIALS**

- A. Insulation: Polyisocyanurate type.

**2.3 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Verify work within construction spaces or crevices is complete prior to insulation application.

- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

### **3.2 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

### **3.3 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.
- B. At crawl spaces provide a minimum 6" gap between the bottom of the insulation and the crawlspace floor for insect observation.

### **3.4 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

**End of Section 072119**

**SECTION 07 4113  
METAL ROOF PANELS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Architectural roofing system of preformed steel panels.
- B. Fastening system.
- C. Factory finishing.
- D. Accessories and miscellaneous components.

**1.2 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Roof sheathing.
- B. Section 06 1500 - Wood Decking: Roof sheathing.
- C. Section 07 9005 - Joint Sealers: Field-installed sealants.

**1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
  - 1. Show work to be field-fabricated or field-assembled.
- C. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
- E. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Department of Natural Resources's name and are registered with manufacturer.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.



## **1.5 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 5 year period from date of Substantial Completion.
- C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 5 years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.1 ARCHITECTURAL ROOF PANELS**

- A. Performance Requirements: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Roofing: Factory-formed panels with factory-applied finish.
  - 1. Steel Panels:
    - a. Steel Thickness: Minimum 0.023 inch.
  - 2. Texture: Smooth.
  - 3. Width: Maximum panel coverage of 24 inches.

### **2.2 ATTACHMENT SYSTEM**

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

### **2.3 PANEL FINISH**

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss to match sample.
- B. Siliconized Polyester Coating: Epoxy primer and silicone-modified polyester enamel topcoat with minimum dry film thickness of 0.8 mil; color and gloss to match sample.
- C. Acrylic Enamel Coating: Epoxy primer and acrylic enamel topcoat with minimum dry film thickness of 0.8 mil; color and gloss to match sample.

D. Solar reflectance index (SRI): 50.

## **2.4 ACCESSORIES AND MISCELLANEOUS ITEMS**

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish, closed-cell synthetic rubber, neoprene, or PVC, or combination steel and closed-cell foam.
- C. Sealants: As specified in Section 07 9005.
  - 1. Exposed sealant must cure to rubber-like consistency.
  - 2. Concealed sealant must be non-hardening type.

## **2.5 FABRICATION**

- A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Gerding Collaborative, LLC of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- B. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- D. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

### 3.3 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
  - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
  - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Underlayment: Install roofing felt and building paper slip sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches. Offset seams in building paper and seams in roofing felt.
- D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
  - 1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by the panel manufacturer.

### 3.4 CLEANING

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

### 3.5 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

**End of Section 074113**

**SECTION 076200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, and other items indicated in Schedule.
- B. Precast concrete splash pads.

**1.2 RELATED REQUIREMENTS**

- A. Section 04 7200-Cast Stone Masonry: Through-wall flashings in masonry.
- B. Section 07 6100 - Sheet Metal Roofing.
- C. Section 09 9000 - Painting and Coating: Field painting.

**1.3 REFERENCE STANDARDS**

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- B. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.
- C. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

**1.5 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

## **PART 2 PRODUCTS**

### **2.1 SHEET MATERIALS**

- A. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal.

### **2.2 ACCESSORIES**

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Sealant: Type silicone specified in Section 07 9005.
- D. Plastic Cement: ASTM D 4586, Type I.

### **2.3 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

### **2.4 GUTTER AND DOWNSPOUT FABRICATION**

- A. Gutters: SMACNA Architectural Sheet Metal Manual, Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size indicated.
- D. Accessories: Profiled to suit gutters and downspouts.
  - 1. Anchorage Devices: In accordance with SMACNA requirements.
  - 2. Gutter Supports: Brackets.
  - 3. Downspout Supports: Brackets.

- E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
- F. Seal metal joints.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

#### **3.2 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Secure gutters and downspouts in place using concealed fasteners.
- E. Slope gutters 1/4 inch per foot minimum.
- F. Set splash pads under downspouts.

**End of Section 076200**

**SECTION 079005  
JOINT SEALERS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.2 REFERENCE STANDARDS**

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2005.
- B. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.
- C. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2007.
- D. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special procedures.

**1.5 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.6 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Silicone Sealants:
  - 1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 2. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).

3. Substitutions: See Section 01 6000 - Product Requirements.

## **2.2 SEALANTS**

- A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01 6116.

## **2.3 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.2 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **3.3 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.



E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave.

### 3.4 CLEANING

A. Clean adjacent soiled surfaces.

### 3.5 PROTECTION

A. Protect sealants until cured.

**End of Section 079005**

**SECTION 081113  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Thermally insulated steel doors.

**1.2 RELATED REQUIREMENTS**

- A. Section 09 9000 - Painting and Coating: Field painting.

**1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

**1.4 QUALITY ASSURANCE**

- A. Maintain at the project site a copy of all reference standards dealing with installation.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

**PART 2 PRODUCTS**

**2.1 DOORS AND FRAMES**

- A. Requirements for All Doors and Frames:
  - 1. Door Texture: Smooth faces.
  - 2. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
  - 3. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

## **2.2 STEEL DOORS**

- A. Exterior Doors:
  - 1. Core: Polystyrene foam.
  - 2. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  - 3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
  - 4. Texture: Smooth faces.
  - 5. Finish: Factory primed, for field finishing.
  
- B. Storm/Screen Doors:
  - 1. Match Exterior door in texture and finish.
  - 2. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  - 3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
  - 4. Screen insert to have black fiberglass screen.
  - 5. Storm door in set to be single glazed, tempered unit.

## **2.3 STEEL FRAMES**

- A. General:
  - 1. Comply with the requirements of grade specified for corresponding door.
    - a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
  - 2. Finish: Same as for door.
  
- B. Exterior Door Frames: Face welded, seamless with joints filled.
  - 1. Weatherstripping: Separate, see Section 08 7100.

## **2.4 ACCESSORY MATERIALS**

## **2.5 FINISH MATERIALS**

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
  
- B. Verify that opening sizes and tolerances are acceptable.

### **3.2 PREPARATION**

### **3.3 INSTALLATION**

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. Coordinate frame anchor placement with wall construction.
- C. Coordinate installation of hardware.

**3.4 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

**3.5 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**End of Section 081113**

**INVITATION TO BID  
#462-492-88014**

**COMFORT STATION CONSTRUCTION**

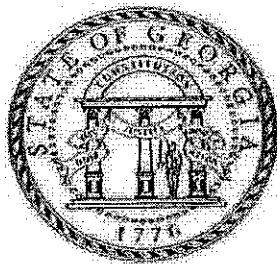
**AT**

**TUGALOO STATE PARK  
LAVONIA, GEORGIA**

**PROJECT MANUAL**

**VOLUME II**

**OCTOBER 13, 2010**



**GEORGIA STATE FINANCING AND INVESTMENT COMMISSION**

**ATLANTA, GEORGIA**

**SECTION 085400  
COMPOSITE WINDOWS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. All Ultrex® double hung window complete with hardware, glazing, weather strip, insect screen and half screen, grilles-between-the glass, jamb extension, sheet rock return, j-channel, and standard or specified anchors, trim and attachments.

**1.2 RELATED SECTIONS**

- A. Section 01 3000-Submittal Procedures: Shop Drawings, Product Data, and Samples.
- B. Section 06 2000-Millwork: Wood trim other than furnished by window manufacturer
- C. Section 07 9005-Joint Sealants: Sill sealant and perimeter caulking
- D. Section 09 9000-Paints and Coatings: Paint or stain other than factory applied finish

**1.3 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. E 283: Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
  - 2. E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtains Walls, and Doors by Uniform Static Air Pressure Difference.
  - 3. E 547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  - 4. E 774: Specification for Sealed Insulated Glass Units.
  - 5. C 1036: Standard Specification for Flat Glass.
- B. Sealed Insulating Glass Manufacturers Association / Insulating Glass Certification Council (SIGMA / IGCC).
- C. American Architectural Manufacturers Association / Window and Door Manufacturers Association (AAMA / WDMA):
  - 1. ANSI/AAMA/NWWDA 101 / I.S.2-97: Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
  - 2. 101/I.S. 2/NAFS-02: Voluntary Performance Specification for Windows, Skylights and Glass Doors/
- D. Window and Door Manufacturers Association (WDMA): Hallmark Certification Program.
- E. American Architectural Manufacturers Association (AAMA): 613: Voluntary Performance Requirements and Test Procedures for Organic Coatings on Plastic Profiles.

- F. National Fenestration Rating Council (NFRC): 101: Procedure for Determining Fenestration Product Thermal Properties.
- G. American Society for Testing and Materials (ASTM):
  - 1. E 283: Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
  - 2. E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtains Walls, and Doors by Uniform Static Air Pressure Difference.
  - 3. E 547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  - 4. E 774: Specification for Sealed Insulated Glass Units.
  - 5. C 1036: Standard Specification for Flat Glass.

#### 1.4 SYSTEM DESCRIPTION

- A. Design and Performance Requirements:
  - 1. Window units shall be designed to comply with ANSI / AAMA / NWWDA 101 / I.S.2-97 and 101 / I.S. 2/ NAFS-02
    - a. Transom: (TR-C50)
  - 2. Air leakage shall not exceed the following when tested at 1.57 according to ASTM E 283: .0.3 cfm per square foot of frame.
  - 3. No water penetration shall occur when units are tested at the following pressure according to ASTM E 547:
    - a. Transom: (TR-C50-7.5 psf)
  - 4. Units shall be designed to comply with ASTM E330 for structural performance when tested at the following pressures:
    - a. Transom: (TR-C50-75 psf)

#### 1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings under provisions of Section 01 33 23.
- B. Product Data: Submit catalog data under provisions of Section 01 33 23.
- C. Samples:
  - 1. Submit corner section under provisions of Section 01 33 23.
  - 2. Include glazing system, quality of construction, and specified finish.
- D. Quality Control Submittals: Submit manufacturer's certifications indicating compliance with specified performance and design requirements under provisions of Section 01 33 23.

#### 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Emergency Egress or Rescue: Comply with requirements for sleeping units of [IBC International Building Code].

#### 1.7 DELIVERY

- A. Comply with provisions of Section 01 65 00.

- B. Deliver in original packaging and protect from weather.

## 1.8 STORAGE AND HANDLING

- A. Prime or seal wood surfaces, including surface to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation.
- B. Store window units in an upright position in a clean and dry storage area above ground and protect from weather under provisions of Section 01 66 00.

## 1.9 WARRANTY

- A. Windows shall be warranted to be free from defects in manufacturing, materials, and workmanship for a period of ten (10) years from purchase date.
- B. Window glass shall be warranted to be free from defects in manufacturing, materials and workmanship for period of twenty (20) years from the purchase date.

## PART 2 PRODUCTS

### 2.1 MANUFACTURED UNITS

- A. Description: All Ultrex® Double Hung (and related stationary or picture units) as manufactured by Integrity Windows and Doors, Fargo, North Dakota. Operating sash tilt to interior for cleaning or removal.

### 2.2 FRAME DESCRIPTION

- A. Interior: Pultruded reinforced fiberglass (Ultrex®), 0.065 - 0.070 inch (2 mm) thick.
- B. Frame width: 3 3/32 inches (79 mm).
- C. Jamb depth: 2 inches (51 mm).

### 2.3 SASH DESCRIPTION

- A. Pultruded reinforced fiberglass (Ultrex®), 0.065 - 0.070 inch (2 mm) thick.
- B. Composite sash thickness: 15/16" inches (24 mm).

### 2.4 GLAZING

- A. Select quality complying with ASTM C 1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E 774.
- B. Glazing method: 3/4 inch (19 mm) Insulated glass.
- C. Glass type: Low E II - Argon gas.
- D. Glazing seal: Silicone bedding at exterior and interior.



## **2.5 FINISH**

- A. Factory baked on acrylic urethane.
- B. Color: Stone White exterior with Stone White interior; Pebble Gray exterior with Stone White interior; Bronze exterior with Stone White interior; Evergreen exterior with Stone White interior.

## **2.6 HARDWARE**

- A. Balance System: Coil spring block and tackle with nylon cord and glass filled nylon shoe and steel locking shoe.
- B. Jamb Track: Pultrusion.
- C. Lock: High pressure zinc die-cast cam lock and keeper.
  - 1. Finish: Phosphate coated and electrostatically painted. Color: White.

## **2.7 WEATHER STRIP**

- A. Sill weather strip is foam filled vinyl bulb. The bottom sash is sealed to the jambs using rigid vinyl with flexible seals. The top stationary sash seal is foam tape. The checkrails are sealed using rigid vinyl with flexible seals.

## **2.8 JAMB EXTENSION**

- A. Standard: 2". Furnish jamb extension: 4-9/16" (116 mm); 6-9/16 (167 mm); factory installed.

## **2.9 INSECT HALF SCREEN**

- A. Factory installed half screen. Screen mesh, 18 by 16: Charcoal fiberglass.
- B. Aluminum frame finish: Stone White; Pebble Gray; Bronze; Evergreen.

## **2.10 GRILLES-BETWEEN-THE-GLASS (GBG)**

- A. Manufactured from aluminum in an 11/16" (17mm) wide contoured profile placed between the two panes of glass. Available in rectangular and prairie lite cut patterns. Prairie lite pattern - six lite for single hung and nine lite for picture. Size limitations may apply to prairie lite cut availability.
- B. Colors: Stone White exterior with Stone White interior; Pebble Gray exterior with Stone White interior;
- C. Bronze exterior with Stone White interior; Evergreen exterior with Stone White interior.

## **2.11 ACCESSORIES AND TRIM**

- A. Installation Accessories:

1. Factory installed vinyl folding nailing fin at head, sill and side jambs.
2. Installation brackets: Brackets for 4-9/16 inch (116 mm); 6-9/16 inch (167 mm) jambs.
3. Sheet rock return.
4. J-channel.
5. Mullion kit: Standard mullion kit for field assembly of related units available in horizontal, vertical and 2-wide and/or 2-high configurations. Kit includes: Instructions, interior and exterior mull covers, mull plugs and brackets.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verification of Conditions: Before Installation, verify openings are plumb, square, and of proper dimension as required in Section 01 71 00. Report frame defects or unsuitable conditions to the General Contractor before proceeding.
- B. Acceptance of Conditions: Beginning of installation confirms acceptance of existing conditions.

#### **3.2 INSTALLATION**

- A. Comply with Section 01 73 00.
- B. Assemble and install window unit according to manufacturer's instructions and reviewed shop drawings.
- C. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.
- D. Install accessory items as required.
- E. Use finish nails to apply wood trim and mouldings.

#### **3.3 CLEANING**

- A. Remove visible labels and adhesive residue according to manufacturer's instructions.
- B. Leave windows and glass in a clean condition. Final cleaning as required in Section 01 74 00.

#### **3.4 PROTECTING INSTALLED CONSTRUCTION**

- A. Comply with Section 01 76 00.
- B. Protect windows from damage by chemicals, solvents, paint, or other construction operations that may cause damage.

**End of Section 085400**

**SECTION 088000  
GLAZING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Glass.
- B. Glazing compounds and accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 08 5313 - Vinyl Windows

**1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Samples: Submit two samples 12x12 inch in size of glass units.
- D. Maintenance Materials: Furnish the following for Department of Natural Resources's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Insulating Glass Units: One of each glass size and each glass type.

**1.4 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.5 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.1 GLAZING TYPES**

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
  - 1. Application(s): All exterior glazing unless otherwise indicated.
  - 2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  - 3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.

- a. Tint: Clear.
4. Total Thickness: 1 inch.

## 2.2 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
  1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
  2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  3. Thicknesses listed are minimum.

## 2.3 GLASS MATERIALS

- A. Float Glass Manufacturers:
  1. Pilkington North America Inc: [www.pilkington.com](http://www.pilkington.com).
  2. PPG Industries, Inc: [www.ppg.com](http://www.ppg.com).
  3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Float Glass: All glazing is to be float glass unless otherwise indicated.
  1. Annealed Type: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  2. Heat-Strengthened and Fully Tempered Types: ASTM C 1048.
  3. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

## 2.4 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
  1. Any of the manufacturers specified for float glass.
  2. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Sealed Insulating Glass Units: Types as indicated above.
  1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
  2. Edge Spacers: Aluminum, bent and soldered corners.
  3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  4. Purge interpane space with dry hermetic air.

## 2.5 GLAZING COMPOUNDS

- A. Manufacturers:
  1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  3. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  4. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.

- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

## **2.6 GLAZING ACCESSORIES**

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

### **3.2 PREPARATION**

- A. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- B. Prime surfaces scheduled to receive sealant.
- C. Install sealant in accordance with manufacturer's instructions.

### **3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)**

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.4 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)**

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/16 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
- F. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- G. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.5 INSTALLATION - EXTERIOR WET METHOD (SEALANT AND SEALANT)**

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- C. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.6 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**3.7 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

**End of Section 088000**

**SECTION 087100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. The work required under this section consists of furnishing hardware and supervising the installation of hardware and related items that are necessary to complete the work as indicated on the drawings and described in this section.
- B. Related work described in other sections:
  - 1. Division 8 Section "Hollow Metal Doors and Frames"
  - 2. Division 8 Section "Overhead Coiling Doors"

**1.2 REFERENCES**

- A. State of Georgia Minimum Fire Safety Standards 120-3-3; January 2000
- B. Accessibility Codes for Buildings & Facilities 120-3-20; July, 1997
- C. ANSI A117.1 - Specifications for making buildings and facilities usable by physically handicapped people
- D. AWI - Architectural Woodwork Institute
- E. BHMA - Builders' Hardware Manufacturers Association
- F. DHI - Door and Hardware Institute
- G. NAAMM - National Association of Architectural Metal Manufacturers
- H. NFPA - National Fire Protection Association
  - 1. NFPA 80 - Fire Doors and Windows 1995
  - 2. NFPA 101 - Life Safety Code 1997
  - 3. NFPA 252 - Fire Tests of Door Assemblies
  - 4. NFPA 105 - Smoke and Draft Control Door Assemblies
- I. UL - Underwriters' Laboratories
  - 1. UL10C - Fire Test of Door Assemblies
  - 2. UL305 - Panic Hardware

**1.3 SUBMITTALS**

- A. Hardware schedule: Submit a complete schedule of hardware. Using the format of this specification, indicate type, number location, and finish of each item. Include manufacturer's name and model description, fastening devices, and complete keying schedule. Reference architect's door designation, including room identifier location for the opening involved. Submit six (6) copies.



- B. Provide a cross-reference between door numbers and specification hardware heading numbers.
- C. Physical samples: When requested, submit physical samples of each item of hardware and show manufacturer's name, model, and finish.
- D. Templates: Furnish templates and approved schedule to each related manufacturer of equipment that requires same for the fabrication of their material.

#### **1.4 QUALITY ASSURANCE**

- A. Provide hardware in compliance with the local building code requirements. Comply with NFPA 101 Life Safety Code and ANSI A117.1 where applicable.
- B. Provide hardware for fire rated openings in accordance with NFPA 80, Fire Doors and Windows and NFPA 105, Smoke and Draft Control Door Assemblies.
- C. Provide the services of a finish hardware supplier who has been furnishing hardware in the project's vicinity for a period of not less than two (2) years and is an experienced hardware consultant (AHC). The hardware supplier's office is to be located within a seventy-five(75) square mile area from the job site. The consultant shall be available during the course of the work to the architect, contractor, and owner.

#### **1.5 DELIVERY, STORAGE & HANDLING**

- A. Deliver the finish hardware to project site in the manufacturer's protective packaging. All items are to be marked to indicate door opening number, hardware schedule number, or other identifying marks.
- B. Store hardware in a secure lock-up area that is dry and lighted.

