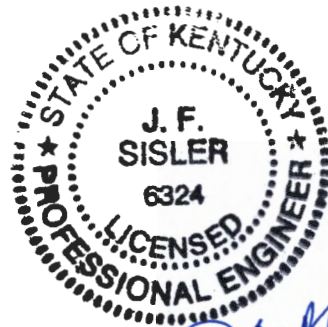


SPECIFICATIONS AND CONTRACT DOCUMENTS  
FOR  
**BIG SANDY WATER DISTRICT**  
BOYD COUNTY, KENTUCKY  
**WATER BOOSTER PUMP STATION - UPGRADES**

**CONTRACT G-1**



*Joseph F. Sisler*  
7/29/19

**FOR CONSTRUCTION**

**JULY 2019**

**SME PROJECT CODE: 15030**



**SISLER-MAGGARD ENGINEERING, PLLC**

220 EAST REYNOLDS ROAD, SUITE A3  
LEXINGTON, KY 40517  
Office (859) 271-2978 Fax (859) 271-5670  
Email: [sme@sislermaggard.com](mailto:sme@sislermaggard.com)



**BIG SANDY WATER DISTRICT**

**CONTRACT NO. G-1**

**WATER BOOSTER PUMP STATION - UPGRADES**

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# **SECTION 1**

## **ADVERTISEMENT FOR BIDS**



ADVERTISEMENT FOR BIDS

1. **INVITATION:** Sealed bids for the construction of the following **BIG SANDY WATER DISTRICT – PHASE V – WATER SYSTEM IMPROVEMENTS - F-1 Water Tank Painting & Repairs, G-1 Water Booster Pump Station Upgrades, H-1 Stream Crossing Replacements & Service Line Replacements and I-1 Office Building** will be received by the Big Sandy Water District Office, 18200 State Route 3, Catlettsburg, KY 41129, until **12:00 NOON**, local time **June 13, 2019** for furnishing all labor and materials and performing all work as set forth by this advertisement, conditions (general, supplemental, and special), specifications, and/or the drawings prepared by Sisler-Maggard Engineering, PLLC., 220 East Reynolds Road, Suite A3, Lexington, Kentucky 40517. Bids will be publicly opened and read at above time.

2. **PROJECT DESCRIPTION:** The project includes but is not limited to the following:

**CONTRACT – “F-1” – Water Tank Painting & Repairs**

- a) 7 EA. Sandblasting & Painting Existing Ground Storage Tanks (3 @ 60-75,000 gallon, 4 @ 100-150,000 gallon)
- b) 2 EA. Misc. Repairs at Tanks

**CONTRACT – “G-1” – Water Booster Pump Station Upgrades**

- a) 2 EA. Construct Duplex Pump Stations
- b) 2 EA. Add VFD’s to existing Water Booster Pump Stations

**CONTRACT – “H-1” – Stream Crossing Replacements and Service Line Replacements**

- a) 925 L.F. 6” & 8” HDPE Horizontal Direct Drilling
- b) 43,600 L.F. ¾” Service Line Replacement by Trenchless Replacement or HDD Method
- c) 3,600 L.F. 1” Service Line Replacement by Trenchless Replacement or HDD Method

**CONTRACT – “I-1” – Office Building**

- a) Construct 2100 S.F. Masonry Office Building with Metal Roof

3. **OBTAINING PLANS, SPECIFICATIONS AND BID DOCUMENTS:**

Contract documents may be reviewed and obtained at the following locations:

Lynn Imaging Lexington....(859) 255-1021	Lynn Imaging Louisville.....(502) 499-8400
328 Old Vine Street.....(800) 888-0693	11460 Bluegrass Parkway.....(502)499-0022 fax
Lexington, KY 40507.....(859) 233-1558 fax	Louisville, KY 40299

A **non-refundable** deposit will be required for **each** set of documents as follows:

Contract “F-1” – Water Tank Painting & Repairs: \$150.00

Contract “G-1” – Water Booster Pump Station Upgrades: \$150.00

Contract “H-1” – Stream Crossing Replacements & Service Line Replacements: \$250.00

Contract “I-1” – Office Building: \$200.00

Deposit **DOES NOT** include shipping. Partial sets of plans or specifications will **not** be issued.

Contract Documents may also be reviewed at the following locations:

Sisler-Maggard Engineering, PLLC  
220 East Reynolds Road, Suite A3  
Lexington, Kentucky 40517  
(859) 271-2978

Big Sandy Water District  
18200 State Route 3  
Catlettsburg, Kentucky 41129  
(606) 928-2075

Builders Exchange  
1035 Strader Avenue, Suite100  
Lexington, Kentucky 40505  
(859) 288-0011

Builder's Exchange  
2300 Meadow Lane  
Louisville, Ky. 40218-1336  
(502) 459-9800

- 4. METHOD OF RECEIVING BIDS: Bids will be submitted in the manner and subject to the conditions as set forth and described in the Instructions to Bidders and Contract Documents.
- 5. METHOD OF AWARD AND RIGHT TO REJECT: The Contract will be awarded by the Owner to the low responsive, responsible, best and qualified Bidder. Owner reserves the right to reject any and all bids and to waive all informalities and/or technicalities should it be in the best interest of the Owner.
- 6. BID WITHDRAWAL: No Bidder may withdraw his bid for a period of **(90) ninety** calendar days after receipt of bids. Errors and omissions will not be the cause for withdrawal of bid without forfeit of bid bond. Bids may be withdrawn in person prior to the closing time for receipt of bids.
- 7. FUNDING: This project is being funded by **U.S.D.A.- Rural Development and Big Sandy Water District**.
- 8. WAGE RATES: State and Federal wage rates **will not** apply to this project.
- 9. BID SECURITY: Bidders shall furnish (with bid) bid security equal to 5% of bid. A bid bond on Kentucky Resident insurance carrier or certified check is acceptable.
- 9. GENERAL REQUIREMENTS: Bidders who submit a Bid **must** be a Plan Holder of record at the issuing Office (Lynn Imaging). Bids from Bidders who are not on the Plan Holders List may be returned as not being responsive.  
  
Plan Holders are requested to provide an e-mail address with their purchase of plans if they wish to receive addenda and other information electronically.
- 10. PERFORMANCE AND PAYMENT BOND: A Performance and Payment Bond each in the amount of 100 percent of the Contract Price issued by a responsible surety will be required of the successful Bidders.

"EQUAL EMPLOYMENT OPPORTUNITY"

OWNER: Big Sandy Water District

By: Paul E. Thomas  
Paul E. Thomas, Chairman



# **SECTION 2**

## **INSTRUCTIONS TO BIDDERS**

.



## INSTRUCTIONS TO BIDDERS

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## ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued

1. Sisler Maggard Engineering, PLLC  
220 E. Reynolds Road, Ste. A3  
Lexington, KY 40517  
Phone – (859) 271-2978

2. Lynn Imaging  
328 Old Vine Street  
Lexington, KY 40503  
Phone – (859) 255-1021

## ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the Advertisement for Bids.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

## ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and the following additional information:
- A. Qualification forms @ end of Section 8 of these Specifications shall be used.
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

**ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER’S SAFETY PROGRAM; OTHER WORK AT THE SITE**

4.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:
  - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
  - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
  - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
  - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
4. Geotechnical Baseline Report: The Bidding Documents **may** contain a Geotechnical Baseline Report (GBR). The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (“Baseline Conditions”). The GBR is a Contract Document.

The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

- B. **Underground Facilities:** Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. **Adequacy of Data:** Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

#### 4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.
- D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

#### 4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

#### 4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

**ARTICLE 5 – BIDDER’S REPRESENTATIONS**

- 5.01 It is the responsibility of each Bidder before submitting a Bid to:
- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
  - B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
  - C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
  - D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;
  - E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder’s safety precautions and programs;
  - F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
  - G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
  - H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
  - I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
  - J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.



**ARTICLE 6 – PRE-BID CONFERENCE (NOT USED)****ARTICLE 7 – INTERPRETATIONS AND ADDENDA**

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

**ARTICLE 8 – BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5% (percent)** of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or **60 days** after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

**ARTICLE 9 – CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

**ARTICLE 10 – LIQUIDATED DAMAGES**

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

The liquidated damage for **these** contracts shall be **\$500 per calendar day** that the contracts are NOT substantially complete.

**ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS**

- 11.01 The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute materials and equipment

subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed "or-equal". Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not reply upon approvals made in any other manner. Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions after the Effective Date of the Contract.

- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.
- 11.03 If an award is made, Contractor shall be allowed to submit proposed substitutes and "or-equals" in accordance with the General Conditions.

#### **ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 12.01 If required by the bid documents, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for any of the work.
- If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.
- 12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06.

#### **ARTICLE 13 – PREPARATION OF BID**

- 13.01 The Bid Form is included with the Bidding Documents.

- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 13.04 A Bid by an individual shall show the Bidder's name and official address.
- 13.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.06 All names shall be printed in ink below the signatures.
- 13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.09 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.
- 13.10 Each bid must be submitted on the prescribed forms accompanied by the following items which will constitute the submittal documents necessary for a complete bid package:
1. Bid Forms Including Subcontractors & Manufacturers List
  2. Bid Bond with Power Of Attorney
  3. Compliance Statement (Rd Form 400-6)
  4. Certificate for Contracts, Grants, & Loans (Rd Form 1940-Q)
  5. Certificate Regarding Debarment, Suspension, And Other Responsibilities (AD-1048)
  6. Equal Employment Opportunity Certification (RD Form 400-1)
  7. Bidder's Qualifications Statement
  8. Contractor's Certification Concerning Labor Standards and Prevailing Wage Requirements
- 
- 13.11 Subcontracts: The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this Contract:
- a. Must be acceptable to the Owner and have current eligibility status for federal programs; and  
Approval of the proposed subcontract award cannot be given by the Owner unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject. Although the bidder is not required to attach such Certifications by proposed subcontractors to their bid,

the bidder is hereby advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

#### ARTICLE 14 – BASIS OF BID

##### 14.01 *Unit Price*

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The “Bid Price” (sometimes referred to as the extended price) for each unit price Bid item will be the product of the “Estimated Quantity” (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding “Bid Unit Price” offered by the Bidder. The total of all unit price Bid items will be the sum of these “Bid Prices”; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

#### ARTICLE 15 – SUBMITTAL OF BID

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation “BID ENCLOSED.” A mailed Bid shall be addressed to the **Big Sandy Water District**
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.
- 15.04 The **Big Sandy Water District** (herein called the “Owner”), invites bids on the forms attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the **Big Sandy Water District, 18200 State Route 3, Catlettsburg, Kentucky 41129** until **12:00 Noon**, local time, **June 13, 2019** and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to the **Big Sandy Water District**, designated as bid for **Phase V – Water System Improvements – Contract “F-1 - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building.**

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid

received after the time and date specified shall not be considered. No bidder may withdraw a bid within 90 days after the actual date of the opening thereof.

- 15.05 **Telegraphic/Facsimile Modification:** Any bidder may modify their bid by telegraphic or facsimile communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic/facsimile modification over the signature of the bidder was mailed prior to the closing time. The communication should not reveal the bid price but should provide the addition or subtraction or their modifications so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic/facsimile modification.

**Method of Bidding:** The Owner invites the following bid: **Phase V – Water System Improvements – Contract “F-1 - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building.**

**Time of Completion and Liquidated Damages:** Bidder must agree to commence work on or before a date to be specified in a written “Notice to Proceed” of the Owner and to fully complete the project as follows:

**Phase V – Water System Improvements:**

**Contract “F-1 - Water Tank Painting & Repairs - 180 consecutive calendar days**

**Contract “G-1” - Water Booster Pump Station Upgrades - 150 consecutive Calendar days**

**Contract “H-1” - Stream Crossings & Service Line Replacements - 210 consecutive calendar days**

**Contract “I-1” - Office Building - 150 consecutive calendar days**

thereafter. Bidder must agree also to pay as liquidated damages, the sum of \$500.00 for each consecutive calendar day thereafter as hereinafter provided in Article 15 of the Special Conditions and in the Agreement.

- 15.06 Every request for such interpretation on **Phase V – Water System Improvements – Contract “F-1” - Water Tank Painting & Repairs, Contract “G-1” – Water Booster Pump Station Upgrades, Contract “H-1” – Stream Crossings and Service Line Replacements, Contract “I-1” – Office Building** should be in writing addressed to **Sisler - Maggard Engineering, PLLC, 220 East Reynolds Road, Suite A3, Lexington, Kentucky 40517** and to be given consideration must be received in writing at least **five days** prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under their bid as submitted. All addenda so issued shall become part of the Contract Documents.

**Security for Faithful Performance:** Simultaneously with their delivery of the executed Contract, the Contractor shall furnish a 100% surety bond or bonds as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract, as specified in the General Conditions included

herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

- 15.07 Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney with Kentucky Resident agent.
- 15.08 Notice of Special Conditions: Attention is particularly called to those parts of the Contract Documents and Specifications which deal with the following:
- a. Inspection and testing of materials.
  - b. Insurance requirements.
  - c. Wage rates - State and Federal – **DO NOT APPLY**
- 15.09 Safety Standards and Accident Prevention: With respect to all work performed under this Contract, the Contractor shall:
- a. Comply with the safety standards provisions of applicable laws, building and construction codes and the “Manual of Accident Prevention in Construction” published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the “Federal Register”, Volume 36, No. 75, Saturday, April 17, 1971.
  - b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
  - c. Maintain at their office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor’s care of persons (including employees), who may be injured on the job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor’s care.
- 15.10 **Federal and State Prevailing Wage Rates do not apply to this project.**

#### **ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID**

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

**ARTICLE 17 – OPENING OF BIDS**

- 17.01 Bids will be opened at the time and place indicated in the Advertisement to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

**ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

**ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.
- 19.03 Evaluation of Bids
- A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

**ARTICLE 20 – BONDS AND INSURANCE**

- 20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

**ARTICLE 21 – SIGNING OF AGREEMENT**

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be

delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

**ARTICLE 22 – SALES AND USE TAXES, DO APPLY TO THIS CONTRACT**

**ARTICLE 23 – CONTRACTS TO BE ASSIGNED (NOT USED)**

**ARTICLE 24 - WAGE RATE REQUIREMENTS (NOT USED)**

- 24.01 If the contract price is in excess of \$100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5 (b) apply.



## **SECTION 3**

### **RURAL DEVELOPMENT GENERAL CONDITIONS & SUPPLEMENTAL CONDITIONS**



# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2 – PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds:* When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance:* When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance:* After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### 2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### 2.03 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

#### 2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

#### 2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

#### 2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

### **ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

#### **3.01 Intent**

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

#### **3.02 Reference Standards**

- A. Standards Specifications, Codes, Laws and Regulations
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

#### **3.03 Reporting and Resolving Discrepancies**

- A. *Reporting Discrepancies:*
  - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,



error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

**B. *Resolving Discrepancies:***

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
  - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

**3.04 *Requirements of the Contract Documents***

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
  2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

### 4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

### 4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  2. abnormal weather conditions;
  3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
  4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

## **ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

### **5.01 *Availability of Lands***

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

### **5.02 *Use of Site and Other Areas***

#### **A. *Limitation on Use of Site and Other Areas:***

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

### 5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
  2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
  3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
  2. is of such a nature as to require a change in the Drawings or Specifications; or
  3. differs materially from that shown or indicated in the Contract Documents; or
  4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
    - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
  3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
  - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
    - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
    - d. Contractor gave the notice required in Paragraph 5.05.B.
  - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.