#### **1.6 WARRANTY**

- A. Warrant door closers against failure due to defective materials and workmanship for a period of ten (10) years beginning at date of substantial completion. Closers judged defective during this period shall be replaced or repaired at no cost to the owner.
- B. Warrant exit devices against failure due to defects in material or workmanship for a period of three (3) years.
- C. All other warranties and bonds are to be in accordance with Division 1, Section 01700 - Contract Closeout.

### **PART 2 PRODUCTS**

#### **2.1 FINISH**

- A. Finish, unless otherwise indicated, shall be 630 (US32D) or 626(US26D)
- B. Door closers shall be spray-painted for finish to match adjacent hardware.

## 2.2 KEYING

- A. All new cylinders shall be keyed to the restricted, patented, removable core key system by Best Access Systems
- B. All cylinders shall be provided with removable construction cores. The cylinder manufacturer shall be responsible for replacing the construction cores with the permanent cores at the direction of the Architect/Owner.
- C. Provide the following numbers of keys:
  - 1. Three (3) Change Keys per lock
  - 2. Ten (10) Construction Keys
  - 3. Two (2) Permanent Control Keys
  - 4. Three (3) Masterkeys
- D. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. Best Access Systems - Peaks

## 2.3 HINGES

- A. Types, materials, sizes, and finishes as noted in the Hardware Schedule. Steel hinges shall be prime coated for use on hollow metal doors with a zinc plate base, bonderized in addition to the final finish. Use security studs in secure areas with stainless steel pins, non-rising.
- B. Bearings are not to be installed in hinges before electroplating the hinge. If frozen bearings are found, replace the complete shipment.
- C. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. Bommer
  - 2. Hager
  - 3. McKinney
  - 4. Stanley

## 2.4 LOCKSETS AND LATCHES

- A. Grade 1 – Mortise Locksets and Latchsets: Provide 5/8" minimum throw of latch on pairs of doors. Comply with UL requirements for throw of latch bolts of fire rated openings. Furnish strike with curved lip extended to protect frame.
- B. Grade 1 – Extra Heavy Duty Cylindrical Locksets and Latchsets: Provide 1/2" minimum throw of latch. Comply with UL requirements for throw of latch bolts of fire rated openings. Locksets and latchsets must have independent lever return springs and be through bolt mounted to door as standard.
- C. Grade 2 - Heavy Duty Cylindrical Locksets and Latchsets: Provide 1/2" minimum throw of latch. Comply with UL requirements for throw of latch bolts of fire rated openings. Locks and latchsets must be through bolt mounted to door as standard.

- D. All locksets and latches are to be the product of the same manufacturer. All lever trim is to be cast solid.
- E. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. Best 45H Series x 14H, 93K Series x 14D, 73KC Series x 14D
  - 2. DORMA ML9000 Series x LCB, CL800 Series x LC, CL700 Series x LC
  - 3. Schlage L9000 Series x 17B, ND Series x Sparta, AL Series x Neptune

## 2.5 EXIT DEVICES

- A. Panic exit devices must be listed with the Underwriter's Laboratories, Inc. for Accident Hazard. Fire exit devices must be available with UL Label for a three (3) hour fire rating for the specified door opening size.
- B. All exit devices must be reversible. All exit devices must have 3/4" throw latch bolts. All exit devices must have components fastened with screws for ease of maintenance. Rivets are not acceptable as fasteners. All exit devices must be stainless steel. All exit device lever trim must be cast brass or bronze.
- C. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. DORMA 9000 Series
  - 2. Precision APEX Series
  - 3. Von-Duprin 98 Series

## 2.6 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of units: Provide closers with adjustable spring power from sizes 1 through 6. Opening force shall comply with ADA and ANSI A117.1 where indicated with "Barrier Free" closers in the hardware sets
- B. Adjustments: Closers must have separate adjustments for latch speed, sweep speed and backcheck.
- C. Furnish non-handed closers with full plastic cover unless otherwise noted in the hardware sets.
- D. Where "IS" or "S-IS" arms are specified in hardware sets, if manufacturer does not offer this arm provide a regular arm mount closer in conjunction with a heavy-duty overhead stop equal to a DORMA 900 Series.
- E. Provide brackets, drop plates, spacer blocks and accessories to ensure proper installation. Use manufacturer's chart for recommended sizes when adjusting closers.
- D. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. DORMA 8900 Series and 8600 Series as specified
  - 2. Norton 7500 Series and 8500 Series as specified
  - 3. LCN 4040 Series and 4010/4110 Series as specified

## 2.7 FLAT GOODS

- A. Where specified in the hardware sets, door protection plates shall be constructed of stainless steel to meet ANSI 156.6 requirements for .050" thickness.
- B. Plates are to be beveled three sides with countersunk holes, staggered equal distances apart, and applied with flat-head screws.
- C. Kick plates are to be mounted on the push side of the door and are to be 8" x 2" LDW. Mop plates are to be mounted on the pull side of the door and are to be 8" x 1" LDW.
- D. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. Don-Jo
  - 2. Rockwood
  - 3. Trimco

## **2.8 THRESHOLDS, WEATHER-STRIP/SOUND-SEAL, RAIN DRIPS, AND DOOR BOTTOMS**

- A. Types as indicated in Hardware Schedule.
- B. Manufacturers whose product meets the criteria of this specification and are acceptable:
  - 1. PEMKO
  - 2. National Guard
  - 3. Zero

## **PART 3 EXECUTION**

### **3.1 PRELIMINARY**

- A. Receive, store in temporary bins, and be responsible for all finish hardware. Tag, index, and file all keys temporarily during construction.
- B. Check all hardware upon arrival on job site against approved Finish Hardware Schedule. Function of hardware shall be examined against the job site conditions and interferences. If exceptions in these regards are found, notify Architect at once and retain subject hardware in its original packing carton. Adjustment and/or substitutions shall be made only as authorized by Architect.

### **3.2 INSTALLATION**

- A. Install hardware to doors as listed in the door schedule. Comply with Recommended Locations for Builders Hardware for Custom Steel Doors and Frames as published by the Door and Hardware Institute. Application shall be by skilled workmen who work with proper equipment and shall be in accord with manufacturer's instructions, fit to work of others accurately, applied securely, and adjusted properly. Hardware let into work of others shall be neatly done from template and shall fit perfectly. Exercise care not to damage work of others.
- B. Install finish hardware to template. Cut and fit substrate to avoid substrate damage or weakening. Cover cut-outs with hardware items. Mortise work to correct location and size without gouging, splintering, or causing irregularities in exposed finished work.

- C. Where cutting and fitting is required on substrates to be painted or similarly finished, install, fit, and adjust hardware prior to finishing and then remove and place in original packaging. Reinstall hardware after finishing operation is completed.
- D. Attach thresholds with flathead screws in lead expansion shields, spaced at 24" o/c maximum and symmetrical with the center of door opening. On cast thresholds where cast-on-anchors are used, apply utilizing an epoxy grout mixture.

### **3.3 CLEANING AND ADJUSTING**

- A. At the time of hardware installation, adjust each hardware item to perform function intended. Lubricate moving parts with lubricant acceptable to hardware manufacturer.
- B. Prior to "Date of Substantial Completion" readjust and relubricate hardware. Repair or replace defective materials. Clean hardware as recommended by manufacturer to remove dust and stains.

### **3.4 FASTENINGS**

- A. All exposed screws shall be Torx head where specified or Phillips head, finished to match item, and sized to suit job requirements.
- B. Surface applied items such as closers and overhead holders shall be applied with sex nut and bolt assemblies.
- C. All finish hardware shall be installed with the fasteners furnished by the manufacturer. Warranty and/or fire label will be void on finish hardware items installed with unapproved fasteners.

### **3.5 OPERATION**

- A. After installation, all templates, installation instructions, and special details are to be placed in a properly identified binder. This binder and all special tools are to be turned over to the Architect at Final Acceptance of the project.
- B. After Final Acceptance, the hardware supplier shall instruct the Owner's designated personnel in the proper operation, adjustment, and maintenance of hardware and finishes.

### **3.6 COORDINATION**

- A. Coordinate finish hardware installation with other trades to ensure proper installation and function for a complete operating system.

### **3.7 HARDWARE SCHEDULE**

HW-CS1 – Door 102.1

Each Door to Receive:

3 ea. Hinges w/ non-removable pins CFM-HD1

PEMKO

DOOR HARDWARE

08 7100 - 6

1 ea. Core	As required	Best
1 ea. Closer/Holder	8616FC-FHO	DORMA
1 ea. Armor Plate	90 – 34" x 34"	Don-Jo
1 ea. Wall Stop	1407	Don-Jo
1 ea. Threshold	S2005AT	PEMKO
1 ea. Sweep	18061CNB	PEMKO
1 set Weatherstrip	18041CNB	PEMKO

HW-CS2 – Doors 100.1, 101.1

Each Door to Receive:

3 ea. Hinges w/ non-removable pins	CFM-HD1	PEMKO
1 ea. Core	As required	Best
1 ea. Push Plate	78	Don-Jo
1 ea. Pull Plate	7816	Don-Jo
1 ea. Closer	8616FC – AF86	DORMA
1 ea. Kick Plate	90 – 8 x 34	Don-Jo
1 ea. Wall Stop	1407	Don-Jo
1 ea. Threshold	S2005AT	PEMKO
1 ea. Sweep	18061CNB	PEMKO
1 set Weatherstrip	18041CNB	PEMKO

HW-CS3 – Door 103.1, 103.2

Each Door to Receive:

3 ea. Hinges w/ non-removable pins	LB5002 – 450	Bommer
1 ea. Classroom Deadbolt	MB9963	DORMA
1 ea. Storeroom Lock	ML9980	DORMA
1 ea. Overhead Stop/Holder	912H	DORMA
1 ea. Threshold	S2005AT	PEMKO
1 ea. Sweep	18061CNB	PEMKO
1 set Weatherstrip	18041CNB	PEMKO

**End of Section 087100**

**SECTION 088000  
GLAZING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Glass.
- B. Glazing compounds and accessories.

**1.2 RELATED REQUIREMENTS**

- A. Section 08 5313 - Vinyl Windows

**1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Samples: Submit two samples 12x12 inch in size of glass units.
- D. Maintenance Materials: Furnish the following for Department of Natural Resources's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Insulating Glass Units: One of each glass size and each glass type.

**1.4 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.5 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.1 GLAZING TYPES**

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
  - 1. Application(s): All exterior glazing unless otherwise indicated.
  - 2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  - 3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.

- a. Tint: Clear.
4. Total Thickness: 1 inch.

## 2.2 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
  1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
  2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  3. Thicknesses listed are minimum.

## 2.3 GLASS MATERIALS

- A. Float Glass Manufacturers:
  1. Pilkington North America Inc: [www.pilkington.com](http://www.pilkington.com).
  2. PPG Industries, Inc: [www.ppg.com](http://www.ppg.com).
  3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Float Glass: All glazing is to be float glass unless otherwise indicated.
  1. Annealed Type: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  2. Heat-Strengthened and Fully Tempered Types: ASTM C 1048.
  3. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

## 2.4 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
  1. Any of the manufacturers specified for float glass.
  2. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Sealed Insulating Glass Units: Types as indicated above.
  1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
  2. Edge Spacers: Aluminum, bent and soldered corners.
  3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  4. Purge interpane space with dry hermetic air.

## 2.5 GLAZING COMPOUNDS

- A. Manufacturers:
  1. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  3. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  4. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.



- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; color as selected.

## **2.6 GLAZING ACCESSORIES**

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

### **3.2 PREPARATION**

- A. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- B. Prime surfaces scheduled to receive sealant.
- C. Install sealant in accordance with manufacturer's instructions.

### **3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)**

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.4 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)**

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/16 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
- F. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- G. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.5 INSTALLATION - EXTERIOR WET METHOD (SEALANT AND SEALANT)**

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- C. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.6 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**3.7 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

**End of Section 088000**

**SECTION 08 9100  
LOUVERS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Louvers, frames, and accessories.

**1.2 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.
- C. Test Reports: Independent agency reports showing compliance with specified performance criteria.

**1.3 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.
  - 1. Finish: Include coverage against degradation of exterior finish.

**PART 2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Wall/Gable Louvers:
  - 1. Ruskin Air and Sound Control: [www.ruskin.com](http://www.ruskin.com)
  - 2. American Warming and Ventilating: [www.awv.com](http://www.awv.com).
  - 3. Construction Specialties, Inc: [www.c-sgroup.com](http://www.c-sgroup.com).
  - 4. PCI Industries, Inc; All-Lite Brand: [www.alllite-louvers.com](http://www.alllite-louvers.com).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

**2.2 LOUVERS**

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified under AMCA 511.
  - 1. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
  - 2. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
  - 1. Free Area: 50 percent, minimum.

2. Blades: Drainable.
3. Frame: 4 inches deep, channel profile; corner joints mitered and mechanically fastened, with continuous recessed caulking channel each side.
4. Metal Thickness: Frame 0.081 inch; blades 0.081 inch.
5. Finish: Color anodized; finish welded units after fabrication.
6. Color: refer to Architectural drawings.

### **2.3 MATERIALS**

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M),
  1. Color Anodizing: AAMA 611 Class I, AA-M12C22A42/44.
- B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.
- C. Insect Screen: 18 x 16 size aluminum mesh.

### **2.4 ACCESSORIES**

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- B. Head and Sill Flashings: See Section 07 6200.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

### **3.2 INSTALLATION**

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.
- D. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- E. Secure louver frames in openings with concealed fasteners.

### **3.3 CLEANING**

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

**End of Section 089100**

**SECTION 09 29 00  
GYPSUM BOARD**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Glass-mat faced, moisture resistant gypsum board.
- B. Related Sections:
  - 1. Section 06 10 00 Rough Carpentry.
  - 2. Section 09 21 16 Gypsum Board Assemblies.
  - 3. Section 09 22 00 Supports for Plaster and Gypsum Board.

**1.2 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM C630 Standard Specification for Water-Resistant Gypsum Backing Board.
  - 4. ASTM C840 Standard Specification for Application and Finishing of Gypsum Board.
  - 5. ASTM C1396 Standard Specification for Gypsum Board.
  - 6. ASTM C1658 Standard Specification for Glass Mat Gypsum Panels.
  - 7. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 8. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. Gypsum Association (GA): GA-214 Recommended Levels of Gypsum Board Finish.

**1.3 SUBMITTALS**

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

**1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements: Provide products that comply with the following limits for surface burning characteristics when tested per ASTM E84:
  - 1. Flame spread: 25, maximum.
  - 2. Smoke developed: 450, maximum.
- B. Provide products that have been GREENGUARD Indoor Air Quality Certified by the GREENGUARD Environmental Institute under the GREENGUARD Standard for Low Emitting Products and GREENGUARD for Children & Schools product certification program.

## 1.5 WARRANTY

- A. Provide products that offer six months of coverage against in-place exposure damage (delamination, deterioration and decay).
- B. Manufacturer's Warranty: Three years against manufacturing defects.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Georgia-Pacific Gypsum LLC:
  - 1. Fiberglass-Mat Faced Gypsum Board: DensArmor Plus.
  - 2. Fire-Rated Fiberglass-Mat Faced Gypsum Board: DensArmor Plus Fireguard.

### 2.2 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Board:
  - 1. Thickness: 1/2 inch.
  - 2. Width: 4 feet.
  - 3. Length: 8 feet.
  - 4. Weight: 2020 pounds per M square feet.
  - 5. Edges: Tapered.
  - 6. Surfacing: Coated fiberglass mat on face, back, and long edges.
  - 7. Flexural Strength, Parallel (ASTM C473, ASTM C1658): Not less than 80 lbf.
  - 8. Flexural Strength, Perpendicular (ASTM C473, ASTM C1658): Not less than 100 lbf.
  - 9. R-Value (ASTM C518): Not less than 0.56.
  - 10. Nail Pull Resistance (ASTM C473, ASTM C1658): Not less than 80 lbf.
  - 11. Humidified Deflection (ASTM C473, ASTM C1658): Not more than 1/4 inch.
  - 12. Hardness, Core, Edges, and Ends (ASTM C473, ASTM C1396): Not less than 15.
  - 13. Water Absorption (ASTM C630, ASTM C1396, ASTM C1658): Less than 5 percent of weight.
  - 14. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  - 15. Acceptable Products:
    - a. 1/2 inch DensArmor Plus Interior Guard, Georgia-Pacific Gypsum.
    - b. 1/2 inch DensArmor Plus Fireguard Interior Guard Type C, Georgia-Pacific Gypsum.
- B. 5/8 Inch Fire-Rated Fiberglass-Mat Faced Gypsum Board:
  - 1. Thickness: 5/8 inch.
  - 2. Width: 4 feet.
  - 3. Length: 8 feet.
  - 4. Weight: 2570 pounds per M square feet.
  - 5. Edges: Tapered.
  - 6. Surfacing: Coated fiberglass mat on face, back, and long edges.
  - 7. Flexural Strength, Parallel (ASTM C473, ASTM C1658): Not less than 100 lbf.

8. Flexural Strength, Perpendicular (ASTM C473, ASTM C1658): Not less than 140 lbf.
  9. R-Value (ASTM C518): Not less than 0.67.
  10. Nail Pull Resistance (ASTM C473, ASTM C1658): Not less than 90 lbf.
  11. Humidified Deflection (ASTM C473, ASTM C1658): Not more than 1/8 inch.
  12. Hardness, Core, Edges, and Ends (ASTM C473, ASTM C1396): Not less than 15.
  13. Water Absorption (ASTM C630, ASTM C1396, ASTM C1658): Less than 5 percent of weight.
  14. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  15. Acceptable Products:
    - a. 5/8 Inch DensArmor Plus Fireguard Interior Guard Type X, Georgia-Pacific Gypsum.
    - b. 5/8 Inch DensArmor Plus Abuse Guard, Georgia-Pacific Gypsum.
- C. 1/2 Inch Fire-Rated Fiberglass-Mat Faced Gypsum Board:
1. Thickness: 1/2 inch.
  2. Width: 4 feet.
  3. Length: 8 feet.
  4. Weight: 2020 pounds per M square feet.
  5. Edges: Tapered.
  6. Surfacing: Coated fiberglass mat on face, back, and long edges.
  7. Flexural Strength, Parallel (ASTM C473, ASTM C1658): Not less than 80 lbf.
  8. Flexural Strength, Perpendicular (ASTM C473, UL File No. R2717): Not less than 120 lbf.
  9. R-Value (ASTM C518): Not less than 0.56.
  10. Nail Pull Resistance (ASTM C473, ASTM C1658): Not less than 80 lbf.
  11. Humidified Deflection (ASTM C473, ASTM C1658): Not more than 1/4 inch.
  12. Hardness, Core, Edges, and Ends (ASTM C473, ASTM C1396): Not less than 15.
  13. Water Absorption (ASTM C630, ASTM C1396, ASTM C1658): Less than 5 percent of weight.
  14. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  15. Acceptable Products:
    - a. 1/2 Inch DensArmor Plus Fireguard Interior Guard Type C, Georgia-Pacific Gypsum.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. General: In accordance with ASTM C840 and the manufacturer's recommendations.
  1. Manufacturer's Recommendations:
    - a. Current "Product Catalog", Georgia-Pacific Gypsum.

### **3.2 APPLICATION**



- A. Primer and Paint Application:
  - 1. Use a high quality, high build drywall primer/surfacer. Comply with application instructions of the primer manufacturer as stated on the container.
  - 2. Apply high build primer at a sufficient wet film thickness to ensure a dry film thickness that will produce acceptable results.
  - 3. Apply finish coats of paint per the paint manufacturer's label instructions.

### **3.3 PROTECTION**

- A. Protect gypsum board installations from damage and deterioration until the date of Substantial Completion.

**End of Section 092900**

## SECTION 093000 TILING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Tile for shower receptors.
- D. Cementitious backer board as tile substrate.
- E. Stone thresholds.
- F. Ceramic trim.

#### 1.2 REFERENCE STANDARDS

- A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2005.
  - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2005.
  - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 1999 (R2005).
  - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar; 1999 (R2005).
  - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 1999 (R2005).
  - 5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (R2005).
  - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and - Grouting Epoxy; 1999 (R2005).
  - 7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (R2005).
  - 8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (R2005).
  - 9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (R2005).
  - 10. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999 (R2005).

11. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 1999 (R2005).
  12. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation; 1999 (R2005).
  13. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (R2005).
  14. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 1999 (R2005).
- B. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of North America, Inc.; 2007/2008.

### **1.3 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- C. Maintenance Materials: Furnish the following for Department of Natural Resources's use in maintenance of project.
1. See Section 01 6000 - Product Requirements, for additional provisions.
  2. Extra Tile: 10 square feet of each size, color, and surface finish combination.

### **1.4 QUALITY ASSURANCE**

- A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.

### **1.5 MOCK-UP**

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.
1. Approved mock-up may remain as part of the Work.

### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

### **1.7 FIELD CONDITIONS**

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

## **PART 2 PRODUCTS**

### **2.1 TRIM AND ACCESSORIES**

- A. Porcelain/Quarry Tile Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
  - 1. Manufacturer: Same as for tile.
- B. Thresholds: Marble, white, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
  - 1. Applications: Provide at the following locations:
    - a. At doorways where tile terminates.
    - b. At open edges of floor tile where adjacent finish is a different height.

### **2.2 ADHESIVE MATERIALS**

### **2.3 MORTAR MATERIALS**

- A. Manufacturers:
  - 1. Bonsal American, Inc: [www.sakrete.com](http://www.sakrete.com)
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Mortar Bed Materials: Portland cement, sand, latex additive and water.

### **2.4 GROUT MATERIALS**

- A. Manufacturers:
  - 1. Bonsal American, Inc: [www.sakrete.com](http://www.sakrete.com)
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Standard Grout: Any type specified in ANSI A118.6 or A118.7.
  - 1. Color: refer to Architectural drawings.

### **2.5 ACCESSORY MATERIALS**

- A. Waterproofing Membrane at Showers and Tiled Tubs: PVC sheet membrane, 40 mils thick, minimum; specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
- B. Reinforcing Mesh: 2 x 2 inch size weave of 16/16 wire size; welded fabric, galvanized.
- C. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners.
- D. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

### **3.2 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

### **3.3 INSTALLATION - GENERAL**

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- I. Allow tile to set for a minimum of 48 hours prior to grouting.

J. Grout tile joints. Use standard grout unless otherwise indicated.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

### **3.4 INSTALLATION - FLOORS - MORTAR BED METHODS**

A. Over wood substrates, install in accordance with TCA Handbook method F141, with standard grout, unless otherwise indicated.

B. Cleavage Membrane: Lap edges and ends.

C. Mortar Bed Thickness: 2" inch, unless otherwise indicated.

### **3.5 INSTALLATION - SHOWERS AND BATHTUB WALLS**

A. At tiled shower receptors install in accordance with TCA Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls.

B. Grout with standard grout as specified above.

C. Seal joints between tile work and other work with sealant specified in Section 07 9005.

### **3.6 INSTALLATION - WALL TILE**

A. Over gypsum wallboard on wood or metal studs install in accordance with TCA Handbook Method W243, thin-set with dry-set or latex-portland cement bond coat, unless otherwise indicated.

### **3.7 CLEANING**

A. Clean tile and grout surfaces.

### **3.8 PROTECTION**

A. Do not permit traffic over finished floor surface for 4 days after installation.

**End of Section 093000**

**SECTION 099000  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Surfaces to be finished are indicated in this section and on the Drawings.

**1.2 RELATED REQUIREMENTS**

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

**1.3 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, [www.paintinfo.com](http://www.paintinfo.com).
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Master Painters and Decorators Association; 2004.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system (copy of relevant MPI Manual page is acceptable).
- C. Samples: Submit three paper "drop" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
- D. LEED Report: VOC content of all interior opaque coatings actually used.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

## **1.6 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **1.7 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints: Acceptable manufacturers are limited to the following:
  - 1. Duron, Inc: [www.duron.com](http://www.duron.com).
  - 2. ICI Paints: [www.icipaintsinna.com](http://www.icipaintsinna.com).
  - 3. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 4. PPG Architectural Finishes, Inc: [www.ppgaf.com](http://www.ppgaf.com).
  - 5. Sherwin Williams: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- C. Substitutions: See Section 01 6000 - Product Requirements.



## 2.2 MATERIALS - GENERAL

- A. Volatile Organic Compound (VOC) Content:
  - 1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- B. Paints and Coatings: Provide products listed in Master Painters Institute Approved Product List, current edition available at [www.paintinfo.com](http://www.paintinfo.com), for specified MPI Categories, except as otherwise indicated.
  - 1. Provide ready mixed paints and coatings, except field-catalyzed coatings.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

## 2.3 PAINT SYSTEMS

- A. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
- B. Where a specified paint system does not have a Premium Grade, provide Custom Grade system.
- C. Provide colors as scheduled on Drawings.

## 2.4 INTERIOR PAINT SYSTEMS

- A. refer to Architectural drawings.

## PART 3 EXECUTION

### 3.1 SCOPE -- SURFACES TO BE FINISHED

- A. Paint all exposed surfaces except where indicated not to be painted or to remain natural; the term "exposed" includes areas visible through permanent and built-in fixtures when they are in place.
- B. Paint the surfaces described in PART 2, indicated on the Drawings, and as follows:
  - 1. If a surface, material, or item is not specifically mentioned, paint in the same manner as similar surfaces, materials, or items, regardless of whether colors are indicated or not.
  - 2. Paint surfaces behind movable equipment and furnishings the same as similar exposed surfaces.
  - 3. Paint surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, using primer only, prior to installation of the permanent item.

4. Paint back sides of access panels and removable and hinged covers to match exposed surfaces.
  5. Finish top, bottom, and side edges of exterior doors the same as exposed faces.
  6. Paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment occurring in finished areas to match background surfaces, unless otherwise indicated.
  7. Paint interior surfaces of air ducts and convector and baseboard heating cabinets with flat, nonspecular black paint where visible through registers, grilles, or louvers.
  8. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- C. Do Not Paint or Finish the Following Items:
1. Items fully factory-finished unless specifically noted; factory-primed items are not considered factory-finished.
  2. Items indicated to receive other finish.
  3. Items indicated to remain naturally finished.
  4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

### 3.2 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials; report incompatible primer conditions and submit recommended changes for Gerding Collaborative, LLC's approval.

### 3.3 PREPARATION

- A. Prepare surfaces as specified in MPI Architectural Painting Specification Manual and as follows for the applicable surface and coating; if multiple preparation treatments are specified, use as many as necessary for best results; where the Manual references external standards for preparation (e.g. SSPC standards), prepare as specified in those standards; comply with coating manufacturer's specific preparation methods or treatments, if any.
- B. Coordinate painting work with cleaning and preparation work so that dust and other contaminants do not fall on newly painted, wet surfaces.
- C. Surface Appurtenances: Prior to preparing surfaces or finishing, remove electrical plates, hardware, light fixtures, light fixture trim, escutcheons, machined surfaces, fittings, and similar items already installed that are not to be painted.
  1. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before preparation and finishing.

2. After completing painting in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- E. Marks: Seal with shellac those which may bleed through surface finishes.
- F. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- I. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### 3.4 APPLICATION

- A. Apply products in accordance with manufacturer's instructions and as specified or recommended by MPI Manual, using the preparation, products, sheens, textures, and colors as indicated.
  1. Remove, refinish, or repaint work not complying with requirements.
- B. Do not apply finishes over dirt, rust, scale, grease, moisture, scuffed surfaces, or other conditions detrimental to formation of a durable coating film; do not apply finishes to surfaces that are not dry.
- C. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
  1. Brush Application: Use brushes best suited for the type of material applied; use brush of appropriate size for the surface or item being painted; produce results free of visible brush marks.
  2. Roller Application: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
  4. Where application method is listed in the MPI Manual for the paint system that application method is required; otherwise any application method recommended by manufacturer for material used and objects to be painted is acceptable.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate; provide total dry film thickness of entire system as recommended by manufacturer.
  1. Number of coats and film thickness required are the same regardless of application method.

2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
  3. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
- E. Apply finish to completely cover surfaces with uniform appearance without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
1. Before applying finish coats, apply a prime coat of material recommended by manufacturer, unless the surface has been prime coated by others; where evidence of suction spots or unsealed areas in first coat appear, recoat primed and sealed surfaces to ensure finish coat with no burn through or other defects due to insufficient sealing.
  2. Apply first coat to surface that has been cleaned, pretreated, or otherwise prepared as soon as practical after preparation and before subsequent surface deterioration.
  3. Do not apply succeeding coats until the previous coat has cured as recommended by manufacturer.
  4. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat will not cause the undercoat to lift or lose adhesion.
  5. If manufacturer's instructions recommend sanding to produce a smooth, even surface, sand between coats.
  6. Before applying next coat vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

### 3.5 CLEANING AND PROTECTION

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from site.
- C. Protect other work, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting as approved by Gerding Collaborative, LLC.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in MPI Manual.

**End of Section 099000**

**SECTION 10 2113.19  
PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.1 SUBMITTALS**

- A. Plastic compartment work includes the following, where indicated:
  - 1. Solid Plastic Privacy Screens.
- B. Furnish all labor and materials necessary for the completion of work in this section as shown on the contract drawings and specified herein.
- C. Work in this section shall include, but is not limited to:
  - 1. Privacy screens.
  - 2. Hardware for privacy screens.
  - 3. Shop drawings and working drawings.
  - 4. Manufacturer's guarantee.
- D. Related work specified elsewhere shall include accessories and anchorage/blocking for attachment of privacy screens.

**1.2 PRODUCT DATA**

- A. Submit six (6) sets of shop drawings and details for architect's approval.
- B. Colors shall be selected from the manufacturer's full range of colors.
- C. Color samples and hardware samples shall be submitted for approval by the architect upon request.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with the ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
  - 1. Smoke Developed Index: Not to exceed 450
  - 2. Flame Spread Index: Not to exceed 75
  - 3. Material Fire Ratings:
    - a. National Fire Protection Association (NFPA): Class B
    - b. International Code Council (ICC): Class B

**1.4 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- B. Installer's Qualifications: A Company or Individual, regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

## 1.5 WARRANTY

- A. SCRANTON PRODUCTS (Santana/Comtec/Capitol), guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 15 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. (Labor not included in warranty.)

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Toilet partitions and screens to be supplied by SCRANTON PRODUCTS (Santana/Comtec/Capitol), Scranton, PA, or approved equal.

### 2.2 MATERIALS

- A. Privacy screens and optional pilasters shall be 1" thick constructed from High-Density Polyethylene compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.
- B. Polyethylene compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. All plastic components shall be covered with a protective plastic masking.

### 2.3 CONSTRUCTION

- A. Panels (and pilasters if required) shall be 1" thick with all edges rounded to a ¼" radius.
- B. Panels shall typically be 42" or 55" high, mounted at 14" above the finished floor. An aluminum heat sink may be fastened to the bottom edges (optional).
- C. Pilasters (if required) shall typically be 56", 69" or 82" high and fastened into a 3" high pilaster shoe with a stainless steel tamper resistant torx head sex bolt. Floor to ceiling pilasters are also available (if required) up to 120" and are attached at the floor and ceiling with a stainless steel angle bracket and sleeve.

### 2.4 HARDWARE

- A. Over head braced pilasters and floor supported pilasters (if required) shall have pilaster shoes 3" high and made of one-piece molded HDPE plastic available in: burgundy, mocha, black, parchment, white, charcoal grey, hunter, grey, fossil, linen, beige, blueberry, azure, cappuccino, sandcastle, sandstone and glacier grey. OR, pilaster shoes shall be 3" high (type 304, 20 gauge) stainless steel. Pilaster shoes shall be secured to the pilaster with a stainless steel tamper resistant torx head sex bolt.

- B. Floor to ceiling pilasters (if required) shall have a stainless steel angle bracket used to attach pilasters at floor and ceiling in lieu of shoes. These angle brackets shall be attached to pilasters with  $\frac{3}{4}$ " stainless steel tamper resistant torx head screws. Pilaster sleeves shall be 4" high stainless steel (type 304, 20 gauge) and secured to pilasters with a stainless steel tamper resistant torx head screw. Sleeves shall conceal the angle brackets connections at the floor and ceiling.
- C. Wall brackets shall be 41" or 54" long, made of extruded PVC plastic and are available in the following colors: burgundy, mocha, black, parchment, white, charcoal grey, hunter, grey, fossil, linen, beige, blueberry, azure, cappuccino, sandcastle, sandstone and glacier grey. These plastic brackets are fastened to the pilaster with stainless steel tamper resistant torx head screws and fastened to the panels with stainless steel tamper resistant torx head sex bolts. OR, wall brackets shall be  $1\frac{1}{2}$ " stirrup type made of heavy-duty aluminum (6463-T5 alloy) with a bright dip anodized finish. Stirrup brackets shall be fastened to pilasters and panels with stainless steel tamper resistant torx head sex bolts.
- D. Headrail (used with optional 82" pilasters only) shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with anti-grip design and integrated curtain track. The headrail shall have a clear anodized finish and shall be fastened to the headrail bracket by a stainless steel tamper resistant torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant torx head screws.
- E. Headrail brackets (required with headrail) shall be 20 gauge stainless steel with a satin finish, and secured to the wall with a stainless steel tamper resistant torx head screws.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Examine areas to receive screens for correct height and spacing of anchorage/blocking and plumbing fixtures that may affect installation of screens. Report any discrepancies to the architect.
- B. Blocking and plumbing fixtures that may affect installation of screens. Report any discrepancies to the architect.
- C. Take complete and accurate measurements of complete screen locations.
- D. Start of work constitutes acceptance of job.

#### **3.2 INSTALLATION**

- A. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings and manufacturer's installation instructions.
- B. All panels shall typically be mounted at 14" above finished floor.

- C. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- D. Finished surfaces shall be cleaned after installation and be left free of all imperfections.

**End of Section 102113.19**



**SECTION 102800  
TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Accessories for toilet rooms, showers, residential bathrooms, and utility rooms.
- B. Grab bars.
- C. Self-retracting step.

**1.2 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates and above ceiling framing.
- B. Section 08 8300 - Mirrors: Other mirrors.
- C. Section 10 2113.19 - Plastic Toilet Compartments.
- D. American Society for Testing and Materials (ASTM): ASTM A167 - Stainless and heat resisting chromium-nickel steel plate, sheet and strip.
- E. American national Standards Institute (ANSI): ANSI Z535.4 - Product Safety Signs and Labels.
- F. International Building Code Council / American National Standards Institute Standard on Accessible and Useable Buildings and Facilities: ICC / ANSI A117.1.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.4 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Products listed are made by Bobrick.
- B. All items of each type to be made by the same manufacturer.

### **2.2 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Self-retracting seat: 304 Stainless, reinforced with 2 Stainless plates, 1 Stainless bracket and 2 Stainless steel support rods. Mounting supports: 4 Stainless wedge anchors 2. tension rating of 3999 lbs. and shear rating of 3031 lbs.

### **2.3 FINISHES**

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

### **2.4 TOILET ROOM ACCESSORIES**

- A. refer to Architectural drawings.
- B. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
  - 1. refer to Architectural drawings.
  - 2. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
  - 3. Fixed Tilt Mirrors: Minimum 3 inches tilt from top to bottom.
- C. Grab Bars: Stainless steel, 1-1/4 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
  - 1. refer to Architectural drawings for sizes and locations.

### **2.5 SHOWER AND TUB ACCESSORIES**

- A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.
- B. Shower Curtain:
  - 1. Material: Cotton, machine washable, and mildew-resistant.
  - 2. Size: 36 by 72 inches, hemmed edges.
  - 3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
  - 4. Color: White.
  - 5. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure.

- C. Folding Shower Seat: Wall-mounted recessed; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, L-shaped, right-hand seat.
  - 1. Seat: One-piece, pan-type, 0.05 inch stainless steel sheet, Type 304. Weld seams and grind smooth.
  - 2. Size: ADA compliant.
- D. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.

## **2.6 UTILITY ROOM ACCESSORIES**

- A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
  - 1. Holders: 3 spring-loaded rubber cam holders.
  - 2. Length: Manufacturer's standard length for number of holders.

## **2.6 SELF-RETRACTING SEAT**

- A. Step 'n Wash Model # SNW-SS 800, Step 'n Wash [www.stepnwash.com](http://www.stepnwash.com)
  - 1. Operation: Opens and self-closes with pneumatic, gas spring mechanism in concealed cylinder.
  - 2. Nominal size: [15.54 inches] wide by [18.00 inches] high when step is in up-position and [15.54 inches] wide by [12.42 inches] high when step is in down-position.
  - 3. Rated load capacity: [150 pounds].
  - 4. Maximum weight capacity: [600 pounds].

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

### **3.2 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### **3.3 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations, as indicated on drawings, and as follows:

- D. Install Self-retracting seat so that they are centered under lavatory and secure. After install, cycle unit (open and close) a minimum of 3 times to verify unit operates smoothly. For instructions on securing to a sub-floor other than concrete, contact Step ' Wash, Inc. 4829 Mill Brook Drive, Atlanta, Georgia 30338; (770) 677-4000.

**End of Section 102800**

**SECTION 22 05 09  
ANCHORS AND SUPPORTS**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes hangers and supports for mechanical systems piping and equipment.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 5 Section "Metal Fabrications: for materials for attaching hangers and supports to building structure.
  - 2. Division 22 Section "Vibration Control: for vibration-isolation hangers and supports.

**1.3 DEFINITIONS**

- A. Terminology used in this Section is defined in MSS SP-90.

**1.4 SUBMITTALS**

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of hanger and support.
- C. Submit pipe hanger and support schedule showing manufacturer's Figure No., size, location, and features for each required pipe hanger and support.
- D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- E. Shop drawings for each type of hanger and support, indicating dimensions, weights, required clearances, and methods of component assembly.

**1.5 QUALITY ASSURANCE**

- A. Qualify welding processes and welding operators according to AWS D1.1 "Structural Welding Code—Steel."
  - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone rectification.

- B. Qualify welding processes and welding operators according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."
- C. NFPA Compliance: Comply with NFPA 13 for hangers and supports used as components of fire protection systems.
- D. Listing and Labeling: Provide hangers and supports that are listed and labeled as defined in NFPA 70, Article 100.
  - 1. Listing and labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

## **PART 2 – PRODUCTS**

### **2.1 MANUFACTURED UNITS**

- A. Hangers, Supports, and Components: Factory-fabricated according to MSS SP-58.
  - 1. Components include galvanized coatings where installed for piping and equipment that will not have a field-applied finish.
  - 2. Pipe attachments include nonmetallic coating for electrolytic protection where attachments are in direct contact with copper tubing.
- B. Thermal-Hanger Shield Inserts: 100-psi (690kPa) average compressive strength, waterproofed calcium silicate, encased with sheet metal shield. Insert and shield cover entire circumference of pipe and are of length indicated by manufacturer for pipe size and thickness of insulation.
- C. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Fasteners for fire protection systems include UL listing and FM approval.