5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

**ARTICLE 6 – BONDS AND INSURANCE****6.01 Performance, Payment, and Other Bonds**

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

**6.02 Insurance—General Provisions**

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

### 6.03 Contractor's Insurance

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
  1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
  2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
  3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  2. claims for damages insured by reasonably available personal injury liability coverage.
  3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
    - a. Such insurance shall be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
1. include at least the specific coverages provided in this Article.
  2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
  3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
  4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
  5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

#### 6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

#### 6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
  - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
  - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
  - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
  6. extend to cover damage or loss to insured property while in transit.
  7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
  8. allow for the waiver of the insurer's subrogation rights, as set forth below.
  9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
  10. not include a co-insurance clause.
  11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
  12. include performance/hot testing and start-up.
  13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.



## 6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
  - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
  - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

## 6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

## ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

### 7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

### 7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

### 7.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      - 3) it has a proven record of performance and availability of responsive service; and
      - 4) it is not objectionable to Owner.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 Substitutes

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
  - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
  - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
  - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
    - a. shall certify that the proposed substitute item will:
      - 1) perform adequately the functions and achieve the results called for by the general design,
      - 2) be similar in substance to that specified, and
      - 3) be suited to the same use as that specified.
    - b. will state:
      - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
      - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
      - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
    - c. will identify:
      - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

#### 7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

- O. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
  2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

#### 7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

#### 7.09 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

#### 7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.11 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

#### 7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
  - 1. all persons on the Site or who may be affected by the Work;



2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
  - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
  - D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
  - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
  - F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
  - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.13 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

#### 7.16 *Shop Drawings, Samples, and Other Submittals*

##### A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

##### 1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples:*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
  5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
  6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
  7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;
  3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. use or occupancy of the Work or any part thereof by Owner;
  5. any review and approval of a Shop Drawing or Sample submittal;
  6. the issuance of a notice of acceptability by Engineer;
  7. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.

- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
  1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### 7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

## **ARTICLE 8 – OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

## 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

## 8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

## **ARTICLE 9 – OWNER'S RESPONSIBILITIES**

### **9.01 *Communications to Contractor***

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### **9.02 *Replacement of Engineer***

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

### **9.03 *Furnish Data***

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **9.04 *Pay When Due***

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

### **9.05 *Lands and Easements; Reports, Tests, and Drawings***

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### **9.06 *Insurance***

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

### **9.07 *Change Orders***

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.



9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

**ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION**

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

#### 10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

### **ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

#### 11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. *Change Orders:*
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### 11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

#### 11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
  1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

#### 11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
  2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

#### 11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
  2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
  4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

#### 11.08 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

### ARTICLE 12 – CLAIMS

#### 12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
  1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
  3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
  1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
  2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

### 13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
  1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable



thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

### 13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

- B. *Cash Allowances*: Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

### 13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
  2. there is no corresponding adjustment with respect to any other item of Work; and
  3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

## ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

### 14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

### 14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
  1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  3. by manufacturers of equipment furnished under the Contract Documents;
  4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
  - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

## **ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

### **15.01 Progress Payments**

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
  2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
  3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- C. *Review of Applications:*
1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
  2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
- a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
- a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or



- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner:*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. the Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. the Contract Price has been reduced by Change Orders;
  - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
  - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

#### 15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

#### 15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
  2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

#### 15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 15.06 *Final Payment*

##### A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents;
  - b. consent of the surety, if any, to final payment;
  - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
  - d. a list of all disputes that Contractor believes are unsettled; and
  - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

**B. *Engineer's Review of Application and Acceptance:***

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

**C. *Completion of Work:*** The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

**D. *Payment Becomes Due:*** Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### 15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such other adjacent areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

### 16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

### 16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
  2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
  2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
  1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
  3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

#### 16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

## ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

### 17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
  2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
  2. agree with the other party to submit the dispute to another dispute resolution process; or
  3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## ARTICLE 18 – MISCELLANEOUS

### 18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

### 18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

### 18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.



18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

**CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE**

CERTIFICATE OF OWNER'S ATTORNEY

PROJECT NAME: **BIG SANDY WATER DISTRICT - CONTRACT G-1**

---

CONTRACTOR NAME:

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I, the undersigned, Roger W. Hall, the duly authorized and acting legal representative of Big Sandy Water District, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

---

Name - Roger W. Hall

Date

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

**USDA - Rural Development**

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Agency Representative

Date

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Name Julie Anderson - RD

## Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-700, 2013 Edition). All provisions that are not so amended or supplemented, remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

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**ARTICLE 1 - DEFINITIONS AND TERMS**

*SC 1.01 Defined Terms*

**SC-1.01.A.3. Add the following language to the end of Paragraph 1.01.A.3:**

The Application for Payment form to be used on this Project is Form RD 1924-18. The Agency must approve all Applications for Payment before payment is made.

**SC-1.01.A.8. Add the following language to the end of Paragraph 1.01.A.8:**

The Change Order form to be used on this Project is Form EJCDC C-941. Agency approval is required before Change Orders are effective.

**SC-1.01.A.48 Add the following language at the end of the last sentence of Paragraph 1.01.A.48:**

A Work Change Directive cannot change Price or Contract Times without a subsequent Change Order.

**SC-1.01.A.49 Add the following new Paragraph after Paragraph 1.01.A.48:**

Abnormal Weather Conditions - Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

*SC 1.01 Project Financing*

**SC 1.01.A.50 Add the following new Paragraph after Paragraph 1.01.A.49:**

The project is financed the **U.S.D.A - Rural Development and the Big Sandy Water District.**

*SC 1.02 Terminology*

**SC-1.02.A.15. Delete in its entirety and replace with the following:**

Contract Times: The number of days or date stated in the Agreement to achieve substantial completion, based on remaining work, weather and market conditions.

**ARTICLE 2 - PRELIMINARY MATTERS**

*SC -2.02 Copies of Documents*

**SC-2.02.A. Amend the first sentence of Paragraph 2.02.A. to read as follows:**

Owner shall furnish to Contractor **four** copies of the Contract Documents (including one fully executed counterpart of the Agreement). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

*SC 2.03 Before Starting Construction*

**SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:**

A. The Contract Times will commence on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 10 days after the Effective Date of the Agreement.

**ARTICLE 4 - COMMENCEMENT AND PROGRESS OF THE WORK**

*SC 4.01 - Commencement of Contract Times; Notice to Proceed*

**SC-4.01. Delete the following sentence from Paragraph 4.01A:**

In no event will the Contract Times commence to run later than the **sixtieth** day after the day of Bid opening unless agreed to by all parties.

**SC 4.05.C.2 Amend Paragraph 4.05.C.2 by striking out the following text:**

“abnormal weather conditions;” and inserting the following text:  
Abnormal Weather Conditions;

**ARTICLE 5 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

*SC 5.03 Subsurface and Physical Conditions*

**SC-5.03. Delete Paragraphs 5.03.A and 5.03B in their entirety and insert the following:**

A. No reports of explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

*SC 5.05 Underground Facilities*

**SC-5.05**

**Add the following new paragraphs immediately after Paragraph 5.05 A.1:**

a. Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the owner or by public or private utility companies.

b. The available information concerning the location of existing underground utilities is show on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy of this information.

c. Before proceeding with the work, the Contractor shall confer with all public or private companies, agencies or departments that own and operate utilities in the vicinity of the construction work. The purpose of the conference, or conferences, shall be to notify said companies, agencies or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost of locating and avoiding, or repairing damage to said existing utilities.