### **2.2 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36/A 36/M, steel plates, shapes, and bars, black and galvanized.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Grout: ASTM C 1107, Grade B, non-shrink, nonmetallic.
  - 1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic-cement-type grout that is nonstaining, noncorrosive, nongaseous and is recommended for both interior and exterior applications.
  - 2. Design mix: 5000-psi (34.5Mpa), 28-day compressive strength.
  - 3. Water: Potable
  - 4. Packaging: Pre-mixed and factory-packaged.

## **PART 3 – EXECUTION**

### 3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger requirements are specified in the Section specifying the equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping specification Sections.

### 3.2 HANGER AND SUPPORT INSTALLATION

- A. General: Comply with MSS SP-69 and SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible.
- C. Install supports with maximum spacing complying with MSS SP-69.
- D. Where pipes of various sizes are supported together to trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
- E. Install building attachments within concrete or to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert to forms. Install reinforcing bars through openings at top if inserts.
- F. Install concrete inserts in new construction prior to placing concrete.
- G. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4 inches (100mm) thick.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- I. Heavy-Duty-Steel Trapezes; Field-fabricate from ASTM A 36 steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.
- J. Support fire protection systems piping independent of other piping.
- K. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so that maximum pipe deflections allowed by ASME B31.9 "Building Services Piping" is not exceeded.
- N. Insulated Piping: Comply with the following installation requirements.
  - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
  - 2. Saddles: Install protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments if insulation that match adjoining pipe insulation.
  - 3. Shields: Install MSS Type 40, protective shields on cold piping with vapor barrier. Shields span an arc of 180 degrees (3.1 rad) and have dimensions in inches not less than the following:
  - 4. Insert Material: Length at least as long as the protective shield.
  - 5. Thermal-Hanger Shields: Install with insulation of same thickness as piping.

### 3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make a smooth bearing surface.

### 3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal-arc welding, appearance and quality of welds, methods used in correcting welding work, and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so that no roughness shows after finishing, and so that contours of welded surfaces match adjacent contours.

### 3.5 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.



### 3.6 PAINTING

- A. Touching Up: Clean field welds and abraded areas of shop paint and paint exposed areas immediately after erection of hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05mm).
  
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**End of Section 220509**

**SECTION 220523  
VALVES**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes general duty valves common to several mechanical piping systems.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1 Special purpose valves are specified in Division 15 piping system Sections.
  - 2 Valve tags and charts are specified in Division 15 Section "Mechanical Identification."

**1.3 SUBMITTALS**

- A. General: Submit each item in this article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each valve type. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions. Include list indicating valve and its application.
- C. Maintenance data for valves to include in the operation and maintenance manual specified in Division 1. Include detailed manufacturer's instructions on adjusting, servicing, disassembling, and repairing.

**1.4 QUALITY ASSURANCE**

- A. Single-Source Responsibility: Comply with the requirements specified in Division 1 Section "Materials and Equipment," under "Source Limitations" Paragraph.
- B. ASME Compliance: Comply with ASME B31.9 for building services piping and ASME B31.1 for power piping.
- C. MSS Compliance: Comply with the various MSS Standard Practice documents referenced.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
  2. Protect threads, flange faces, grooves, and weld ends.
  3. Set ball and plug valves open to minimize exposure of functional surfaces
- B. Use the following precautions during storage:
1. Maintain valve end protection
  2. Store indoors and maintain valve temperature higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

## **PART 2 – PRODUCTS**

### **2.1 MANUFACTURER**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
1. Ball Valves
    - a. Hammond Valve Corporation
    - b. Milwaukee Valve Company, Inc.
    - c. Stockham Valves & Fittings, Inc.
  2. Plug Valves:
    - a. Homestead
    - b. Rockwell International
    - c. Stockham Valves & Fittings, Inc.
  3. Swing Check Valves:
    - a. Hammond Valve Corporation.
    - b. Milwaukee Valve Company, Inc.
    - c. Stockham Valves & Fittings, Inc.
  4. Butterfly Valves:
    - a. Hammond Valve Corporation.
    - b. Milwaukee Valve Company, Inc.
    - c. Stockham Valves & Fittings, Inc.

### **2.2 BASIC COMMON FEATURES**

- A. Pressure and Temperature Ratings: As indicated in the "Application Schedule" of Part 3 of this Section and as required to suit system pressures and temperatures.
- B. Sizes: Same size as upstream pipe, unless otherwise indicated.
- C. Operators: Use specified operators, except provide the following special operator features:
1. Lever Handles: For quarter-turn valves 6 inches (DN150) and smaller, except for plug valves, which shall have square heads. Furnish Owner with 1 wrench for every 10 plug valves.
- D. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.

- E. Bypass and Drain Connections: Comply with MSS SP-45 bypass and drain connections.
- F. Threads: ASME B1.20.1
- G. Flanges: ASME B16.1 for cast iron, ASME B16.5 for steel, and ASME B16.24 for bronze valves.
- H. Solder Joint: ASME B16.18
  - 1. Caution: Where soldered end connections are used, use solder having a melting point below 840 deg F (450 C) for gate, globe, and check valves; below 421 deg f (216 C) for ball valves.

### 2.3 BALL VALVES

- A. Ball valves, 4 Inches (DN100) and Smaller: MSS SP-110, Class 150, 600-psi (4140-kPa) CWP, ASTM B 584 bronze body and bonnet, 20piece construction; chrome-plated brass ball, standard port for ½-inch (DN20) valves and larger: blowout proof; bronze or brass stem; Teflon seats and seals; threaded end connections:
  - 1. Operator: Vinyl-covered steel lever handle.
  - 2. Stem Extension: For valves installed in insulated piping.
  - 3. Memory Stop: For operator handles.

### 2.4 PLUG VALVES

- A. Plug Valves: MSS SP-78, 175-psi (1200-kPa) CWP, ASTM A 126 cast-iron body and bonnet, cast-iron plug, Buna N, Viton, or Teflon packing, threaded end connections:
  - 1 Operator: Square head with 1 wrench for every 10 valves.

### 2.5 CHECK VALVES

- A. Swing Check Valves, 2-1/2" (DN65) and smaller; MSS SP-80; Class 125, 200-psi (1380-kPa) CWP, or Class 150, 300-psi (2070)kPa) CWP; horizontal swing, Y-pattern, ASTM B 62 cast-bronze body and cap, rotation bronze disc with rubber seat or composition seat, threaded or soldered end connections.
- B. Swing Check Valves; 3 Inches (DN80 and larger; MSS SP-71, Class 125, 200-psi (1380-kPa) CWP, ASTM A 126 cast-iron body and bolted cap, horizontal-swing bronze disc, flanged or grooved end connections.

### 2.6 BUTTERFLY VALVES

- A. Butterfly Valves: MSS SP-67, 200-psi (1380kPa) maximum pressure differential, ASTM A 126 cast-iron body and bonnet, extended neck stainless-steel stem, field replaceable EPDM or Buna N sleeve and stem seals, water, or lug style:
  - 1. Disc type: Nickel-plated ductile iron.
  - 2. Operator for Sizes 2 Inches (DN50) to 6 Inches (DN150): Standard lever handle.

### **PART 3 – EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine piping system for compliance with requirements for installation tolerances and other conditions affecting performance of valves. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- C. Operate valves from fully open to fully closed positions. Examine guides and seats made accessible by such operation.
- D. Examine threads on valve and mating pipe for form and cleanliness.
- E. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedom from defects and damage.
- F. Do not attempt to repair defective valves; replace with new valves.

#### **3.2 INSTALLATION**

- A. Install valves as indicated, according to manufacturer's written instructions.
- B. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties.
- C. Install valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.
- D. Locate valves for easy access and provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above the center of the pipe.
- F. Install valves in a position to allow full stem movement.
- G. Install swing check valves in horizontal position with hinge pin level.

### 3.3 SOLDERED CONNECTIONS

- A. Cut tube square and to exact lengths.
- B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket.
- C. Apply proper soldering flux in an even coat to inside of valve socket and outside of tube.
- D. Insert tube into valve socket, making sure the end rests against the shoulder inside the valve. Rotate tube or valve slightly to ensure even distribution of the flux.
- E. Apply heat evenly to outside of valve around joint until solder melts on contact. Feed solder until it completely fills the joint around tube. Avoid hot spots or overheating valve. Once the solder starts cooling remove excess amounts around the joint with a cloth or brush.

### 3.4 THREADED CONNECTIONS

- A. Note the internal length of threads in valve ends and proximity of valve internal seat or wall to determine how far pipe should be threaded into valve.
- B. Align threads at point of assembly
- C. Apply appropriate tape or thread compound to the external pipe threads, except where dry seal threading is specified.
- D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

### 3.5 FLANGED CONNECTIONS

- A. Align flange surfaces parallel.
- B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.
- C. For dead-end service, butterfly valves require flanges both upstream and downstream for proper shutoff.

### 3.6 VALVE END SELECTION

- A. Select valves with the following ends or types of pipe/tube connections:
  - 1. Copper Tube Size, 2-1/2 Inches (DN65) and Smaller: Soldered
  - 2. Steep Pipe Sizes, 2-1/2 Inches (DN65) and Smaller: Threaded
  - 3. Steep Pipe Sizes, 3 Inches (DN80) and Larger: Flanged.

### 3.7 APPLICATION SCHEDULE

- A. General Application: Use gate, ball, and butterfly valves for shutoff duty; ball, and butterfly for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.
- B. Domestic Water Systems: Use the following valve type:
  - 1. Ball Valves: Class 150, 600-psi (4140-kPa) CWP, with stem extension.
  - 2. Butterfly Valves: Nickel-plated ductile iron; EPDM or Buna N sleeve and stem seals.
  - 3. Bronze Swing Check: Class 125, with rubber seat.
  - 4. Natural Gas Systems: Use the following valve type:
    - a. Plug Valves: See Section 15488 Natural Gas Piping Systems for details.

### 3.8 ADJUSTING

- A. Adjust or replace packing after piping systems have been tested and put into service, but before final adjusting and balancing. Replace valves if leak persists.

End of Section 220523

**SECTION 220700  
PLUMBING INSULATION**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide thermal insulation for piping.
- B. Provide equipment, materials, accessories, and labor necessary to install mechanical insulation described in these Specifications.

**1.2 QUALITY ASSURANCE**

- A. Provide mechanical insulation in accordance with:
  - 1. 2006 International Mechanical Code with 2007 Georgia Amendments
  - 2. SMACNA Sheet Metal and Air Conditioning Contractors National Association
  - 3. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
  - 4. NFPA
    - a. NFPA 255 Method of Test of Surface Burning Characteristics of Building Materials
  - 5. UL
    - a. UL 723 Test for Surface Burning Characteristics of Building Materials
  - 6. ASTM
    - a. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
- B. Provide mechanical insulation products with a Flame Spread Rating not exceeding 25 and a Smoke Developed Rating not exceeding 50.

**1.3 SUBMITTALS**

- A. Shop drawings and catalog data
  - 1. The required number of copies of shop drawings shall be as indicated in Section 01 30 00. Refer to Division 1, General Requirements Paragraph 7 for submittal procedure.
  - 2. Shop drawings, catalogue specification data and capacity ratings of the following equipment shall be submitted to the Engineer for approval prior to purchase or installation of work:
    - a. Pipe insulation.
    - b. Fittings and valve insulation.
  - 3. Engineers shall review shop drawings for general conformance with the design concept and contract documents. Markings or comments shall not



be construed as relieving the Contractor from compliance with the project plans and specifications, nor departures therefrom. The Contractor remains responsible for details and accuracy.

4. Particular attention shall be taken to steel supports and hangers furnished under other sections of the specification. Adaptation, modification, or additions are the responsibility of and to be paid for by the Contractor and shall be approved by the Engineer before execution. Openings in the building required for the execution of the contract is the responsibility of the Contractor to coordinate.

#### **1.4 COORDINATION OF CONTRACTORS**

- A. The Contractor shall give full cooperation to the Builder and the contractors of other trades, and shall furnish information necessary to permit the work in other sections to be installed satisfactorily and with least possible interference or delay.
- B. In areas where conflicts occur, if so directed by the Engineer, the Contractor shall prepare composite sketches at a suitable scale, not less than 1/4 inch = 1 foot 0 inches, clearly showing how his work is to be installed in relation to the work of other trades.
- C. In certain areas, due to construction conditions, work in other sections may be required to use common openings in beams, chases, shafts and sleeves for the passage of conduits, raceways, piping, ductwork and other materials.
- D. Before installing work from this section, see that it does not interfere with the clearances required for finished columns, partitions or walls, as shown on the contract architectural or structural drawings showing floor plans, roof plans and details.
- E. Plumbing insulation work that is installed under this contract which interferes with the architectural design or building structure, shall be changed as directed by the Engineer, and cost incidental to such changes shall be paid by the Contractor.

#### **1.5 OBTAINING AND GIVING INFORMATION**

- A. The Contractor shall obtain detailed information from the Manufacturers of insulation which he is to furnish as to the proper method of installing and connecting same. The contractor shall obtain required information from other sections necessary to facilitate and complete the Mechanical insulation installation.
- B. The Contractor shall keep fully informed as to the shape, size and position of openings required for materials under this Section. He shall provide all insulation materials necessary to complete the work under this Section.

#### **1.6 CLEANING AND ADJUSTING**

- A. After the completion of the work, all insulation materials shall be cleaned in accordance with the finish of the material. Insulation systems shall be thoroughly adjusted for intended operation. Submit in writing to the Engineer upon completion of this work that it is completed and ready for use.

## 1.7 JOB CONDITIONS

- A. Deliver material to job site in original non-broken labeled factory packaging. Store materials in dry location, on wood pallets.
- B. Perform work at ambient and equivalent temperatures as recommended by the adhesive manufacturer.

## 1.8 SCAFFOLDING

- A. Scaffolding shall be supplied as required by the Contractor.

## 1.9 GUARANTEE

- A. Guarantee for work furnished and installed under this section shall be as specified in Division 1.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General
  - 1. Provide insulation in accordance with the Council of American Building Officials Model Energy Code and the Georgia State Energy Code
- B. Acceptable manufacturers
  - 1. Certainteed
  - 2. Knauf
  - 3. Manville
  - 4. Owens-Corning
  - 5. Armstrong
  - 6. Foamglass

### 2.2 PIPING INSULATION

- A. Materials
  - 1. Foam Glass Insulation  
Asphalt Bonded, Single or multiple layer with hot asphalt  
(ASTM) D 312, Type III, in all joints  
-290... F (-179... C) to 250... F (121... C)

2. Heavy density fiberglass with thermal efficiency conforming to ASTM C 335-89 and the applicable energy code.
  3. Manufacturer: Foamglass
- B. Description
1. Insulate exterior heating hot water/chilled water piping with foam glass insulation. Recommended supplier source or equivalent source.
  2. Insulate interior heating hot water/chilled water piping with fiber glass insulation.
  3. The piping, fittings and valves shall be insulated with the following minimum thicknesses: hot water/chilled water piping 1¼" and smaller – 1" thick. Piping sizes 1½ " and larger – 1½" thick.
  4. Manufacturer: Foamglass
- C. Fitting And Valves Insulation
1. Premolded fitting covers are required on exposed piping and valves, mitered joints are acceptable only on concealed piping.
  2. Fitting covers shall be molded with factory cut insulation inserts of equal thickness and identical in composition to the adjacent pipe premolded insulation. Covers shall be Zeston covering or equal.
  3. Materials, including vapor barrier jackets, glass cloth jackets and adhesives, shall be fire retardant.
  4. Insulation shall be Schuller Manville Micro-Lok 850 AP or approved equal.
- D. Finish
1. For foamglass insulation, use aluminum jacket on pipe and fittings.
    - A. Concealed: Vapor barrier jacket on water piping except where flexible tubing insulation is used which required no vapor barrier. Pre-sized glass cloth jacket shall be used on hot water piping. Fittings shall be finished with ASJ Fiberglass 25 All Service Jacket pasted canvas or pre-sized glass cloth jacket.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Insulation shall be installed in strict accordance with the manufacturers recommendations and shall be applied by a qualified insulation Installer.
- B. Insulation shall not be applied on piping until the piping has been thoroughly cleaned, tested and accepted as tight.

#### **3.2 INSTALLATION**

- A. Do not use staples to secure insulation.
- B. Install insulation on clean, dry surfaces.
- C. Continue insulation through wall and ceiling openings and sleeves.

- D. Terminate insulation at flexible connections at equipment.

### **3.3 PIPING**

- A. Pipe insulation, where vapor barrier jacket is required, shall be installed with vapor barrier jackets drawn tight and firmly sealed to assure a positive vapor-seal. End joints shall be covered with 4 inch wide butt strips of material identical to vapor barrier jackets, and shall be drawn tight and securely sealed. The use of staples or bands to secure insulation where vapor barrier jacket is required will not be acceptable. Pipe insulation where no vapor barrier is required shall be secured with flare type staples.

### **3.4 PIPE FITTINGS AND VALVES**

- A. Cement or molded insulation shall be applied on fitting and valve bodies and shall be the same thickness as adjacent covering and finished neatly to match the adjacent pipe insulation.

**End of Section 220523**

**SECTION 221000  
PLUMBING PIPING**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes plumbing piping systems to a point 5 feet outside the building. Systems include the following:
  - 1. Potable water distribution, including cold- and hot-water supply.
  - 2. Drainage and vent systems, including sanitary and storm.
- B. Related Sections: The following sections contain requirements that relate to this Section:
  - 1. Division 23 Section "Basic Mechanical Materials and Methods" for piping joining materials, joint construction, and installation requirements not specified in this Section.
  - 2. Division 22 Section "Plumbing Specialties" for plumbing system components.

**1.3 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, except where indicated otherwise:
  - 1. Water Distribution Systems, Below Ground: 150 psig.
  - 2. Water Distribution Systems, Above Ground: 125 psig.
  - 3. Soil Waste, and Vent Systems: 10-foot head of water.
  - 4. Storm Drainage Systems: 10-foot head of water.

**1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Water samples, test results, and reports specified in "Field Quality Control" and "Cleaning" Articles.
- C. Coordination drawings, drawn accurately to scale and coordinating penetrations.

**1.5 QUALITY ASSURANCE**

- A. Comply with the provisions of ASME B31.9 "Building Services Piping" for materials, products, and installation.

- B. Provide listing/approval stamp, label, or other marking on piping made to specified standards.

## **PART 2 – PRODUCTS**

### **2.1 PIPES AND TUBES**

- A. General: The application of the following pipe, tube, and fitting materials and joining methods required for plumbing piping systems are indicated in Part 3 Article "Pipe and Fittings Applications."
- B. Hard Copper Tube: ASTM B 88, Types K, L, water tube, drawn temper.
- C. Copper Drainage Tube: ASTM B 306, Type DEV, drawn temper.
- D. Steel Pipe: ASTM A 53, Type S, Grade A, Schedule 40, seamless, galvanized, plain ends.
  - 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53 or ASTM A 106, Schedule 40, Seamless, galvanized, carbon-steel pipe.
- E. Ductile-Iron Pipe: AWWA C151, Classes 50 and 51, mechanical joint and punch-on joint, with AWWA C104 cement-mortar lining.
- F. Flanged Ductile-Iron Pipe: AWWA C115, ductile-iron barrel, Class 150 or 300 iron-alloy threaded flanges, with AWWA C104 cement-mortar lining.
- G. Hubless, Cast-Iron Soil Pipe: CISPI 301.

### **2.2 PIPE FITTINGS AND TUBE FITTINGS**

- A. Wrought-Copper, Solder-Joint Pressure Fittings: ASME B16.22.
- B. Cast-Copper-Alloy, Solder-Joint Pressure Fittings: ASME B16.18.
- C. Wrought-Copper, Solder-Joint, DWV Drainage Fittings: ASME B16.29.
- D. Cast-Copper-Alloy, Solder-Joint, DWV Drainage Fittings: ASME B16.23.
- E. Bronze Flanges: ASME B16.24, Classes 150 and 300.
- F. Copper Unions: ASME B16.18, cast-copper-alloy body, hexagonal stock, with ball-and-socket joint, metal-to-metal bronze seating surfaces, and solder-joint, threaded, or solder-joint and threaded ends.
  - 3 Threaded Ends: Threads conforming to ASME B1.20.
- G. Mechanically Formed Outlets: Manufacturer's standard written procedure for forming tee-branch outlet from pipe and tube.
- H. Malleable-Iron Unions: ASME B16.39, Classes 150 and 300, hexagonal stock, with ball-and-socket joint, metal-to-metal bronze seating surfaces, and female threaded ends having threads conforming to ASME B1.20.1.

- I. Galvanized, Cast-Iron Threaded Fittings: ASME B16.4, Classes 125 and 250, standard pattern, with threads conforming to ASME B1.20.1.
- J. Galvanized, Cast-Iron Threaded Drainage Fittings: ASME B16.12, recessed drainage pattern, with threads conforming to ASME B1.20.1.
- K. Cast-Iron Threaded Flanges: ASME B16.1, Classes 125 and 300.
- L. Ductile-Iron and Gray-Iron Gasketed Fittings: AWWA C110 standard pattern of ductile-iron AWWA C153 compact pattern, 250 psig minimum pressure rating, with AWWA C104 cement-mortar lining and AWWA C111 rubber gaskets.
- M. Ductile-Iron and Gray-Iron Flanged Fittings AWWA C110, 250-psig minimum pressure rating, with AWWA C104 cement-mortar lining.
- N. Ductile-Iron Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends conforming to AWWA C110 or AWWA C153.
- O. Polyethylene Encasement: AWWA C105, mil minimum thickness tube or sheet.
- P. Hubless, Cast-Iron Soil Pipe Fittings: CISPI 301.

### 2.3 JOINING MATERIALS

- A. Solder, brazing, and welding filler metals are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Cast-Iron Soil Pipe and Fittings: ASTM C564 neoprene rubber gaskets and lubricant.
- C. Ductile-Iron Pipe and Ductile-Iron or Cast-Iron Fittings: The following materials apply:
  - 1. Push-On Joints: AWWA C111 rubber gaskets and lubricant.
  - 2. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
  - 3. Flanged Joints: AWWA C115 ductile-iron or gray-iron pipe flanges, rubber gaskets, and high-strength steel bolts and nuts.
- D. Stainless Steel, Heavy-Duty Couplings for Hubless Cast-Iron Soil Pipe and Fittings: ASTM C 564 neoprene sealing gasket, with Type 304 stainless steel housing or shield and stainless-steel clamps. Couplings shall be 3 inches wide in sizes 1-1/2 to 4 inches and 4 inches wide in sizes 5 to 10 inches.
- E. Sleeve-Type Couplings for Plain-End, Nonpressure System pipe: Rubber or elastomeric sleeve and stainless steel band assembly, fabricated to match outside diameters of pipes to be joined.
  - 1. Sleeves: ASTM C 564, rubber for cast-iron soil pipe and ASTM F477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2. Bands: Stainless steel, one at each pipe insert.
- F. Gasket-Type Couplings for Plain-End, Nonpressure System Pipe: Rubber or elastomeric compression gasket, made to match pipe inside diameter or hub and adjoining pipe outside diameter.
1. Gaskets: ASTM C 564, rubber for cast-iron soil pipe and ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

## 2.4 VALVES

- A. Refer to Division 15 Section "Valves" for ball, valves.
- B. Refer to Division 15 Section "Plumbing Specialties" for special-duty valves.

## **PART 3 – EXECUTION**

### 3.1 EXCAVATION

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

### 3.2 REPARATION OF FOUNDATION FOR BURIED PIPING

- A. Grade trench bottom to provide smooth, firm, stable, and rock-free foundation throughout length of piping.
- B. Remove unstable, soft, and unsuitable materials at surface on which piping is to be laid and backfill with clean sand or pea gravel to indicated level.
- C. Shape bottom of trench to fit bottom of piping. Fill unevenness with tamped-sand backfill. Dig bell holes at each pipe joint to relieve balls of loads and to ensure continuous bearing of pipe barrel on foundation.

### 3.3 PIPE AND FITTINGS APPLICATIONS

- A. General: Use pipe, tube, fittings, and joining methods for piping systems according to the following applications.
- B. Water Distribution Piping Below Ground: Use the following:
  1. 2-1/2 to 3-1/2 Inches: 3- or 4-inch size, ductile-iron pipe, ductile-iron or gray-iron fittings or ductile-iron compact fittings, rubber gaskets, and push-on or mechanical joints.
  2. 2 Inches and Smaller: Soft copper tube, Type K, cast-copper-alloy solder-joint pressure fittings, and soldered joints with Alloy Sn95 solder.
- C. Water Distribution Piping Above Ground: Use the following:
  1. 3-1/2 Inches and Smaller: Hard copper tube, Type L; wrought-copper or cast-copper-alloy pressure fittings; copper unions; bronze flanges; and solder joints with Alloy Sn95 solder.



- a. Fitting Option: Mechanically formed outlets, brazing filler alloy, and brazed joints.
- D. Soil, Waste, and vent Piping Below Ground: Use the following:
1. 5 to 10 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; cast-iron, heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.
  2. 2 to 4 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; cast-iron heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.
  3. 1-1/2 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; cast-iron, heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.
- E. Soil, Waste, and Vent Piping Above Ground: Use the following:
1. 2 to 4 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; stainless-steel, cast-iron, or FM-type heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.
  2. 1-1/2 Inches: Hubless cast-iron soil pipe, hubless cast-iron soil pipe fittings, cast-iron heavy-duty couplings for hubless cast-iron soil pipe and fittings, and hubless joints.
  3. Vent Piping Option: Type DWV. Copper with wrought or cast copper alloy solder fittings for 4" and smaller.
- F. Storm Drainage Piping Below Ground: Use the following:
1. 5 to 10 Inches: Hubless cast-iron soil pipe, hubless cast-iron soil pipe fittings, cast-iron heavy-duty couplings for hubless cast-iron soil pipe and fittings, and hubless joints.
  2. 2 to 4 Inches: Hubless cast-iron soil pipe, hubless cast-iron soil pipe fittings, cast-iron heavy-duty couplings for hubless cast-iron soil pipe and fittings, and hubless joints.
- G. Storm Drainage Piping Above Ground: Use the following:
1. 5 to 10 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; stainless-steel, cast-iron, or FM-type heavy-duty couplings for hubless cast-iron soil pipe and fittings; and hubless joints.
  2. 2 to 4 Inches: Hubless cast-iron soil pipe; hubless cast-iron soil pipe fittings; stainless steel, cast-iron or FM-type heavy-duty couplings for hubless cast-iron soil pipe and fittings.
- H. Sump Pump Discharge: Use the following:
1. ASTM A 53 galvanized steep pipe, Sch. 40 with galvanized cast iron drainage pattern fittings, ASME B 16.12.

### 3.4 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Shutoff Duty: Use ball valves.
  2. Throttling Duty: Use ball valves.

### **3.5 PIPING INSTALLATION, GENERAL**

- A. Basic piping installation requirements are specified in Division 15 Section "Basic Mechanical Materials and Methods."

### **3.6 SERVICE ENTRANCE PIPING**

- A. Extend water distribution piping and connect to water service piping of size and in location indicated for service entrance to building. Water service piping is specified in Division 2.
- B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside building at water service entrance.
- C. Ductile-Iron Water Service Pipe: Comply with AWWA C600. Install buried pipe inside building between shutoff valve, wall and floor penetrations, and point 5 feet outside building, with restrained joints, including anchoring pipe to wall or floor. Provide supports (thrusts blocks) at vertical and horizontal offsets.
- D. Extend building storm drain piping and connect to building storm sewer piping (10 5 ft. outside building), of size and in location indicated for service entrance to building. Install cleanout and extension to grade at connection of building storm drain and building storm sewer. Storm sewerage piping is specified in separate Section of Division 2.
- E. Extend building sanitary drain piping and connect to sanitary sewer piping (to 5 ft. outside building), of size and in location indicated for service entrance to building. Install cleanout and extension to grade at connection of building sanitary drain and building sanitary sewer. Sanitary sewerage piping is specified in separate Section of Division 2.
- F. Install sleeve and mechanical sleeve seal at service penetrations through foundation wall for watertight installation.

### **3.7 WATER DISTRIBUTION PIPING INSTALLATION**

- A. Install piping with 1/32-inch-per-foot (1/4 percent) slope downward toward drain.

### **3.8 DRAINAGE AND VENT PIPING INSTALLATION**

- 2. Install cast-iron soil pipe and cast-iron soil fittings according to CISPI 1990 revised and edited edition of "Cast Iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- 3. Make changes in direction for drainage and vent piping using appropriate Y branches, Y branches with 1/8 bends, and long-sweep 1/4, 1/5, 1/6, 1/8, and 1/16 bends. Sanitary tees and short-sweep quarter bends may be used on vertical stacks of drainage lines where change in direction of flow is from horizontal to vertical. Use long-turn double-y-branch and 1/8-bend fittings where 2 fixtures are installed back to back or side by side and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. Make no change in direction of

flow greater than 90 degrees. Where different sizes of drainage pipes and fittings are connected, use proper size standard increases and reducers. Reduction of the size of drainage piping in the direction of flow is prohibited.

- 4 Lay buried building drains beginning at low point of each system, true to grades and alignment indicated, with unbroken continuity of invert. Place hub or bell ends of piping facing upstream. Install required gaskets according to manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Maintain swab or drag in piping and pull past each joint as completed.
- 5 Install drainage and vent piping at the following minimum slopes, except where another slope is indicated:
  1. Sanitary building Drain: ¼-inch per foot (2 percent) for piping 3 inches and smaller; 1/8 inch per foot (1 percent) for piping 4 inches and larger.
  2. Horizontal Sanitary Drainage Piping: ¼-inch per foot (2 percent).
  3. Storm Building Drain: 1/8 inch per foot (1 percent).
  4. Horizontal Storm Drainage Piping: ¼-inch per foot (2 percent).
  5. Vent Piping: 1/8 inch per foot (1 percent).
- 6 Sleeves are not required for cast iron soil pipes passing through concrete slab, without membrane waterproofing, on grade.

### 3.9 JOINT CONSTRUCTION

- A. Basic piping joint construction is specified in Division 15 Section "Basic Mechanical Materials and Methods."
- B. Cast Iron Soil Pipe and Cast Iron Soil Pipe Fitting Joints: Make joints according to recommendations in CISPI 1990 revised and edited edition of "Cast iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  1. Hubless Joint: Make with neoprene gasket and sleeve or clamp.

### 3.10 ROUGHING-IN FOR WATER METER

- A. Install roughing-in piping and plumbing specialties specified in Division 15 Section "Plumbing Specialties" for water meter installation according to utility company's instructions and requirements.

### 3.11 INSTALLATION OF VALVES

- A. Sectional Valves: Install sectional valve close to main on each branch and riser serving 2 or more plumbing fixtures or equipment connections and where indicated. Use ball valves for sectional valves 2 inches and smaller. Use butterfly valves for sectional valves 2-1/2 inches and larger.
- B. Shutoff Valves: Install shutoff valves on inlet to each plumbing equipment item, on each supply to each plumbing fixture not having stops on supplies, and elsewhere as indicated. For shutoff valves 2 inches and smaller, use ball valves; for shutoff valves 2-1/2 inches and larger, use butterfly valves.

- C. Drain Valves: Install drain valves specified in Division 15 Section "Plumbing Specialties" on each plumbing equipment item located to drain equipment for service and repair. Install drain valve at base of each riser, at low points of horizontal runs, and where required to drain water distribution piping system.
  - 1. Install hose-end drain valves at low points in water mains, risers, and branches.
  - 2. Install stop and waste drain valves where indicated.
- D. Check Valves: Install swing check valves where indicated. Use MSS SP-80, Class 125, cast-bronze for 2 inch and smaller; MSS SP-71, Class 125 cast iron body for 2-1/2-inch and larger piping.

### 3.12 HANGERS AND SUPPORTS INSTALLATION

- 1. Hanger and support devices are specified in Division 15 Section "Hangers and Supports."
- 2. Install hangers for horizontal piping with following maximum spacing and minimum rod sizes:
  - a. Support vertical steel pipe and copper tube at each floor.
- 3. Conform to table below for maximum spacing of supports:
- 4. Pipe attachments: Install the following:
  - 1. Riser Clamps: MSS Type 8 or Type 42 for vertical runs.
  - 2. Adjustable Steel Cleaves Hangers: MSS Type 1 for individual straight horizontal runs 100 feet and less.
  - 3. Adjustable Roller Hangers: MSS Type 43 for individual straight horizontal runs longer than 100 feet.
- 5. Support cast-iron soil pipe and fittings not included in table, at maximum horizontal spacing of 5 feet, except 10-foot sections of pipe may be supported at 10-foot spacing and at maximum vertical spacing of 15 feet.

### 3.13 CONNECTIONS

- A. Supply runouts to Fixtures: Install Hot-and cold-water supply piping runouts of sizes indicated, but not smaller than required by plumbing code fixtures.
- B. Drainage Runouts to Fixtures: Provide drainage and vent piping runouts, with approved trap, of sizes indicated, but not smaller than required by plumbing code, to plumbing fixtures and drains.
- C. Locate drainage piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.
- D. Mechanical Equipment Connections: Connect hot-and cold-water supply piping system to mechanical equipment as indicated. Provide shutoff valve and union for each connection; provide drain valve on drain connection. Use flanges instead of unions for connections 2-1/2 inches and larger.

### 3.14 FIELD QUALITY CONTROL

- A. Inspect water distribution piping as follows:
1. Do not enclose, cover, or put into operation, water distribution piping system until it has been inspected and approved by the authority having jurisdiction.
  2. During progress of the installation, notify the plumbing official having jurisdiction at least 24 hours prior to time inspection must be made. Perform tests specified below in presence of the plumbing official.
    - a. Roughing-In Inspection: Arrange for inspection of piping system before concealed or closed-in after system roughing-in and prior to setting fixtures.
    - b. Final Inspection: Arrange for final inspection by plumbing official to observe tests specified below and to ensure compliance with requirements of plumbing code.
  3. Re-inspections: When a plumbing official finds that piping system will not pass test or inspection, make required corrections and arrange for re-inspection by the plumbing official.
  4. Reports: Prepare inspection reports signed by plumbing official.
- B. Test water distribution piping as follows:
1. Test for leaks and defects in new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired. If testing is performed in segments submit separate report for each test, complete with diagram of portion of system tested.
  2. Leave uncovered and unconcealed in new, altered, extended, or replaced water distribution piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved for testing.
  3. Cap and subject the piping system to a static water pressure of 50 psig above the operating pressure without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for 4 hours. Leaks and loss in test pressure constitute defects that must be repaired.
  4. Repair leaks and defects with new materials and re-test system or portion thereof until satisfactory results are obtained.
  5. Prepare reports for tests and required corrective action.
- C. Inspect drainage piping as follows:
1. Do not enclose, cover, or put into operation drainage and vent piping system until it has been inspected and approved by the authority having jurisdiction.
  2. During progress of installation, notify the plumbing official having jurisdiction at least 24 hours prior to time such inspection must be made. Perform tests specified below in presence of the plumbing official.
    - a. Roughing-In Inspection: Arrange for inspection of piping system after system roughing-in, before concealing, and prior to setting fixtures.
    - b. Final Inspection: Arrange for final inspection by plumbing official to observe tests specified below and to ensure compliance with requirements of plumbing .
  3. Re-inspections: make required corrections and arrange for re-inspection by plumbing official when piping system fails to pass test or inspection.

4. Reports: Prepare inspection reports signed by the plumbing official.
- D. Drainage and Vent Piping system Tests: Test drainage and vent systems according to procedures of authority having jurisdiction or, in absence of published procedure, as follows:
  1. Test for leaks and defects in new drainage and vent piping systems and parts of existing systems that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with a diagram of the portion of the system tested.
  2. Leave uncovered and unconcealed in new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose for testing work that has been covered or concealed before it has been tested and approved.
  3. Rough Plumbing Test Procedure: Except for outside leaders and perforated or open-jointed drain tile, test piping of plumbing drainage and venting systems on completion of roughing-in piping installation. Tightly close all openings in piping system and fill with water to point of overflow, but not less than 10 feet head of water. Water level shall not drop during the period from 15 minutes before inspection starts through completion of inspection. Inspect joints for leaks.
  4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove gaslight and watertight. Plug stack opening on roof and building drain where it leaves the building and introduce air into the system equal to pressure of 1-inch water column. Use a U tube or manometer inserted in the trap of a water closet to measure this pressure. Air pressure shall remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
  5. Repair leaks and defects using new materials and re-test system or portion thereof until satisfactory results are obtained.
  6. Prepare reports for tests and required corrective action.

### 3.15 CLEANING

- A. Clean and disinfect water distribution piping as follows:
  1. Purge new potable water distribution piping systems and parts of existing potable water systems that have been altered, extended, or repaired prior to use.
  2. Use purging and disinfection procedure prescribed by authority having jurisdiction or, if a method is not prescribed by that authority, the procedure described in either AWWA C651 or AWWA C652 or as described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill system or part thereof with water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) and allow to stand for 24 hours.
    - c. Drain system or part thereof of precious solution and refill with water/chlorine solution containing at least 200 parts per million of chlorine. Isolate and allow to stand for 3 hours.

- d. Flush system with clean, potable water until chlorine does not remain in water coming from system following allowed standing time.
  - e. Submit water samples in sterile bottles to authority having jurisdiction. Repeat procedure if biological examination made by the authority shows evidence of contamination.
- B. Prepare and submit reports for purging and disinfection activities.
- C. Clean interior of piping system. Remove dirt and debris as work progresses.

### 3.16 COMMISSIONING

- A. Fill water systems. Check compression tanks to determine that they are not air bound and that system is completely full of water.
- B. Before operation systems, perform these steps:
- 1. Close drain valves, hydrants, and hose bibs.
  - 2. Open shutoff valves to full open position.
  - 3. Open throttling valves to proper setting.
  - 4. Remove plugs used during testing of piping systems and plugs used for temporary sealing of piping during installation.
  - 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
  - 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used, clean, and ready for use.
- C. Check plumbing equipment and verify proper setting, adjustments, and operation. Do not operate water heaters before filling with water.
- D. Check plumbing specialties and verify proper settings, adjustments, and operation.

### 3.17 PROTECTION

- 1. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- 2. Place plugs in ends of uncompleted piping at end of day or when work stops.

**End of Section 221000**

**SECTION 221113  
FACILITY WATER DISTRIBUTION PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All construction methods and materials shall comply with local, state and federal standards.