*SC 5.06 Hazardous Environmental Conditions*

**SC-5.06 Delete Paragraphs 5.06A and 5.06B in their entirety and insert the following:**

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.**
- B. Not Used.**

**ARTICLE 6 - BONDS AND INSURANCE**

*SC 6.01 Performance, Payment and Other Bonds*

**SC-6.01**

**Add the following new paragraph immediately after Paragraph 6.01.F:**

G. The Performance Bond shall remain in full force and effect throughout the Guaranty period referred to in SC 6.03. All warranties and guarantees remaining in effect at and beyond the Guaranty expiration date shall be relinquished and transferred to the Owner. Copies of such warranty/guaranty shall be submitted to the Engineer prior to date of the start of the Guaranty period.

*6.02 Insurance - General Provisions*

**SC-6.02**

**Add the following paragraph immediately after Paragraph 6.02.B:**

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has

been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

*SC 6.03 Contractor's Insurance*

**SC 6.03 Contractor's Liability Insurance - add the following new paragraph immediately after Paragraph 6.03J:**

**K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amount or greater where required by Laws and Regulations:**

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Federal, if applicable (e.g. Longshoreman's): (e.g., Longshoremen's)	Statutory
c. Employer's Liability	\$500,000
Bodily injury, each accident	\$500,000
Bodily injury by disease, each employee	\$500,000
Bodily injury/disease aggregate	\$500,000

2. Contractor's General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

a. General Aggregate	\$2,000,000
b. Products – Completed Operations Aggregate	\$1,000,000
c. Personal and Advertising Injury	\$1,000,000
d. Each Occurrence (Bodily Injury and property damage)	\$1,000,000
e. General Aggregate	\$5,000,000
f. Each Occurrence	\$2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

- a. Bodily Injury:



Each Person	\$1,000,000
Each Accident	\$1,000,000
b. Property Damage	
Each Accident	\$1,000,000
c. Combined Single Limit of	\$1,000,000
4. Excess or Umbrella Liability:	
a. Per Occurrence	\$1,000,000
b. General Aggregate	\$1,000,000
5. Contractor's Pollution Liability	
a. Each Occurrence	\$1,000,000
b. General Aggregate	\$1,000,000
6. Contractor's Professional Liability	
a. Each Claim	\$1,000,000
b. Annual Aggregate	\$1,000,000

*SC 6.05 Property Insurance*

**Add the following paragraph immediately after Paragraph 6.05.F:**

G. The Contractor shall provide INSTALLATION FLOATER INSURANCE when Builder's Risk Insurance is inappropriate, or when Builder's Risk Insurance will not respond, to cover damage or destruction to renovations, repairs, materials, or equipment being installed or otherwise being handled or stored by the Contractor, including off-site storage, transit and installation. The amount of coverage shall provide full replacement value (FRV) of the property, repairs, additions, materials, or equipment being installed, otherwise being handled or stored on or off premises. All risks coverage shall be provided. Coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment that will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

**ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES**

*SC 7.01 Supervision and Superintendence*

**Add the following new paragraph C after Paragraph 7.01.B:**

C. All General Contractors shall have the authority and be responsible for coordination of the activities among the other prime contractors and subcontractors on the Site to ensure a safe, efficient working environment. This authority covers scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing, and all other aspects of the Work that do not impact the design or function of the work.

*SC 7.02 Labor; Working Hours*

**SC-7.02.A.1**

**Add the following new paragraphs immediately after Paragraph 7.02.B:**

C. Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services, Owner's representative and construction observation services occasioned by the performance of work on Saturday, Sunday, any legal holiday, or as overtime on any work day. For purposes of administering the foregoing requirement, additional overtime costs are defined as \$75 per hour.

D. The Contractor shall employ workmen skilled in their various duties and shall remove from the project, at the request of the Engineer, any person employed in, about, or upon the work, who misconducts himself or is incompetent or negligent in the performance of the duties assigned to him. No person under the age of eighteen (18) years and no convict labor shall be employed to perform any work under this Contract. No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health or safety of others shall be employed to perform any work under this Contract, provided that this shall not operate against the employment of physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform. There shall be no discrimination because of race, creed, color or political affiliation in the employment of persons for work under this Contract.

With respect to additional skilled, semi-skilled workers employed to perform work on the project, preference in employment shall be given first to persons who reside in the city in which the work is to be performed, and second to persons residing in the county in which the work is to be performed.

*SC 7.03 Services, Materials and Equipment*

**Add the following new paragraph immediately after Paragraph 7.03.C:**

D. The Contractor agrees that he will obtain from the manufacturers of equipment and materials furnished under this Contract guarantees against defective materials and workmanship, and if those guarantees furnished by the manufacturer do not extend for the term of one (1) year from and after the date upon which the final estimate of the Engineer is formally approved by the Owner or other established date as set forth herein (such as the substantial completion date), he shall make the necessary arrangements and assume all cost for extending this guarantee for the required period.

*SC 7.04 "Or Equals"*

**SC 7.04.A Amend the third sentence of Paragraph 7.04.A by striking out the following words:**

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

**SC 7.04.A.1 Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.**

**SC 7.04.A.1 Delete paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:**

[Deleted]

*SC 7.06 Concerning Subcontractors, Suppliers and Others*

**SC 7.06.B Delete paragraph 7.06.B in its entirety and insert the following in its place:**

[Deleted]

**SC 7.06.E Amend the second sentence of Paragraph 7.06.E by striking out "Owner may also require Contractor to retain specific replacements; provided, however, that".**

**Delete Paragraph 7.06.F in its entirety.**

**SC-7.06 Add a new paragraph immediately after Paragraph 7.06.O:**

P. The Contractor shall not award work valued at more than (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

*SC 7.08 Permits*

**Delete Paragraph 7.08.A in its entirety and insert the following in its place.**

Owner shall obtain and pay for all construction permits, including building permits. Contractor is responsible for all utility permits and fees for usage during the construction period. Contractor is responsible for any electrical, plumbing and/or building inspections and fees which may be required.

*SC 7.16 Shop Drawings, Samples and Other Submittals*

**Add the following new paragraphs immediately after Paragraph 7.16D.8:**

9. CONTRACTOR shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the ENGINEER'S approval thereof.

10. ENGINEER'S review of submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instruction for installation or performance of equipment of systems, all of which remain the responsibility of the Contractor as required by the Contract Documents.

11. ENGINEER'S review and approval of Shop Drawings or Samples do not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER'S attention to each such variation at the time of each submittal as required by paragraph 7.16.A.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval, or has issued a Change Order that authorizes the deviation.

## **ARTICLE 10 - ENGINEER'S STATUS DURING CONSTRUCTION**

### *SC 10.03 Project Representative*

#### **SC-10.03**

The Engineer will provide Resident Project Representative Services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific project. Owner or Engineer will make available upon request.

## **ARTICLE 11 - AMENDING THE CONTRACT DOCUMENTS: CHANGES IN THE WORK**

### *SC 11.07 Execution of Change Orders*

#### **SC 11.07.C Add the following new Paragraph after Paragraph 11.07.B:**

All Contract Change Orders must be concurred in by Agency before they are effective.

## **ARTICLE 13 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### *SC 13.02 Allowances*

**SC 13.02.C Delete Paragraph 13.02.C in its entirety and insert the following in its place:**

[Deleted]

## **ARTICLE 14 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### *SC 14.03 Defective Work*

#### **SC-14.03**

**Add the following new paragraph immediately after Paragraph 14.03.D:**

1. When the repairs or replacements involve one or more items of installed equipment, Contractor shall provide the services of qualified factory-trained servicemen in the employ of the equipment manufacturers to perform or supervise the repairs or replacements.

*SC 14.07 Owner May Correct Defective Work*

**SC-14.07**

**Add the following new paragraph immediately after Paragraph 14.07.D:**

E. When the Engineer or the Owner deems it necessary, and so orders, such replacements or repairs under this section shall be undertaken by the Contractor within twenty-four (24) hours after service of notice. If the Contractor unnecessarily delays or fails to make the ordered replacements or repairs within the time specified, or if any replacements or repairs within the time specified, or if any replacements or repairs are of such nature as not to admit /of the delay incident to the service of notice, then the Owner shall have the right to make such replacements or repairs and the expense thereof shall be paid by the Contractor or deducted from any moneys due to Contractor.

**ARTICLE 15 - PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

*SC 15.01 Progress Payments*

**SC 15.01.B Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text: "a bill of sale, invoice, or other."**

**SC 15.01.B.3 Add the following language at the end of paragraph 15.01.B.3:  
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No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

**SC 15.01.B.4 Add the following new Paragraph after Paragraph 15.01.B.3:**

The Application for Payment form to be used on this Project is EJCDC C-620. The Agency must approve all Applications for Payment before payment is made.

**SC-15.01 D**

**Add the following new paragraph immediately after 15.01 D.1**

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

*SC 15.02 Contractor's Warranty of Title*

**SC 15.02.A Amend Paragraph 15.02.A by striking out the following text:**

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“no later than seven days after the time of payment by Owner” and insert “no later than the time of payment by Owner.”

## **ARTICLE 18 - MISCELLANEOUS**

### **SC-18.09 Add the following new paragraph:**

A. If this Contract exceeds \$100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

### **SC-18.10 Add the following new paragraph:**

A. If the Contractor shall fail or refuse to complete the work within the Contract Time, or extension of time granted by the Owner, then the Contractor agrees as a partial consideration for the awarding of this Contract that the Owner may retain from the compensation otherwise to be paid to the Contractor the amount specified below, not as a penalty but as liquidated damages, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

### **SC-18.11 Add the following new paragraph:**

#### **18.11 Disruption of water or wastewater operations**

A. The Contractor shall take all necessary precautions to minimize the disruption in water and/or wastewater system operations. When a disruption in the operations is required, the Contractor shall coordinate in advance (5 days minimum) the interruption with the Engineer and the Owner; the interruptions shall be held to a minimum by wise and prudent coordination of Contractor work efforts. The Contractor shall be held responsible for all damages brought about by disruption of the operations if such disruptions are a direct cause of Contractor negligence and or a failure of the Contractor to coordinate his work effort with the Engineer and Owner.

### **SC 18.12 Add the following new paragraph after Paragraph 18.11:**

Tribal Sovereignty. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the {insert name of Tribe} Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.

## **ARTICLE 19 - FEDERAL REQUIREMENTS**

### **SC 19.01 Add the following language as Paragraph 19.01 with the title “Agency Not a Party”:**

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

**SC 19.02 Add the following sections after Article 19.01 with the title “Contract Approval”:**

A. Owner and Contractor will furnish Owner’s attorney such evidence as required so that Owner’s attorney can complete and execute the following “Certificate of Owner’s Attorney” (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

**SC 19.03 Add the following language after Article 19.02.B with the title “Conflict of Interest”:** *RUS Bulletin 1780-26 Exhibit H Page 5*

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner’s officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner’s officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

**SC 19.04 Add the following language after Article 19.03.A with the title “Gratuities”:**

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor’s agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

**SC 19.05 Add the following language after Article 19.04.B with the title “Audit and Access to Records”:**

A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

**SC 19.06 Add the following language after Article 19.05.A with the title “Small, Minority and Women’s Businesses”:**

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women’s businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and RUS Bulletin 1780-26 Exhibit H Page 6 women’s businesses on solicitation lists; (2) assuring that small, minority and women’s businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women’s businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women’s businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

**SC 19.07 Add the following after Article 19.06.A with the title “Anti-Kickback”:**

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States”). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

**SC 19.08 Add the following after Article 19.07.A with the title “Clean Air and Pollution Control Acts”:**

A. If this Contract exceeds \$100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

**SC 19.09 Add the following after Article 19.08 with the title “State Energy Policy”:**



A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

**SC 19.10 Add the following after Article 19.09 with the title “Equal Opportunity Requirements”:**

A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, “Equal Employment Opportunity,” as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and as supplemented by regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”  
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B. Contractor’s compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor’s goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed. C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

**SC 19.11 Add the following after Article 19.10.C with the title “Restrictions on Lobbying”:**

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

**SC 19.12 Add the following after Article 19.11.A with the title “Environmental Requirements”:**

When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:  
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A. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands. B. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps. C. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO). D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service. E. Mitigation Measures – The following environmental mitigation measures are

# **SECTION 4**

## **SPECIAL CONDITIONS**



## SECTION 4 - SPECIAL CONDITIONS

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SPECIAL CONDITIONS

1. Contract Change Order - All changes which affect the cost of the construction of the project must be authorized by means of a CONTRACT CHANGE ORDER. The CONTRACT CHANGE ORDER will include extra work, work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes should be recorded on a CONTRACT CHANGE ORDER as they occur so that they may be included in the partial payment estimate. All CONTRACT CHANGE ORDERS must be approved by the Rural Development.
2. Pre-Construction Conference - Following award of the CONTRACT, the CONTRACTOR will be required to attend a Pre-Construction Conference with OWNER, ENGINEER, RUS-RD and CDBG representatives during which items pertinent to performance and management of the project, will be thoroughly discussed and documented.
3. Equal Opportunity - If this contract exceeds \$10,000 the CONTRACTOR is subject to provisions of the equal opportunity requirements set forth in the Supplemental General Conditions, included herein with forms.
4. Labor Regulations - The CONTRACTOR and each of his subcontractors shall comply with the following statutes (and with regulations issued pursuant thereto which are incorporated herein by reference):

Title 18 U.S.C., Section 876: Kickback from public works employees. Whoever, by force, intimidation, or threat of procuring dismissal from employment, or by any other manner whatsoever induces any person employed in the construction, prosecution, completion or repair of any public building, public work, or building or work financed in whole or in part by loans (made, insured, or guaranteed) or grants from the United States, to give up any part of the compensation to which he is entitled under his contract of employment, shall be fined not more than \$5,000 or imprisoned not more than five years, or both.

Title 40 U.S.C., Section 276c: Regulations Governing Contractors and Subcontractors. The Secretary of Labor shall make reasonable regulations for Contractors and Subcontractors engaged in the construction, prosecution, completion or repair of public buildings, public works, or buildings or work financed in whole or in part by loans (made, insured, or guaranteed) or grant from the United States, including a provision that each Contractor and Subcontractor shall furnish weekly a statement with respect to the wages paid each employee during the preceding week.

The CONTRACTOR shall also comply with all Labor regulations set out in RUS/RD Supplemental General Conditions and CDBG Supplemental General Conditions.

The OWNER shall report all suspected or reported violations to the funding agencies.

5. Protection of Lives and Property - In order to protect the lives and health of his employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc., 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 or 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 which may result from their failure or their

improper construction, maintenance or operation.