**1.2 SUMMARY**

- A. This Section includes water-distribution piping and related components outside the building for water service mains.
- B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

**1.3 DEFINITIONS**

- A. PVC: Polyvinyl chloride plastic.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

**1.5 QUALITY ASSURANCE**

- A. Regulatory Requirements:
  - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
  - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
- B. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- C. NSF Compliance:
  - 1. Comply with NSF 14 for plastic potable-water-service piping.
  - 2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:



1. Ensure that valves are dry and internally protected against rust and corrosion.
  2. Protect valves against damage to threaded ends and flange faces.
  3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
  2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

## **1.7 PROJECT CONDITIONS**

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
1. Notify owner no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of water-distribution service without owner's written permission.

## **1.8 COORDINATION**

- A. Coordinate connection to water main with utility company.

## **PART 2 - PRODUCTS**

### **2.1 COPPER TUBE AND FITTINGS**

- A. Soft Copper Tube: ASTM B 88, Type K, water tube, annealed temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
  2. Copper, Pressure-Seal Fittings:
- B. Hard Copper Tube: ASTM B 88, Type K, water tube, drawn temper.
1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
  2. Copper, Pressure-Seal Fittings:
- C. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
- D. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

## 2.2 PVC PIPE AND FITTINGS

- A. PVC, AWWA Pipe: AWWA C900, Class 200, with bell end with gasket, and with spigot end.
1. Comply with UL 1285 for fire-service mains if indicated.
  2. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.

## 2.3 PIPING SPECIALTIES

- A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

## 2.4 GATE VALVES

- A. Bronze Gate Valves:
1. OS&Y, Rising-Stem Gate Valves:
    - a. Description: Bronze body and bonnet and bronze stem.
      - i. Standards: UL 262 and FMG approved.
      - ii. Minimum Pressure Rating: 175 psig.
      - iii. End Connections: Threaded.

## 2.5 GATE VALVE ACCESSORIES AND SPECIALTIES

- A. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.
1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

## 2.6 CHECK VALVES

- A. AWWA Check Valves:
  - 1. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.
    - a. Standard: AWWA C508.
    - b. Pressure Rating: 175 psig.

## **2.7 CORPORATION VALVES AND CURB VALVES**

- A. Service-Saddle Assemblies: Comply with AWWA C800. Include saddle and valve compatible with tapping machine.
  - 1. Service Saddle: Copper alloy with seal and AWWA C800, threaded outlet for corporation valve.
  - 2. Corporation Valve: Bronze body and ground-key plug, with AWWA C800, threaded inlet and outlet matching service piping material.
- B. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.

## **PART 3 - EXECUTION**

### **3.1 EARTHWORK**

- A. Refer to Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

### **3.2 PIPING APPLICATIONS**

- A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.
- B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
- C. Do not use flanges or unions for underground piping.
- D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- E. Underground water-service piping 2 inch shall be the following:
  - 1. PVC, Class 200 with gasket fitted joints.

### **3.3 PIPING INSTALLATION**

- A. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.
- B. Bury piping with depth of cover over top at least 48 inches, with top at least 12 inches below level of maximum frost penetration.
- C. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

- D. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
  - 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- E. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

### **3.4 JOINT CONSTRUCTION**

- A. Make pipe joints according to the following:
  - 1. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

### **3.5 ANCHORAGE INSTALLATION**

- A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
  - 1. Concrete thrust blocks.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
  - 1. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.

### **3.6 VALVE INSTALLATION**

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

### **3.7 ROUGHING-IN FOR WATER METERS**

- A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

### **3.8 FIELD QUALITY CONTROL**

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Perform test in accordance with local codes but not less stringent than the following.
  - 1. Test at not less than one-and-one-half times working pressure for two hours.

2. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
- C. Prepare reports of testing activities.

### **3.9 IDENTIFICATION**

- A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 31 Section "Earth Moving."

### **3.10 CLEANING**

- A. Clean and disinfect water-distribution piping as follows:
1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
    - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    - b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    - c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

**END OF SECTION 221113**

**SECTION 221313  
FACILITY SANITARY SEWERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All construction methods and materials shall comply with local, state and federal sanitary sewer standards.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Cleanouts.

**1.3 SUBMITTALS**

- A. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.

**1.5 PROJECT CONDITIONS**

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Engineer no fewer than two days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of service without Engineer's written permission.

**PART 2 - PRODUCTS**

**2.1 PVC PIPE AND FITTINGS**

- A. PVC Type PSM Sewer Piping:
  - 1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
  - 2. Fittings: ASTM D 3034, PVC with bell ends.
  - 3. Gaskets: ASTM F 477, elastomeric seals.
- B. PVC Pressure Piping:

1. Pipe: AWWA C900, Class 200 PVC pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: AWWA C900, Class 200 PVC pipe with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

## **2.2 CLEANOUTS**

- A. PVC Cleanouts:
  - a. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

## **PART 3 - EXECUTION**

### **3.1 EARTHWORK**

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

### **3.2 PIPING INSTALLATION**

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, nonpressure, drainage piping according to the following:
  1. Install piping pitched down in direction of flow, at minimum slope indicated.
  2. Install piping with 48-inch minimum cover.
  3. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
- F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

### **3.3 PIPE JOINT CONSTRUCTION**

- A. Join gravity-flow, nonpressure, drainage piping according to the following:
  - 1. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
  - 2. Join dissimilar pipe materials with nonpressure-type, flexible or rigid couplings.
- B. Join force-main, pressure piping according to the following:
  - 1. Join PVC water-service piping according to ASTM D 2855.
  - 2. Join dissimilar pipe materials with pressure-type couplings.
- C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
  - 1. Use nonpressure flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
  - 2. Use pressure pipe couplings for force-main joints.

### **3.4 CLEANOUT INSTALLATION**

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
  - 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
  - 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 18 by 18 by 6 inches deep. Set with tops 1 inch above surrounding grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

### **3.5 CONNECTIONS**

- A. Make connections to existing piping and underground manholes.
  - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 3. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### **3.6 CLOSING ABANDONED SANITARY SEWER SYSTEMS**



- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  - 1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
  - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Backfill to grade according to Division 31 Section "Earth Moving."

### 3.7 IDENTIFICATION

- A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tapes directly over piping.
  - 1. Use warning tape or detectable warning tape over ferrous piping.
  - 2. Use detectable warning tape over nonferrous piping and over edges of underground manholes.

### 3.8 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  - 1. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  - 2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 3. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  - 1. Do not enclose, cover, or put into service before inspection and approval.
  - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
  - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  - 4. Submit separate report for each test.
  - 5. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
    - a. Test plastic gravity sewer piping according to ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
  - d. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

**3.9 CLEANING**

- A. Clean dirt and superfluous material from interior of piping. Flush with potable water.

**END OF SECTION 221313**

**SECTION 230593  
HVAC TEST AND BALANCE**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide equipment, materials, accessories, and labor necessary to test, adjust, and balance heating, ventilating, air conditioning systems including piping and air distribution systems.

**1.2 SUBMITTALS**

- A. Submit in accordance with Divisions 01 and 23.
- B. Submit the name of the test and balance agency, plus the name and registration number of the certified test and balance engineer.
- C. Submit:
  - 1. Detailed procedures
  - 2. Schedule
  - 3. Report forms
  - 4. Performance guaranty
  - 5. Instrument list and calibration dates

**1.3 QUALITY ASSURANCE**

- A. Test, adjust and balance systems in accordance with:
  - 1. AABC - Associated Air Balance Council
  - 2. NEBB - National Environmental Balancing Bureau
  - 3. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association
- B. Pressure tests may be accomplished in sections as a system is constructed. Adjusting and balancing shall not begin until all systems are complete and clean.
- C. After the test is complete, submit six copies of the complete Test and Balance report to the Owner.
- D. Permanently mark the settings of all valves, dampers, and other adjustment devices in a manner that will allow those settings to be restored.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

### **3.1 COORDINATION**

- A. Test and Balance shall take place only after all systems are complete and clean and in safe and proper operating conditions.
- B. Test and Balance shall take place only after all systems have been pressure or leak tested.
- C. All filters for air moving equipment shall be new at the time of Test and Balance.
- D. All equipment and devices shall be identified at the time of Test and Balance.

### **3.2 TEST AND BALANCE**

- A. Test, adjust and balance systems in accordance with:
  - 1. AABC - Associated Air Balance Council
  - 2. NEBB - National Environmental Balancing Bureau
  - 3. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association
- B. Adjust heating, ventilating, air conditioning system control devices such that water flow and air flow quantities are delivered as required by the Contract Documents.
- C. Verify that the heating, ventilating, air conditioning system automatic control devices will control system operation heating, cooling, ventilation, humidification, and dehumidification when required.

### **3.3 MODIFICATIONS AND ADJUSTMENTS**

- A. Modify and correct system installation as necessary to obtain flow values indicated on the Drawings and as required for proper system operation.
- B. Adjust control devices as necessary to obtain flow values indicated on the Drawings and as required for proper system operation.

### **3.4 COMPLETION**

- A. After Test and Balance, leave systems and building components in proper working order, including:
  - 1. Replace belt guards.
  - 2. Close access doors.
  - 3. Close electrical doors.
  - 4. Replace grilles.
  - 5. Replace ceiling tiles.
  - 6. Plug all holes made.
  - 7.

- B. After Test and Balance, restore control devices to the proper working position as marked during the Test and Balance, and restore temperature control devices to the proper setpoints.

**End of Section 230593**

## SECTION 230700 HVAC INSULATION

### PART 1 - GENERAL

#### 1.1 WORK INCLUDED

- A. Provide thermal insulation for piping and ductwork.
- B. Provide equipment, materials, accessories, and labor necessary to install mechanical insulation described in these Specifications.

#### 1.2 QUALITY ASSURANCE

- A. Provide mechanical insulation in accordance with:
  - 1. 2006 International Mechanical Code with 2007 Georgia Amendments
  - 2. SMACNA Sheet Metal and Air Conditioning Contractors National Association
  - 3. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
  - 4. NFPA National Fire Protection Association
    - a. NFPA 255 Method of Test of Surface Burning Characteristics of Building Materials
  - 5. UL Underwriters' Laboratories
    - a. UL 723 Test for Surface Burning Characteristics of Building Materials
  - 6. ASTM American Society for Testing and Materials
    - a. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
- B. Provide mechanical insulation products with a Flame Spread Rating not exceeding 25 and a Smoke Developed Rating not exceeding 50.

#### 1.3 SUBMITTALS

- A. Shop drawings and catalog data
  - 1. The required number of copies of shop drawings shall be as indicated in Section 01300. Refer to Division 1, General Requirements Paragraph 7 for submittal procedure.
  - 2. Shop drawings, catalogue specification data and capacity ratings of the following equipment shall be submitted to the Engineer for approval prior to purchase or installation of work:
    - a. Ductwork and pipe insulation.
    - b. Fittings and valve insulation.
  - 3. Engineers shall review shop drawings for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the project

- plans and specifications, nor departures therefrom. The Contractor remains responsible for details and accuracy.
4. Particular attention shall be taken to steel supports and hangers furnished under other sections of the specification. Adaptation, modification, or additions are the responsibility of and to be paid for by the Contractor and shall be approved by the Engineer before execution. Openings in the building required for the execution of the contract is the responsibility of the Contractor to coordinate.

#### **1.4 COORDINATION OF CONTRACTORS**

- A. The Contractor shall give full cooperation to the Builder and the contractors of other trades, and shall furnish information necessary to permit the work in other sections to be installed satisfactorily and with least possible interference or delay.
- B. In areas where conflicts occur, if so directed by the Engineer, the Contractor shall prepare composite sketches at a suitable scale, not less than 1/4 inch = 1 foot 0 inches, clearly showing how his work is to be installed in relation to the work of other trades.
- C. In certain areas, due to construction conditions, work in other sections may be required to use common openings in beams, chases, shafts and sleeves for the passage of conduits, raceways, piping, ductwork and other materials.
- D. Before installing work from this section, see that it does not interfere with the clearances required for finished columns, partitions or walls, as shown on the contract architectural or structural drawings showing floor plans, roof plans and details.
- E. Plumbing insulation work that is installed under this contract which interferes with the architectural design or building structure, shall be changed as directed by the Engineer, and cost incidental to such changes shall be paid by the Contractor.

#### **1.6 OBTAINING AND GIVING INFORMATION**

- A. The Contractor shall obtain detailed information from the Manufacturers of insulation which he is to furnish as to the proper method of installing and connecting same. The contractor shall obtain required information from other sections necessary to facilitate and complete the Mechanical insulation installation.
- B. The Contractor shall keep fully informed as to the shape, size and position of openings required for materials under this Section. He shall provide all insulation materials necessary to complete the work under this Section.

#### **1.7 CLEANING AND ADJUSTING**

- A. After the completion of the work, all insulation materials shall be cleaned in accordance with the finish of the material. Insulation systems shall be thoroughly adjusted for intended operation. Submit in writing to the Engineer upon completion of this work that it is completed and ready for use.

## 1.8 JOB CONDITIONS

- A. Deliver material to job site in original non-broken labeled factory packaging. Store materials in dry location, on wood pallets.
- B. Perform work at ambient and equivalent temperatures as recommended by the adhesive manufacturer.

## 1.9 SCAFFOLDING

- A. Scaffolding shall be supplied as required by the Contractor.

## 1.10 GUARANTEE

- A. Guarantee for work furnished and installed under this section shall be as specified in Division 1.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General
  - 1. Provide insulation in accordance with the Council of American Building Officials Model Energy Code and the Georgia State Energy Code.
- B. Acceptable manufacturers
  - 1. Certainteed
  - 2. Knauf
  - 3. Manville
  - 4. Owens-Corning
  - A. Armstrong
  - B. Foamglass

### 2.2 DUCTWORK INSULATION

- A. Materials
  - 1. Board type insulation shall be glass fiber board with factory applied foil-skrim-kraft vapor barrier. Thermal conductivity shall not exceed 0.25 BTU in/hr ft<sup>2</sup> at 50 degrees F.
  - 2. Blanket type insulation shall be glass fiber blanket with factory applied foil-skrim-kraft vapor barrier. Thermal conductivity shall not exceed 0.30 BTU in/hr ft<sup>2</sup> at 50 degrees F.
  - 3. Duct liner shall be fiberglass and shall not promote the growth of fungi or bacteria. Thermal conductivity shall not exceed 0.25 BTU in/hr ft<sup>2</sup> at 50



degrees F.

**B. Description**

1. Insulate ductwork containing conditioned supply, return, and exhaust air that is located in attic, ceiling, concealed, or other non-conditioned spaces with 2-inch thick blanket insulation.
2. Insulate ductwork containing conditioned supply, return, and exhaust air that is located in equipment rooms or is exposed in other service areas with 1-inch thick board insulation.
3. Insulate ductwork containing conditioned supply and return air that is located outside with 2-inch thick board insulation, painted white on the exterior surface.
4. Line duct on the inside with 1-inch thick duct liner where indicated on the Drawings. Increase the dimensions of the ductwork to maintain inside clear dimensions as indicated on the Drawings.

**2.3 PIPING INSULATION**

**A. Materials**

1. Foam Glass Insulation  
Asphalt Bonded, Single or multiple layer with hot asphalt  
(ASTM) D 312, Type III, in all joints  
-290° F (-179° C) to 250° F (121° C)
2. Heavy density fiberglass with thermal efficiency conforming to ASTM C 335-89 and the applicable energy code.
3. Manufacturer: Foamglass

**B. Description**

1. Insulate exterior heating hot water/chilled water piping with foam glass insulation. Recommended supplier source or equivalent source.
2. Insulate interior heating hot water/chilled water piping with fiber glass insulation.
3. The piping, fittings and valves shall be insulated with the following minimum thicknesses: hot water/chilled water piping 1¼" and smaller – 1" thick. Piping sizes 1½" and larger – 1½" thick.
4. Manufacturer: Foamglass

**C. Fitting And Valves Insulation**

1. Premolded fitting covers are required on exposed piping and valves, mitered joints are acceptable only on concealed piping.
2. Fitting covers shall be molded with factory cut insulation inserts of equal thickness and identical in composition to the adjacent pipe premolded insulation. Covers shall be Zeston covering or equal.
3. Materials, including vapor barrier jackets, glass cloth jackets and adhesives, shall be fire retardant.
4. Insulation shall be Schuller Manville Micro-Lok 850 AP or approved equal.

**D. Finish**

1. For foamglass insulation, use aluminum jacket on pipe and fittings.
2. Concealed: Vapor barrier jacket on water piping except where flexible tubing

insulation is used which requires no vapor barrier. Pre-sized glass cloth jacket shall be used on hot water piping. Fittings shall be finished with ASJ Fiberglass 25 All Service Jacket pasted canvas or pre sized glass cloth jacket.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Insulation shall be installed in strict accordance with the manufacturers recommendations and shall be applied by a qualified insulation Installer.
- B. Insulation shall not be applied on ductwork or piping until the ductwork and piping have been thoroughly cleaned, tested and accepted as tight.

#### **3.2 INSTALLATION**

- A. Do not use staples to secure insulation.
- B. Install insulation on clean, dry surfaces.
- C. Continue insulation through wall and ceiling openings and sleeves.
  - 1. Terminate ductwork insulation at fire dampers and at flexible connections at equipment.

#### **3.3 PIPING**

- A. Pipe insulation, where vapor barrier jacket is required, shall be installed with vapor barrier jackets drawn tight and firmly sealed to assure a positive vapor-seal. End joints shall be covered with 4 inch wide butt strips of material identical to vapor barrier jackets, and shall be drawn tight and securely sealed. The use of staples or bands to secure insulation where vapor barrier jacket is required will not be acceptable. Pipe insulation where no vapor barrier is required shall be secured with flare type staples.

#### **3.4 PIPE FITTINGS AND VALVES**

- A. Cement or molded insulation shall be applied on fitting and valve bodies and shall be the same thickness as adjacent covering and finished neatly to match the adjacent pipe insulation.

**End of Section 230700**

**SECTION 23 31 00  
HVAC DUCTWORK**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide equipment, materials, accessories, and labor necessary to completely fabricate and install ductwork shown on the Drawings and described in these Specifications.

**1.2 SUBMITTALS**

- A. Submit product data in accordance with Divisions 01 and 23.
- B. Submit:
  - 1. Catalog cut sheets
  - 2. Materials of construction
  - 3. Paint, coating, finish, and color information
  - 4. Performance data
  - 5. Sound data
- C. Submit HVAC equipment and ductwork drawings drawn to not less than 1/4 scale, double-line, showing all fittings, offsets, accessories, etc. required for the installation.

**1.3 QUALITY ASSURANCE**

- A. Install ductwork in accordance with:
  - 1. 2006 International Mechanical Code with 2007 Georgia Amendments
  - 2. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
  - 3. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
  - 4. NFPA National Fire Protection Association
  - 5. UL Underwriter's Laboratories
  - 6. ASTM American Society for Testing and Materials

**PART 2 - PRODUCTS**

**2.1 DESCRIPTION**

- A. Construct ductwork with G90 galvanized sheet steel. Construct round or rectangular as indicated on the Drawings. Duct sizes indicated on the Drawings are the minimum inside clear dimensions. Conversion to different dimensions

may be made to allow ductwork to fit into the space as long as the new dimensions do not increase air velocity or friction losses.

- B. Provide ductwork joint sealing compounds, glues, mastics, and adhesives UL labeled. These compounds must be specifically recommended by the manufacturer for sealing joints and seams in ductwork.

## **2.2 LOW PRESSURE DUCTWORK**

- A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards.
- B. Fabricate elbows square with double thickness turning vanes.