6. Conflict of Interest - No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this CONTRACT or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this CONTRACT if made with a corporation for its general benefit.

No official of the OWNER who is authorized in such capacity and on behalf of the OWNER to negotiate, make, accept or approve, or to take part in negotiating, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in the CONTRACT or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the OWNER who is authorized in such capacity and on behalf of the OWNER who is in any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this CONTRACT or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

7. Partial Payments - Partial Payment estimate forms prepared by the ENGINEER shall be used when estimating periodic payments due the CONTRACTOR.

Computation of quantities that will be the basis for payment estimates, both monthly and final, will be made by the ENGINEER. All payment estimates may be checked and approved by the funding agencies before payment.

Where the computation of areas or volumes by exact geometric methods is unduly laborious or refined, the planimeter shall be held an instrument of precision and may be used in the determination of quantities upon which payments are based.

The measurements of the ENGINEER as to the amount of work done shall be final and conclusive.

Payments shall be made upon the work done within the lines prescribed by the drawings or specifications and in accordance with the unit prices for the items under which the work is done.

To insure the proper performance of the Contract, the OWNER shall retain an amount of each estimate as specified in the General Conditions and/or Supplemental General Conditions of RD.

**Additionally, on waterline contracts, clean up and seeding shall be calculated as ten percent (10%) of the unit price for pipe in place. Testing and sterilization as 5% of the unit price for pipe in place.**

8. Withholding Payments - The OWNER may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:
- (a) Defective work not remedied.
  - (b) Claims filed or reasonable evidence indicating probable filing of claims.
  - (c) Failure of CONTRACTOR to make payments properly to Subcontractors or for material or labor.
  - (d) A reasonable doubt that the work can be completed for the balance then unpaid.
  - (e) Damage to another CONTRACTOR or the OWNER'S facilities.
  - (f) Performance of work in violation of the terms of the CONTRACT DOCUMENTS.
  - (g) Where work on unit price items are substantially complete but lack cleanup and/or corrections ordered by the ENGINEER, amounts shall be deducted from unit prices in



partial payment estimates to amply cover such clean-up and/or corrections.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

9. Sanitary Facilities - All necessary temporary sanitary facilities shall be provided for by the Prime Contractor(s) and shall meet with current requirements of the State Environmental Protection Agency. After the completion of the work, all temporary sanitary facilities shall be properly disposed of by the Prime Contractor(s).
10. Final Inspection - Final inspection of the work shall be made for the OWNER by the ENGINEER in collaboration with the Representatives for the funding agencies. Such inspection shall be made as soon as practicable after the CONTRACTOR has notified the OWNER in writing that the work is ready for such inspection.
11. Project Signs - Contract "G-1" – Water Booster Pump Station - Upgrades shall furnish signs as set out in Section 01580 of this Technical Specifications. Location is to be determined by the Engineer at Pre-Construction Conference.
12. Conflicting Requirements - Should conflicting conditions exist within the Specifications, Contract Documents, or Construction Drawings, priorities shall be established as follows:
  - a) Written Contract
  - b) Written Proposal
  - c) Advertisement for Bids
  - d) Instruction to Bidders
  - e) Special Conditions
  - f) General Conditions
  - g) Written Technical Specifications
  - h) Standard Details
  - i) Large Scale Details on Drawings
  - j) General Arrangement Details on Drawings
13. Owner's Right to Award - The OWNER shall retain the right to award or not award any or all of the Contracts covered by these Contract Documents and Specifications.
14. Owner's Right to Increase or Decrease Units - The OWNER shall retain the right to increase or decrease or eliminate up to 20% of any of the units listed in the BID submitted by the CONTRACTOR as may be required to complete the work at any time concurrent with or following the award of the Contract.
 

Unit prices previously approved in original bid are acceptable for pricing changes of original bid items. However, when changes in quantities exceed 20 percent of the original bid quantity and the total dollar change of that bid item is significant, the unit price may be reviewed by the OWNER to determine if a new unit price should be negotiated for added work performed after the original contract completion date.
15. Workmen's Compensation and Insurance - Workmen's Compensation: As required by State Statutes
  - a) Public Liability and Property Damage Including Vehicular Liability: As listed in General Conditions
  - b) Builder's Risk or Installation Floater: Full amount of Contract Price.

16. Wage Rates - All Contractors for this project shall comply with **State codes** as they apply to wages and hours - public works projects.

**The State Prevailing Wage Determinations are located in Section 4 of these Specifications.**

17. Access to Records - Representatives of the funding agencies and the State D.O.W. shall have access to work whenever it is in preparation or progress. The Comptroller General of the United States, or any authorized representative, shall have access to any books, documents, papers, and records which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcriptions thereof.

18. Time of Completion and Liquidated Damages –

**Contract "G-1" – Water Booster Pump Station - Upgrades** shall be completed within **150** calendar days from date of Notice to Proceed.

Liquidated Damages shall be **\$500.00** for each calendar day any Contract remains incomplete after the Time of Contract Completion.

19. Contractor's Obligations - The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this contract, within the time herein specified, in accordance with the provisions of this Contract and said Specifications and in accordance with the plans and drawings covered by this Contract and any and all supplemental plans and drawings, and in accordance with the directions of the ENGINEER as given from time to time during the progress of the work. He shall furnish, erect, maintain, and remove such construction plants and such temporary works as may be required. The CONTRACTOR shall observe, comply with, and be subject to all the terms, conditions, requirements, and limitations of the Contract and Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the ENGINEER and the OWNER.
20. Quantities of Estimate - Whenever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the BID, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the OWNER to complete the work contemplated by this Contract, and such increase or diminution shall not give cause for claims or liability for damages.
21. 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 arising out of this Contract or receipt in full in lien thereof, and if required in either case, an affidavit that insofar as he has knowledge or information, the releases and receipts include all the labor and materials for which a lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the OWNER all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.
22. Work Reasonably Inferred But Not Particularly Delineated or Specified - The Contractor shall make a thorough examination of the site and study all drawings and specifications and all conditions relating to the erection of the work, and if any materials or labor are evidently necessary for the proper and complete execution of the work which are not specifically mentioned and

included in the drawings and specifications, although reasonably inferred therefrom, unless eliminated by special mention, or if any error or inconsistency appears therein, or in the event of any doubts arising as to the true intent and meaning of the drawings or specifications, he shall report it to the ENGINEER at least five (5) days in advance of receiving the proposals. The ENGINEER will then issue an addendum containing the proper information to all Contractors not later than three (3) days prior to the time for opening of bids, to assure fair competition.

In case the Contractor fails to make such report and the ENGINEER is not otherwise advised of such doubtful matters, the Contractor is hereby made responsible for the furnishing of the necessary labor and material reasonably inferred for any additional work involved in the correction of apparent errors or inconsistencies and in executing the true intent and meaning of the drawings and specifications as interpreted by the ENGINEER, and all such labor and material shall be provided at the Contractor's expense and under no condition will any such labor and material be allowed as an extra.

23. Limit of Liability of Owner to Contractor for Delays, Extra Cost and Damage - If, through no wrongful act or neglect of the OWNER, the Contractor is delayed, stopped, or caused extra cost or damage by injunction, court orders, judgment, or requirements of some other authority or acts beyond the control of the OWNER, he shall not be liable to the Contractor except for extension of time and payments only as reflected in application of quantities, prices, and extra work set forth in these specifications and contract. If sufficient work is otherwise available for application of Contractor's forces, the Owner will not be required to grant extension of time.
24. Requirements for Highway and Railroad Crossings and Rights-of-Way - The specifications herein concerning trenching, pipe laying, jacket pipe crossings, backfilling, maintenance during construction, protection of public, maintaining traffic, tunneling, and re-paving are subject to revision to conform to such requirements as set forth by highway and railroad specifications and such crossings and rights-of-way.
25. Delays and Cost Due to Errors and/or Changes in Lines and Grades - When the OWNER'S engineering forces make errors or changes in lines and grades that cause items of construction to be removed and replaced, the extra cost of such removal and replacement over that of correct construction shall be chargeable as an extra per terms of Article 12 of the General Conditions.

Where the Contractor's forces are delayed only due to ENGINEER'S errors or changes in not more than five in fifty cases of location of points on the whole project, errors and changes will not be above normal to be expected in the execution of the work, and no claims for extra cost due to such delay will be granted. Layout work is considered a normal portion of a construction operation in which it is considered impractical to prevent delays of some of the required labor and equipment while others are performing their portion of the operation. Excessive delay due to such causes shall be chargeable as extra work per terms of Article 12 of the General Conditions. However, to be allowable, time, labor, and equipment delayed must be reported to and approved by the ENGINEER within 24 hours. Labor and equipment must have been applied at the time of stoppage and could not have been applied to other incomplete work during the stoppage.

26. Licenses and Permits - The Owner will secure and pay for permits required for permanent structures and State Highway Encroachment Bonds. The Contractor shall obtain and pay for all other necessary licenses and permits and shall faithfully comply with all laws, ordinances and regulations, Federal, State, or local, which may be applicable to the operations to be conducted hereunder.
27. Conflict With or Damage to Existing Utilities - Insofar as location data is available to the ENGINEER, existing underground utilities (such as water lines, sewer lines, natural gas lines,

and underground telephone and electrical conduits) are located on the drawings. However, due to the approximate nature of such data and information, the locations of any particular utility cannot be certified as being correct. In general, locations and elevations are approximate only. The Contractor shall obtain the services of representatives of each of the utilities involved during construction to assist in the location of existing utilities. Lines and grades of lines have been established to minimize interference with utilities as far as possible. However, it shall be the responsibility of the Contractor to determine any relocations necessary for his performance of the contract, and to pay any fees associated therewith, with no additional cost or liabilities to the OWNER.

28. Shop or Setting Drawings - See Section 01300 of Technical Specifications for further detail. Submittals **must** meet all submittal requirements set out therein or they will be returned to Contractor.
29. Work Hours Beyond Regular Hours - The Contractor shall notify the ENGINEER in writing of any scheduled work beyond regular and normal working hours at least 48 hours in advance of the work. Work performed after regular working hours and without notice to the ENGINEER, shall be considered not in conformance with the Plans and Specifications and may be removed or not paid for.
30. Excavation - All excavation shall be considered unclassified. **Rock excavation is not a separate pay item**, and shall not be cause for claim of additional compensation due to the Contractor.
31. Air and Water Acts - If the contract exceeds \$100,000 the Contractor agrees to comply with all the requirements of Section 114 of the Air Act (41 U.S.C., Section 1857 C-9) and Section 308 of the Water Act (33 U.S.C., Section 1318) relating to inspection, monitoring, entry, reports, and information, as well as all other requirements specified in Section 114 of the Air Act and Section 308 of the Water Act and all regulations (40CFR 15.4) and guidelines issued thereunder after the award of the contract. In so doing, the Contractor further agrees to:
  - a) As a condition for the Award of Contract, to notify the OWNER of the receipt of any communication from the Environmental Protection Agency (EPA) indicating that a facility to be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities. Prompt notification is required prior to contract award.
  - b) The Contractor will include, or cause to be included, the above criteria and requirements in every nonexempt subcontract and that he will take such action as the Government may direct as a means of enforcing such provisions.
  - c) To certify that any facility to be utilized in the performance of any nonexempt contractor is not listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20 as of the date of contract award.
32. Subcontracting - The following is in addition to and in conjunction with Article 6 of the General Conditions.

Prior to the execution and delivery of the Agreement, the successful Bidder will submit to the OWNER and the ENGINEER for acceptance a list of the names of Subcontractors and such other persons and organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for those portions of the Work as to which the identity of the Subcontractors and other persons and organizations must be submitted as specified in the Contract Documents. Prior to the execution and delivery of the Agreement, the ENGINEER will notify the successful Bidder in writing if either the OWNER or the ENGINEER, after due investigation, has reasonable objection to any Subcontractor, person or organization on such list. The failure of the OWNER or the ENGINEER to make objection to any Subcontractor, person or

organization on the list prior to the execution and delivery of the Agreement shall constitute an acceptance of such Subcontractor, person or organization. Acceptance of any such Subcontractor, person or organization shall not constitute a waiver of any right of the OWNER or the ENGINEER to reject defective Work, material or equipment, not in conformance with the requirements of the Contract Documents.

If, prior to the execution and delivery of the Agreement, the OWNER or the ENGINEER has reasonable objection to and refuses to accept any Subcontractor, person or organization on such list, the successful Bidder may, prior to such execution and delivery, either (a) submit an acceptable substitute without an increase in his Bid Price or (b) withdraw his Bid and forfeit his Bid security. If, after the execution and delivery of the Agreement, the OWNER or the ENGINEER refuses to accept any Subcontractor, person or organization on such list, the CONTRACTOR will submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution and appropriate Change Order shall be issued; however, no such increase in the Contract Price shall be allowed in respect of any substitutions unless the CONTRACTOR has acted promptly and reasonably in submitting a name with respect thereto prior to the execution and delivery of the Agreement.

The CONTRACTOR will not employ any Subcontractor (whether initially or as a substitute) against whom the OWNER or the ENGINEER may have reasonable objection, nor will the CONTRACTOR be required to employ any Subcontractor against whom he has reasonable objection. The CONTRACTOR will not make any substitution for any Subcontractor who has been accepted by the OWNER and the ENGINEER, unless the ENGINEER determines that there is good cause for doing so.

The divisions and sections of the Specifications and the identifications of any drawings shall not control the Contractor in dividing the Work among Subcontractors or delineating the Work to be performed by any trade.

The CONTRACTOR agrees to specifically bind every Subcontractor to all of the applicable terms and conditions of the Contract Documents. Every Subcontractor, by undertaking to perform any of the Work, will thereby automatically be deemed to be bound by such terms and conditions.

All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and the Subcontractor which shall contain provisions that waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by insurance provided in accordance with the General Conditions; except such rights as they may have to the proceeds of such insurance held by the OWNER as trustee under the General Conditions. The CONTRACTOR will pay each Subcontractor a just share of any insurance moneys received by the CONTRACTOR under the General Conditions.

33. Materials, Equipment and Labor; Substitute Material or Equipment - The following is in addition to and in conjunction with Article 6 of the General Conditions.

All materials and equipment will be new. If required by the ENGINEER, the CONTRACTOR will furnish satisfactory evidence as to the kind and quality of materials and equipment.

If it is indicated in the Specifications that the CONTRACTOR may furnish or use a substitute that is equal to any material or equipment specified, and if the CONTRACTOR wishes to furnish or use a proposed substitute, he will, promptly after the award of the contract, make written application to the ENGINEER for approval of such a substitute certifying in writing that the proposed substitute will perform adequately the duties imposed by the general design, be

similar and of equal substance to that specified by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. No substitute shall be ordered or installed without the written approval of the ENGINEER who shall be the judge of equality.

34. Availability of Lands, Physical and Subsurface Conditions; Reference Points - The following is in addition to and in conjunction with Article 4 of the General Conditions.