## **2.3 FLEXIBLE DUCTWORK**

- A. Provide flexible ductwork constructed of metallized polyester, fiberglass reinforced aluminum foil polyester laminated or coated woven fiberglass cloth permanently bonded to a non-corrosive metal helix. Factory insulate with 1-inch thick fiberglass with a protective vapor barrier jacket.
- B. Provide in accordance with UL 181, Class 1 air duct.
- C. Provide a bell-mouth spin-in with integral volume damper at all flexible duct connections to ductwork
- D. Use round galvanized duct, same size as flexible ductwork, from the spin-in to the flexible duct where required to make sure that the maximum length of the flexible duct is seven feet.
- E. Acceptable manufacturers
  1. Atco
  2. Certainteed
  3. Flexmaster
  4. Thermaflex
  5. Wiremold

## **PART 3 - EXECUTION**

### **3.1 LOW PRESSURE DUCTWORK**

- A. Install and support in accordance with SMACNA Low Pressure Duct Construction Standards.

### **3.2 FLEXIBLE DUCTWORK**

- A. Install flexible ductwork in a fully extended condition, free of sags and kinks.
- B. Fasten flexible ductwork to spin-in fittings, collars, and transitions with steel draw bands and duct tape.

### **3.3 FIELD QUALITY CONTROL**

- A. Leak test duct in accordance with SMACNA Air Duct Leakage Test Manual and seal ductwork as required to provide a system that has no less than 5 percent leakage.
- B. If the system is tested in sections, add the leakage rates to define the performance of the complete system.

**End of Section 233100**

**SECTION 233300  
AIR DUCT ACCESSORIES**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide equipment, materials, accessories, and labor necessary to completely fabricate and install ductwork accessories shown on the Drawings and described in these Specifications.

**1.2 SUBMITTALS**

- A. Submit product data in accordance with Divisions 01 and 23.
- B. Submit:
  - 1. Catalog cut sheets
  - 2. Materials of construction
  - 3. Paint, coating, finish, and color information
  - 4. Performance data
  - 5. Sound data

**1.3 QUALITY ASSURANCE**

- A. Provide in accordance with:
  - 1. All applicable Georgia State Construction Codes
  - 2. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
  - 3. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
  - 4. NFPA National Fire Protection Association
  - 5. UL Underwriter's Laboratories
  - 6. ASTM American Society for Testing and Materials

**PART 2 - PRODUCTS**

**2.1 AIR TURNING DEVICES**

- A. Provide double thickness turning vanes in all square and rectangular elbows and at other locations shown.
- B. Provide splitters made of the same thickness galvanized steel as the ductwork, 24 gauge minimum, made of two thicknesses folded over such that the leading edge presents a round nose to the air flow.

**2.2 SPIN-IN COLLARS**

- A. Provide a bell-mouth spin-in with integral volume damper at all flexible duct connections to ductwork.

### **2.3 DUCT ACCESS DOORS**

- A. Provide access doors in ductwork where indicated on the Drawings and where necessary for access to all instruments, controls, fire dampers, motorized dampers, and equipment.
- B. Provide access doors with two hinges and two heavy cam latches minimum.
  - 1. Provide access doors of the same material as the ductwork that the access doors are in.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install ductwork accessories in accordance with manufacturer's recommendations.
- B. Verify duct access door installations allow adequate access to the item requiring access.

**End of Section 233300**

**SECTION 23 34 00**  
**FANS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide equipment, materials, accessories, and labor necessary to install fans of the size, type, capacity, and characteristics shown on the Drawings and described in these Specifications.

**1.2 SUBMITTALS**

- A. Submit product data in accordance with Divisions 01 and 23.
- B. Submit:
1. Catalog cut sheets
  2. Materials of construction
  3. Paint, coating, finish, and color information
  4. Fan performance curves
  5. AMCA certification
  6. Sound data
  7. Motor horsepower
  8. Electrical data
  9. Installation and maintenance instructions
  10. Spare parts list
  11. Roof curb materials design, and color information

**1.3 QUALITY ASSURANCE**

- A. Provide in accordance with:
1. 2006 International Mechanical Code
  2. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
  3. ASTM American Society for Testing and Materials
  4. ADC Air diffusion Council
  5. ARI Air Conditioning and Refrigeration Institute
  6. AMCA Air Movement and Control Association
  7. NFPA National Fire Protection Association
  8. UL Underwriter's Laboratories
- B. Fans shall bear the AMCA Certified Performance Seal for both air and sound.
- C. Fans shall bear the UL label.
- D. Provide fans with statically and dynamically balanced fan assemblies. Two-speed fans shall be balanced at the low speed.



- E. Provide belt driven fans with belt drives designed for not less than 150 percent of the connected driving capacity.
- F. Provide fans with bearings selected for a minimum average life in excess of 200,000 hours at maximum cataloged operating conditions. Provide with grease lines extended to the exterior of fan housing.

## **PART 2 - PRODUCTS**

### **2.1 CENTRIFUGAL IN-LINE FANS**

- A. Provide items as scheduled on the Drawings.
- B. Provide constructed of galvanized steel.
- C. Acceptable manufacturers
  - 1. Penn
  - 2. Greenheck
  - 3. Acme
  - 4. Cook

### **2.2 MOTORS AND DRIVES**

- A. Factory install motors on slide base to permit belt tension adjustment.
- B. V-Belt Drives shall be constant speed with fixed pitch sheaves rated at 1.5 times the motor nameplate rating.

### **2.3 ELECTRICAL INFORMATION**

- A. Refer to electrical drawings for correct voltage and phase.
- B. Provide all electrical components in accordance with Division 16.
- C. Provide with control transformers for automatic controls with electric power characteristics as required for automatic control components.
- D. Provide each unit with single point power connection. Power for all unit electric components including motors, heaters, control actuators and control transformers shall be wired from this single point of power connection.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Install in accordance with manufacturer's recommendations.
- B. Provide controls and interlocks to control and interlock as described in Section 15940.

### **3.2 IN-LINE FANS**

- A. Hang fans from the structure separate from the ductwork adjacent to the units such that the weight of the ductwork does not bear on the fans and the weight of the fans do not bear on the ductwork.

### **3.3 DEMONSTRATION**

- A. Verify proper rotation of fan wheel.
- B. Verify proper operation of backdraft dampers.
- C. Verify proper operation of interlocked motor operated dampers.
- D. Adjust fan speed by adjusting or replacing sheaves to obtain proper air flow. Replace sheaves as required at no additional cost.

### **3.4 CONTROLS**

- A. Provide equipment, materials, accessories, and labor necessary to completely install automatic controls to achieve the sequence of operation described in Section 15940.
- B. Provide unit controllers with electronic automatic control programs, input connections, and output connections as required.

**End of Section 233400**

**SECTION 23 37 00  
AIR OUTLETS AND INLETS**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. Provide equipment, materials, accessories, and labor necessary to install air outlets and inlets of the size, type, capacity, and characteristics shown on the Drawings and described in these Specifications.

**1.2 SUBMITTALS**

- A. Submit product data in accordance with Divisions 01 and 23.
- B. Submit:
1. Catalog cut sheets
  2. Materials of construction
  3. Paint, coating, finish, and color information
  4. Performance data
  5. Sound data
  6. Motor operated damper data
  7. Electrical data
  8. Installation and maintenance instructions
  9. Spare parts list
  10. Roof curb

**1.3 QUALITY ASSURANCE**

- A. Provide air outlets and inlets in accordance with:
1. SMACNA Sheet Metal and Air Conditioning Contractor's National Association
  2. ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
  3. ASTM American Society for Testing and Materials
  4. ADC Adiffusion Council
  5. ARI Air Conditioning and Refrigeration Institute
  6. AMCA Air Movement and Control Association
- B. Coordinate dimensions, finish, frame, and border with building structure and finish.

**PART 2 - PRODUCTS**

**2.1 GRILLES, REGISTERS, AND DIFFUSERS**

- A. Provide items as scheduled on the Drawings.
- B. Provide constructed of aluminum with factory baked enamel finish, color selected by Owner.
- C. Coordinate border type with building structure type at item location.
- D. Acceptable manufacturers
  - 1. Titus
  - 2. Anemostat
  - 3. Krueger

## **2.2 LOUVERS**

- A. Provide items as scheduled on the Drawings.
- B. Provide constructed of extruded aluminum with factory Kynar 500 coating, color selected by Owner.
- C. Provide with hidden mullions and insect screens.
- D. Provide with box type frame and install with extended sill. Caulk weather tight.
- E. Acceptable manufacturers
  - 1. Ruskin
  - 2. Arrow
  - 3. American Warming

## **2.3 MOTOR OPERATED DAMPERS**

- A. Provide items as indicated on the Drawings.
- B. Provide constructed of extruded aluminum.
- C. Provide with factory mounted electric damper operators and linkage.
- C. Acceptable manufacturers
  - 1. Ruskin
  - 2. Arrow
  - 3. American Warming

## **PART 3 - EXECUTION**

### **3.1 GRILLES, REGISTERS, AND DIFFUSERS**

- A. Coordinate frame type with building structure and finish.

### **3.2 MOTOR OPERATED DAMPERS**

- A. Install in accordance with manufacturer's recommendations.
- B. Caulk and seal at frame and flanges weather tight.
- C. Adjust motor operator and linkage for full opening and closing stroke.
- D. Interlock as required.

### **3.3 LOUVERS**

- A. Install with extended sill in accordance with manufacturer's recommendations for the building structure.
- B. Caulk weather tight.

**End of Section 233700**

**SECTION 260000  
ELECTRICAL SPECIFICATIONS**

**PART 1 GENERAL**

**1.1 CODES AND REQUIREMENTS**

- A. All electrical work shall comply with the requirements of the applicable edition of the National Electrical Code, Local Building Code and as specified herein whichever is more strict.
- B. The contractor shall comply with the requirements of the General Conditions, Supplemental General Conditions of the project specifications, all Contract Documents, and any base building specifications and building criteria included in this project.
- C. Visit the premises before submitting bid as no extras will be allowed for lack of knowledge of existing conditions.
- D. Drawings are diagrammatic in nature. Take all dimensions from Architectural drawings, certified equipment drawings, and from the structure itself before fabricating any work.
- E. The drawings indicate the location, type and sizes of various utilities within the site where known. Any relocation or remodeling required must be approved by the Architect before proceeding. Investigate all utilities such as electric and telephone and make arrangements with the proper authority to pay for any charges associated with connecting those utilities. Pay for all permits, fees, inspections etc.
- F. Good workmanship and appearance are considered equal to proper operation.
- G. Provide all core drilling, channeling, cutting, patching, trenching and backfill as required for installation of electrical equipment. Seal holes, fireproofing where necessary, and refinish all repair work to original condition where damaged by electrical work.
- H. Make provisions for safe delivery and secure storage of all materials.
- I. Provide the Architect with a complete set of plans and specifications corrected to as-built conditions at the completion of the job.

**1.2 WARRANTY**

- A. The electrical contractor shall provide for the owner a one-year (from the date of final acceptance) warranty of all electrical equipment and systems provided under this contract except for incandescent or fluorescent lamps. All defective equipment or materials which appear during the warranty period shall be replaced or repaired by the electrical contractor in a timely fashion.

**PART 2 PRODUCTS**

**2.1 EQUIPMENT**

- A. The contractor shall provide all equipment, accessories necessary whether specifically stated or not to make the required electrical systems complete and operational.
- B. All equipment provided shall be new except as otherwise stated on the drawings. All equipment provided shall be U.L. listed when such standards exist for the type of equipment furnished and acceptable for installation by the Local Building Authority.

**2.2 CONDUCTORS**

- A. A. Minimum size #12 AWG except for control circuits which may be #14 or signal circuits which shall be as indicated. All conductors shall be copper. Increase conductor size as necessary to limit branch circuit voltage drop to 3% and feeder voltage drop to 2%.
- B. Splices for #8 and smaller conductors - wire or wing nuts.
- C. Feeders and other wiring No. 4 AWG and larger, type THWN.
- D. Other wiring No. 6 and smaller, type THWN.
- E. Wiring in high temperature areas shall be rated 105°C and be a type accepted by local code.
- F. Color Coding: Wiring for control systems to be installed in conjunction with mechanical and miscellaneous equipment shall be color coded in accordance with the wiring diagrams furnished with the equipment. Branch circuit wiring, including circuits to motors, and all feeders shall be coded by line or phase as follows:

Wire No. 2 AWG and smaller shall be factory color coded. Wire No. 1 AWG and larger may be color coded by field painting or color taping of six inch (6") length of exposed ends.

<u>Volts</u>	<u>277/480 Volts</u>
A = Black	A = Brown
B = Red	B = Orange
C = Blue	C = Yellow
Neutral = White	Neutral = Gray
Ground = Green	Ground = Green w/yellow strips
Switch Travelers = Pink	Switch Travelers = Purple

**2.3 OUTLETS**

- A. 4" square or octagonal, zinc coated sheet steel boxes.
- B. Provide 3/8" no-bolt fixture studs.
- C. Provide covers set to come flush with finish walls.

- D. Utility or sectional switch boxes only where permitted.

## 2.4 DEVICES

- A. All devices shall be ivory color.
  - 1. Specification grade receptacles, Hubbell 5262-I.
  - 2. A.C. quiet operating type switches equal to Hubbell 1200-I Series.
- B. Device plates shall be satin stainless steel, as manufactured by Sierra.
- C. Mount devices in accordance with the following schedule except where otherwise noted on the drawings:
  - 1. Convenience Receptacles - Long Axis Horizontal 1'6" A.F.F.\*
  - 2. Light Switches - Latch Side of Door 4'0" A.F.F.
  - 3. Telephone Outlets 1'6" A.F.F.\*

\* Except in areas with counters, baseboard heaters or in areas of block or brick construction.

## 2.5 LIGHTING FIXTURES

- A. Provide all new lighting fixtures complete with lamps, ballasts, reflectors, plaster frames, louvers, stem hangers, etc., and as described on the drawings.
- B. All ballasts shall be internally protected by use of two internal, temperature-sensitive, non-resetting protectors, equal to G.E. Watt-Miser, Class "P".
- C. Exit lights shall conform with local code requirements.
- D. Mount all outlets at position and height to clear ducts, etc.
- E. Acrylic lenses shall be 100% virgin materials and 0.125 inch thick minimum unpenetrated thickness shall be 0.035 inch.

## 2.6 BRANCH CIRCUIT PANELBOARDS

- A. Provide dead-front, circuit breaker type panels, with the size and number of branches indicated. Breakers shall be thermal magnetic type (bolted) employing quick-make and quick-break mechanisms for manual operation as well as automatic operation. Automatic tripping shall be indicated by the breaker handle assuming a distinctive position from the manual "on" and "off". Multiple breakers shall have a common trip. Tie handles will not be permitted.
- B. Panelboards having branch circuit breaker sizes 15 to 100 amperes shall be:
  - 1. General Electric "AQ" for operation on 120/208V. systems.
  - 2. General Electric "AE" for operation on 277/480V. systems.



- C. Panelboards may contain two (2) subfeed breakers having a rating in excess of 100 amperes, but less than 225 amperes.
- D. Panelboards having more than two (2) branch circuit breakers rated in excess of 100 amperes shall be General Electric "CCB".
- E. All spaces shall be fully equipped.
- F. Panelboards shall have a grounding lug for the equipment grounding system.
- G. Circuit breakers shall have a minimum interrupting capacity as follows:
  - 120/208 volts: 10,000 amperes.
  - 277/480 volts: 14,000 amperes.
- H. Panelboards shall be a minimum twenty inches (20") wide (box).
- I. All buses shall be aluminum.
- J. The above panelboard designations are General Electric; however provide any of the following equipment, or as accepted:

	<u>120/208V</u>	<u>277/480V</u>	<u>Sub-distribution type</u>
Cutler Hammer	CHB	NFB	MP-40
General Electric	AQ	AE	CCB
I.T.E.	CDP-7	CDP-7	CDP-6
Square-D	NQOB	NEHB	I-Line
Westinghouse	WEB	WEHB	CDP

**2.7 SAFETY AND DISCONNECT SWITCHES**

- A. Provide enclosed, fusible or nonfusible safety switches where indicated and herein specified. Safety switches shall bear the UL label and each enclosure shall be the NEMA type suitable for the surrounding area and conditions. Switches shall be minimum normal duty, horsepower rated, and shall have quick-make and quick-break mechanisms. Switches used on motor circuits shall have adequate horsepower ratings for the motors served.
  - 1. Safety switches employed as motor disconnect devices for two (2) or more loads shall be of the fusible type for rejection type fuses.
  - 2. Heavy duty industrial type safety switches shall be used for 480 volt application and shall be horsepower rated with quick-make, quick-break mechanisms and interlocked covers.
  - 3. Switches shall be as manufactured by Cutler-Hammer, General Electric, I.T.E., Square-D, Westinghouse, or as accepted, and all switches provided shall be by the same manufacturer.

## 2.8 FUSES

- A. Fuses shall be as manufactured by Bussmann unless noted otherwise on the drawings.
- B. Fuses for application at under 600 volts, and rated at 600 amps or less, shall be as follows:
  - 1. For all fuses in the main service, equipment, except for motor circuits, provide current limiting, 200,000 rms amperes symmetrical interrupting capacity, rejection type, Bussmann Limitron or as accepted.
  - 2. For all other fuses, provide rejection type with 200,000 rms amperes symmetrical interrupting capacity, Bussmann "Fusetron", or as accepted.
- C. Control Fuses shall be Bussmann one-time nonrenewable fuses.

## PART 3 EXECUTION

### 3.1 CONDUIT/RACEWAYS

- A. All conductors shall be enclosed by conduit sized in accordance with Table 3C of the National Electrical Code. Minimum 1/2" except for factory furnished lighting fixture flexible conduit may be 3/8".
  - 1. Galvanized rigid conduit (GRC) and intermediate metal conduit (IMC) shall be utilized for above and below grade applications in accordance with articles 345 AND 346 of the National Electrical Code. All couplings shall be threaded.
  - 2. Rigid nonmetallic conduit (PVC) Schedule 40 shall be permitted for below grade or concrete cast in place applications above grade. All elbow transitions to above grade or stub-out of floor slab shall be asphalt coated rigid conduit. Provide equipment grounding conductor for all runs of rigid nonmetallic conduit.
  - 3. Electrical metallic tubing (EMT) shall be utilized for all dry, above grade or above floor applications in accordance with article 348 of the National Electrical Code. Couplings shall be steel compression type made up wrench-tight.
  - 4. Flexible metal conduit shall be utilized for all connections to vibrating equipment such as motors (minimum of 2'-0" - maximum of 6'-0"), connection to lay-in type light fixtures or in remodel areas specifically noted for "fishing" in existing walls or non-accessible ceilings.
  - 5. Surface metallic raceways shall be used only in areas specifically noted and of size and type specified on the drawings.
- B. All exposed conduit (including conduit installed in ceiling plenums) shall be routed parallel or perpendicular with the building walls. Support conduit as required by the

National Electrical Code.

- C. Provide expansion type fittings for all conduits which cross expansion joints.

### 3.2 GROUNDING

- A. Service equipment, conduit systems, supports, cabinets, equipment, transformers, fixtures, the grounded circuit conductor, etc., shall be properly grounded in accordance with the latest issue of the National Electrical Code. Provide all bonding jumpers and wire, grounding bushings, clamps, etc., as required for complete grounding. Route ground conductors to provide the shortest and most direct path to the ground electrode system. Ground connections shall have clean contact surfaces, tinned and sweated while bolting. Install all ground conductors in conduit. Make readily accessible connections to a continuous, metallic, underground cold water piping system at the point where it enters the building. If this is not practicable, connect to a cold water pipe and provide a meter jumper. Make connections to the water pipe that grounds the conduit enclosing the conductor as well as the conductor. Bond the service equipment to a separate grounding electrode per Code requirements.

### 3.3 PANELBOARDS

- A. Install panelboards with the top of the trim six-feet, three-inches (6'-3") from the finished floor.
- B. Field check all panelboard loading and reconnect circuits as required to provide balanced phase and line loads.

### 3.4 MECHANICAL EQUIPMENT WIRING AND CONNECTIONS

- D. Mechanical equipment motors and controls furnished with mechanical equipment.
- E. Provide feeder circuits to mechanical equipment and make all connections.
- F. Provide safety switches and/or thermal overload switches as required.
- G. Provide all power (line voltage) wiring for mechanical equipment and make all connections except for temperature control equipment, which will be wired by mechanical contractor.
- H. Furnish, set in place, and wire, except as indicated, all heating, ventilating, air conditioning, plumbing, fire protection, motors and controls in accordance with the drawings. Carefully coordinate with work performed under the Mechanical Division of these specifications.
  - (1) If furnished as part of factory wired equipment, wiring and connections only by ED.
  - (2) If float switches, line thermostats, P.E. switches, time switches, etc., carry the FULL LOAD CURRENT to any motor, they shall be furnished by the Mechanical Division, but shall be set in place and connected under the Electrical Division, except that where such items are an integral part of the

mechanical equipment, or directly attached to ducts, piping, etc., they shall be set in place under the Mechanical Division and connected by the Electrical Division. If they do not carry the FULL LOAD CURRENT to any motor they shall be furnished, set in place and wired under the Mechanical Division. Control devices carrying full load current furnished by Mechanical and wired by Electrical shall be located at the device being controlled, unless shown on the drawings or mutual agreement is made between the contractors with no change in the contract price.

- (3) Wiring from alarm contacts to alarm system by ED; all control function wiring by MD.

F. Heater units in all motor starters shall be sized for approximately one hundred fifteen percent (115%) of full load motor current. Check and coordinate all thermal protective devices with the equipment they protect.

1. Provide for each motor, one-half (1/2) horsepower and below, a horsepower rated disconnect switch and thermal overload protection unless integrally provided with the motor. Thermal overload switches for single phase motors shall be Allen-Bradley Bulletin 600 or acceptable. Size heater units for approximately one- hundred fifteen percent (115%) of full load motor current. See "Grounding" Section 16400. Provide equipment connections in accordance with "Raceway Systems" Section 16100.
2. Miscellaneous Equipment: Where outlets are indicated for miscellaneous equipment requiring electric power or control, provide wire, conduit, etc., and make all connections, unless otherwise indicated. Refer to the Mechanical Specifications and Plans covering sprinkler systems, motor interlocks, switching, etc. Provide wiring, conduit, outlets and provide final electrical connections to all equipment.

### 3.5 TELEPHONE SYSTEM

- A. Provide conduits and outlets as indicated. Provide #14 AWG pull wire for all empty conduit.
- B. Outlets shall consist of 4" square box with bushed opening in plate. Plates shall match finish of other plates.

### 3.6 SPECIAL SYSTEMS

- A. Provide all special systems as specified on the drawings including all required accessories to make the system complete and operational. All special systems shall be installed and connected in accordance with the manufacturer's specifications. Provide instructional demonstration for the owner prior to final acceptance.

**End of Section 260000**

**SECTION 311000  
SITE CLEARING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
1. Protecting existing vegetation to remain.
  2. Removing existing vegetation.
  3. Clearing and grubbing.
  4. Stripping and stockpiling topsoil.
  5. Removing above- and below-grade site improvements.
  6. Disconnecting, capping or sealing, and removing site utilities/ abandoning site utilities in place.
  7. Temporary erosion- and sedimentation-control measures.

**1.3 DEFINITIONS**

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

**1.4 MATERIAL OWNERSHIP**

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

**1.5 SUBMITTALS**

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

## 1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: If improvements are to be made on adjoining property, authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Engineer.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- E. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- F. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Erection of sheds or structures.
  - 4. Impoundment of water.
  - 5. Excavation or other digging unless otherwise indicated.
  - 6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches above the ground.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

### **3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **3.3 TREE AND PLANT PROTECTION**

- A. General: Protect trees and plants remaining on-site according to arborist's recommendations.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by owner.

### **3.4 EXISTING UTILITIES**

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
  - 1. Arrange with utility companies to shut off indicated utilities.
- B. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Owner's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.

### **3.5 CLEARING AND GRUBBING**

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 6 inches below exposed subgrade.
  - 3. Use only hand methods for grubbing within protection zones.
  - 4. Dispose of trees and branches off-site. Do not burn debris on-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

### **3.6 TOPSOIL STRIPPING**

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
  - 1. Do not stockpile topsoil within protection zones.
  - 2. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

### **3.7 SITE IMPROVEMENTS**

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.



- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
  - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

### **3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

**END OF SECTION 311000**

**SECTION 312000  
EARTH MOVING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
  2. Excavating and backfilling for buildings and structures.
  3. Drainage course for concrete slabs-on-grade.
  4. Subbase course for concrete walks.
  5. Subbase course and base course for asphalt paving.
  6. Subsurface drainage backfill for walls and trenches.
  7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

**1.3 UNIT PRICES**

- A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.
1. 6 inches outside of concrete forms.
  2. 6 inches outside of minimum required dimensions of concrete cast against grade.
  3. Outside dimensions of concrete walls or footings indicated, or allowed, to be cast against rock without forms or exterior waterproofing treatments.
  4. 6 inches beneath bottom of concrete slabs-on-grade.
  5. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

**1.4 DEFINITIONS**

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
  - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 1/2 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
  - 1. Excavation of Footings, Trenches, and Pits: Late-model, hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; with bucket-curling force of not less than 40,000 lbf ; measured according to SAE J-1179 (John Deere 790 or larger).
  - 2. Bulk Excavation: Late-model, crawler tractor; with a single-tooth ripper; having a minimum draw bar pull rating of not less than 80,000 lpf usable pull, measured according to SAE J-732 (Caterpillar D-8 or larger).
- I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

## 1.5 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
  - 1. Geotextiles.

2. Warning tapes.
- B. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:
  1. Classification according to ASTM D 2487.
  2. Laboratory compaction curve.
- C. Blasting plan approved by authorities having jurisdiction.
- D. Seismic survey report from seismic survey agency, if required by local jurisdiction.
- E. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

## **1.6 QUALITY ASSURANCE**

- A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:
  1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
  2. Seismographic monitoring during blasting operations.

## **1.7 PROJECT CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- C. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures are in place.
- D. Do not commence earth moving operations until plant-protection measures specified in Division 01 Section "Temporary Tree and Plant Protection" are in place.

## **PART 2 - PRODUCTS**

### **2.1 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
  - 1. Consult the Geotechnical Engineer of Record if unsatisfactory soil materials are encountered.

## **2.2 GEOTEXTILES**

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with the Geotechnical Engineer's recommendations.
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with the Geotechnical Engineer's recommendations.

## **2.3 ACCESSORIES**

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.2 DEWATERING**

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### **3.3 EXPLOSIVES**

- A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.
  - 1. Perform blasting without damaging adjacent structures, property, or site improvements.
  - 2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

### **3.4 EXCAVATION, GENERAL**

- A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Engineer and the Geotechnical Engineer. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents.
  - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
    - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
    - b. Rock excavation includes removal and disposal of rock.

### **3.5 EXCAVATION FOR STRUCTURES**

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
  - 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
  - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to arborist requirements.

### **3.6 EXCAVATION FOR WALKS AND PAVEMENTS**

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

### **3.7 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
  1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
  1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
  3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
  4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course where indicated or recommended by pipe or conduit manufacturer. Hand-excavate deeper for bells of pipe.
  1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Trenches in Tree- and Plant-Protection Zones:
  1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

### **3.8 SUBGRADE INSPECTION**

- A. Notify Geotechnical Engineer when excavations have reached required subgrade.
- B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
  2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
  3. Perform proof-rolling in the presence of the Geotechnical Engineer.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Geotechnical Engineer, without additional compensation.

### **3.9 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.
  1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

### **3.10 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.11 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:



1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### **3.12 UTILITY TRENCH BACKFILL**

- A. Place backfill on subgrades free of mud, frost, snow, or ice.

- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.

- D. Trenches under Roadways: Provide a minimum of 12 inches of cover for pipe up to 48" diameter, and 24 inches of cover for larger pipe, measured from the top of the pipe to the bottom of flexible pavement or to top of rigid pavement.

- E. Backfill voids with satisfactory soil while removing shoring and bracing.

- F. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 6 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

- G. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 6 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

- H. Place and compact final backfill of satisfactory soil to final subgrade elevation.

- I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

- J. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

### **3.13 SOIL FILL**

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under steps and ramps, use engineered fill.
  - 4. Under building slabs, use engineered fill.
  - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### **3.14 SOIL MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### **3.15 COMPACTION OF SOIL BACKFILLS AND FILLS**

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
  - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 24 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent Standard Proctor.
  - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.
  - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
  - 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

### **3.16 GRADING**

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1 inch.
  - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### **3.17 SUBSURFACE DRAINAGE**

- A. Subdrainage Pipe: Specified in Division 33 Section "Subdrainage."
- B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

### **3.18 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS**

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
  - 1. Place base course material over subbase course under hot-mix asphalt pavement.
  - 2. Shape subbase course and base course to required crown elevations and cross-slope grades.
  - 3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
  - 4. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
  - 5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at width indicated, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

### **3.19 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE**

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
  - 3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
  - 4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

### **3.20 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  - 2. Determine that fill material and maximum lift thickness comply with requirements.
  - 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### **3.21 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### **3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.
  - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF SECTION 312000**

**SECTION 312319  
DEWATERING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes construction dewatering.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades. Dewatering performance shall be as specified in the project Geotechnical Report.
  - 1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
  - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
  - 5. Remove dewatering system when no longer required for construction.

**1.4 SUBMITTALS**

- A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
  - 1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
  - 2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.
- B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Qualification Data: For qualified Installer.
- D. Field quality-control reports.

- E. Other Informational Submittals:
  - 1. Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer that has specialized in dewatering work.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

### **1.6 PROJECT CONDITIONS**

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify owner no fewer than two days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without owner's written permission.
- B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
  - 1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
  - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
  - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- C. Provide temporary grading to facilitate dewatering and control of surface water.
- D. Monitor dewatering systems continuously.
- E. Promptly repair damages to adjacent facilities caused by dewatering.
- F. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.

### 3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
  - 1. Space well points or wells at intervals required to provide sufficient dewatering.
  - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
  - 1. Maintain piezometric water level to depth indicated in the Project Geotechnical Report below surface of excavation.
- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.



1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

### **3.3 FIELD QUALITY CONTROL**

- A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers recommended by the Geotechnical Engineer; additional observation wells may be required by authorities having jurisdiction.
1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
  2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
  3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.
- B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

**END OF SECTION 312319**

**SECTION 315000  
EXCAVATION SUPPORT AND PROTECTION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section includes temporary excavation support and protection systems.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
  - 1. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 2. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
  - 3. Monitor vibrations, settlements, and movements.

**1.4 SUBMITTALS**

- A. Shop Drawings: For excavation support and protection system.
- B. Other Informational Submittals:
  - 1. Photographs: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.
  - 2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
    - a. Note locations and capping depth of wells and well points.

**1.5 PROJECT CONDITIONS**

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify owner no fewer than two days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without owner's written permission.
- B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.
- E. Tiebacks: Steel bars, ASTM A 722/A 722M.
- F. Tiebacks: Steel strand, ASTM A 416/A 416M.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
  1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

### **3.2 SOLDIER PILES AND LAGGING**

- A. Install steel soldier piles, as necessary, before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

### **3.3 SHEET PILING**

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Cut tops of sheet piling to uniform elevation at top of excavation.

### **3.4 TIEBACKS**

- A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
  - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
  - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

### **3.5 BRACING**

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
  - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
  - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
  - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

### **3.6 REMOVAL AND REPAIRS**

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
  - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
  - 2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."

3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

**END OF SECTION 315000**

**SECTION 321216  
ASPHALT PAVING**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
1. Cold milling of existing hot-mix asphalt pavement.
  2. Hot-mix asphalt patching.
  3. Hot-mix asphalt paving.
  4. Hot-mix asphalt paving overlay.
  5. Asphalt surface treatments.
  6. Pavement-marking paint.

**1.03 DEFINITION**

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

**1.04 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
1. Job-Mix Designs: For each job mix proposed for the Work.

**1.05 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of GDOT for asphalt paving work.
1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

**1.07 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
  2. Tack Coat: Minimum surface temperature of 60 deg F.
  3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
  4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
  5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 55 deg F for water-based materials, and not exceeding 95 deg F.

## **PART 2 - PRODUCTS**

### **2.01 AGGREGATES**

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel.
- C. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

### **2.02 ASPHALT MATERIALS**

- A. Comply with Georgia Department of Transportation Standard Specifications for each mix indicated on the Drawings.
- B. Water: Potable.

### **2.03 AUXILIARY MATERIALS**

- A. Pavement-Marking Paint: Use traffic line paints that meet the applicable requirements of GDOT Section 870.2.02.
1. Color: As indicated.

### **2.04 MIXES**

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:
1. Comply with Georgia Department of Transportation Standard Specifications for each mix indicated on the Drawings.
  2. Base Course: as indicated on the Drawings.
  3. Surface Course: as indicated on the Drawings.
- B. Emulsified-Asphalt Slurry: ASTM D 3910, Type 2.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
  - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
  - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected as verified by the Geotechnical Engineer.

#### **3.02 COLD MILLING**

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
  - 1. Mill to depth indicated.
  - 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
  - 3. Control rate of milling to prevent tearing of existing asphalt course.
  - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
  - 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
  - 6. Keep milled pavement surface free of loose material and dust.

#### **3.03 PATCHING**

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd..
  - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.



### **3.04 REPAIRS**

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
  - 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.
  - 1. Clean cracks and joints in existing hot-mix asphalt pavement.
  - 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
  - 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

### **3.05 SURFACE PREPARATION**

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.
  - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
  - 2. Protect primed substrate from damage until ready to receive paving.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..
  - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
  - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

### **3.06 HOT-MIX ASPHALT PLACING**

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
  - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
  - 2. Place hot-mix asphalt surface course in single lift.
  - 3. Spread mix at minimum temperature of 250 deg F.
  - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
  - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
  - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

### 3.07 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
  - 1. Clean contact surfaces and apply tack coat to joints.
  - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
  - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
  - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
  - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
  - 6. Compact asphalt at joints to a density within 2 percent of specified course density.

### 3.08 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
  - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
  - 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

### **3.09 INSTALLATION TOLERANCES**

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
  - 1. Base Course: Plus or minus 1/2 inch.
  - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
  - 1. Base Course: 1/4 inch.
  - 2. Surface Course: 1/8 inch.
  - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

### **3.10 PAVEMENT MARKING**

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.
- B. Allow paving to age for 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  - 1. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal. where indicated.

### **3.11 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to GDOT standards.
- E. Replace and compact hot-mix asphalt where core tests were taken.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

### **3.12 DISPOSAL**

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
  - 1. Do not allow milled materials to accumulate on-site.

**END OF SECTION 321216**

**SECTION 321313  
CONCRETE PAVING**

**PART 1 GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Curbs and gutters.
  - 2. Walks.

**1.3 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Other Action Submittals:
  - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Certificates: For the following, from manufacturer:
  - 1. Cementitious materials.
  - 2. Steel reinforcement and reinforcement accessories.
  - 3. Fiber reinforcement.
  - 4. Admixtures.
  - 5. Curing compounds.
  - 6. Applied finish materials.
  - 7. Bonding agent or epoxy adhesive.
  - 8. Joint fillers.
- D. Field quality-control reports.

**1.5 QUALITY ASSURANCE**

- A. Ready-Mix-Concrete 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.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

- B. ACI Publications: Comply with ACI 301 unless otherwise indicated.

## **1.6 PROJECT CONDITIONS**

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature as recommended by pavement marking manufacturer.

## **PART 2 - PRODUCTS**

### **2.1 FORMS**

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  - 1. Use flexible or uniformly curved forms for curves. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

### **2.2 STEEL REINFORCEMENT**

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
- D. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

### **2.3 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
  - 1. Portland Cement: ASTM C 150, gray portland cement Type I.

- B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
  - 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.

## 2.4 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

## 2.5 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.
- C. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

## 2.6 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

- E. Pigmented Mineral Dry-Shake Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
- F. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

## 2.7 DETECTABLE WARNING MATERIALS

- A. Detectable Warning Stamp: Semirigid polyurethane mats with formed underside capable of imprinting detectable warning pattern on plastic concrete; perforated with a vent hole at each dome.
  - 1. Size of Stamp: One piece matching detectable warning area shown on Drawings.
- B. Liquid Release Agent: Manufacturer's standard, clear, evaporating formulation designed to facilitate release of stamp mats.

## 2.8 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 6 inches high by 8 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
  - 1. Dowels: 2- #4 bars, 18-inch minimum length.
- B. Wheel Stops: Solid, integrally colored, 96 percent recycled HDPE, or commingled postconsumer and postindustrial recycled plastic; UV stabilized; 6 inches high by 8 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
  - 1. Color: Gray.
  - 2. Dowels: 2- #4 bars, 18-inch minimum length.
  - 3. Adhesive: As recommended by wheel stop manufacturer for application to concrete pavement.

## 2.9 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the properties specified in the Drawings.

## 2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.



1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below vehicular traffic areas, walks, and curbs, to identify soft pockets and areas of excess yielding.
  1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
  2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
  3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

#### **3.3 EDGE FORMS AND SCREED CONSTRUCTION**

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

#### **3.4 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  2. Provide tie bars at sides of paving strips where indicated.
  3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces. Only use butt joints in areas not subject to vehicular traffic.
  4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete. Only use keyed joints in low-traffic areas.
  5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals indicated.
  2. Extend joint fillers full width and depth of joint.
  3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Control Joints: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.
- F. Screed paving surface with a straightedge and strike off.
- G. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- H. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- I. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### **3.7 FLOAT FINISHING**

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
  1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

### **3.8 DETECTABLE WARNINGS**

- A. Stamped Detectable Warnings: Install stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
  1. Before using stamp mats, verify that the vent holes are unobstructed.
  2. Apply liquid release agent to the concrete surface and the stamp mat.
  3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
  4. Trimming: After 24 hours, cut off the tips of mortar formed by the vent holes.
  5. Remove residual release agent according to manufacturer's written instructions. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

### **3.9 CONCRETE PROTECTION AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

### **3.10 PAVING TOLERANCES**

- A. Comply with tolerances in ACI 117 and as follows:
  - 1. Elevation: 3/4 inch.
  - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
  - 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/2 inch.
  - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
  - 5. Lateral Alignment and Spacing of Dowels: 1 inch.
  - 6. Vertical Alignment of Dowels: 1/4 inch.
  - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
  - 8. Joint Spacing: 3 inches.
  - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
  - 10. Joint Width: Plus 1/8 inch, no minus.

### **3.11 WHEEL STOPS**

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.
- B. Securely attach wheel stops to paving with not less than two steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

### **3.12 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- C. When re-testing is necessary, it shall be the responsibility of the Contractor. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
- E. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
- F. Concrete paving will be considered defective if it does not pass tests and inspections.

- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### **3.13 REPAIRS AND PROTECTION**

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.
- B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

**END OF SECTION 321313**