The OWNER will provide, as indicated in the Contract Documents and not later than the date when needed by the CONTRACTOR, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the OWNER, unless otherwise specified in the Contract Documents. If the CONTRACTOR believes that any delay in the OWNER'S furnishing these lands or providing such easements entitles him to an extension of the Contract Time, he may make a claim therefore as provided in the General Conditions. The CONTRACTOR will provide all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

The OWNER will, upon request, furnish to the CONTRACTOR copies of all available boundary surveys and subsurface tests.

The CONTRACTOR will promptly notify the OWNER and ENGINEER in writing of any subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents. The ENGINEER will promptly investigate those conditions and advise the OWNER in writing if further surveys or subsurface tests are necessary. Promptly thereafter, the OWNER will obtain the necessary additional surveys and tests and furnish copies to the ENGINEER and the CONTRACTOR. If the ENGINEER finds that the results of such surveys or tests indicate subsurface or latent physical conditions differing significantly from those indicated in the Contract Documents, a Change Order shall be issued incorporating the necessary revisions.

The OWNER will establish such general reference points as in his judgment will enable the CONTRACTOR to proceed with the Work. The CONTRACTOR will be responsible for the layout of the Work and will protect and preserve the established reference points and will make no changes or relocations without the prior written approval of the OWNER. He will report to the ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations. The CONTRACTOR will replace and accurately relocate all reference points so lost, destroyed or moved.

35. Substantial Completion - Prior to final payment, the CONTRACTOR shall, in writing to the OWNER and the ENGINEER, certify that the entire Project is substantially complete and request that the ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, the OWNER, CONTRACTOR AND ENGINEER will make an inspection of the Project to determine the status of completion. If the ENGINEER considers the Project substantially complete, he will prepare and deliver to the OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion and the responsibilities between the OWNER and the CONTRACTOR for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within the Contract Time. The OWNER shall have seven days after receipt of the tentative certificate during which he shall make written objection to the ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, the ENGINEER concludes that the Project is not substantially complete, he shall notify the CONTRACTOR in

writing, stating his reasons therefore. If, after said seven days and after consideration of the OWNER'S objections, the ENGINEER considers the Project substantially complete, he will execute and deliver to the OWNER and the CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as he believes justified after consideration of any objections from the OWNER.

The OWNER shall have the right to exclude the CONTRACTOR from the Project after the date of Substantial Completion, but the OWNER may allow the CONTRACTOR reasonable access to complete or correct items on the tentative list.

36. Cleaning Up - The CONTRACTOR will keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work, and at the completion of the Work he will remove all waste materials, rubbish and debris from and about the premises as well as tools, construction equipment and machinery, and surplus materials, and will leave the site clean and ready for occupancy by the OWNER. The CONTRACTOR will restore to their original condition those portions of the site not designated for alteration by the Contract Documents. Also see paragraph 7 of these Special Conditions pertaining to clean-up.
37. Miscellaneous - Whenever any provisions of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given 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 or certified mail, postage prepaid, to the last business address known to him who gives the notice.

The duties and obligations imposed by the General Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the CONTRACTOR and the rights and remedies available to the OWNER and ENGINEER thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the Contract Documents.

Should the OWNER or the CONTRACTOR suffer injury or damage to its person or property because of any error, omission or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage.

The Contract Documents shall be governed by the law of the place of the Project.

38. Safety and Health Regulations - The Contractor shall comply with the Department of Labor Safety and Health Act of 1970 (P.L. 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (P.L. 91-54).
39. Siltation and Soil Erosion - The Contractor shall make every effort possible to assure a minimum amount of siltation and erosion will occur on the job site during construction.
40. Permanent Reference Points, Bench Marks, and Property Markers - The CONTRACTOR alone will be responsible for the protection and preservation of all permanent reference points, permanent bench marks, property corners, and property line points. The CONTRACTOR will make no changes or relocations without the written approval from the OWNER. The CONTRACTOR will report to the ENGINEER whenever any reference point, etc., is lost, damaged or destroyed or requires relocation and/or establishment of temporary points for relocation of said permanent point. The CONTRACTOR will have a registered land surveyor replace and accurately relocate all permanent points so lost, damaged, destroyed, or moved. The re-establishment of any said point

shall be considered incidental to the cost of construction and therefore at no additional cost to the OWNER.

41. Existing Utilities - Also see Technical Specifications, Section 02220.

Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies.

The available information concerning the location of existing underground utilities is shown on the Drawings. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies, or departments that own and operate utilities in the vicinity of the Construction Work. The purpose of the conference, or conferences, shall be to notify said companies, agencies, or departments of the proposed construction schedule, verify the location of and possible interference with the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and Owner have no objection to the Contractor arranging for the said utility companies, agencies, or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost for locating and avoiding, or repairing damage to said existing utilities.

Where existing utilities or appurtenant structures, either underground or above-ground, are encountered, they shall not be displaced or disturbed unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Relocation and/or replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense, unless such relocation and/or replacement is by statute or agreement the responsibility of the owner of the utility.

Where a sewer line is to be installed within 18 inches vertically or 10 feet horizontally of a water line, that section of the sewer line shall be encased in concrete, according to the requirements of Paragraph 3.10 B, Section 02700.

A list of the utility companies which service the project area are on the cover sheet of the drawings. The utilities are not limited to those on said list.

42. Coordination - All Contractors are advised that various Contracts will be awarded simultaneously with their Contracts. It is imperative that the various Contractors coordinate its activities and cooperate with the other Contractors to assure expedient completion of the Project. Any conflicts should be brought to the attention of the Engineer.

43. Care of Shrubbery - Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

44. Water for Testing and Disinfecting Purposes - Where water is required for testing and disinfecting water lines and storage tanks or testing and flushing sewer lines, the Contractor shall be responsible for all costs of said water. In the case where test water is to be purchased, the Contractor shall arrange for the purchase and shall pay all costs associated with the purchase including tap fee if applicable.



Note: The Owner will furnish water to Contractors for testing and sterilization at a cost not to exceed \$4.00/1,000 gallons. Contractors are responsible for all charges for water losses caused by leaks which occur during the one year warranty period.

Water volume used for testing and sterilization shall be computed as the difference in the master readings and the average of the readings recorded during the six months prior to construction.

45. **USDA Rus-KY Bulletin 1780-2 Guidance for Implementation of American Iron & Steel (AIS) - 21 Pages and Exhibits.**



UNITED STATES DEPARTMENT OF AGRICULTURE  
Rural Utilities Service  
KENTUCKY BULLETIN 1780-2

**SUBJECT:** Guidance for Implementation of American Iron and Steel (AIS).

**TO:** Applicants, Consulting Engineers, Contractors, and Manufacturers

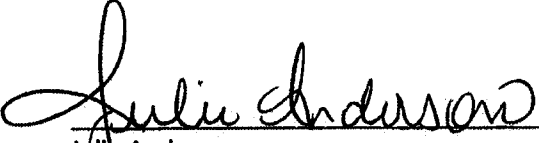
**EFFECTIVE DATE:** Date of approval.

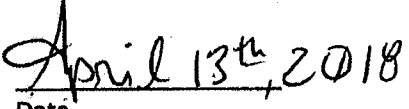
**INSTRUCTIONS:** This is a new Bulletin and does not replace any existing Kentucky Bulletin.

**AVAILABILITY:** This Bulletin, as well as any RD or RUS instructions, regulations, or forms referenced in this Bulletin are available at any RD State Office or Area Office. The State Office staff is familiar with the use of the documents and can answer specific questions or RD requirements.

The basic concept of this new requirement is that all iron and steel products used in projects funded by RUS WEP must be produced in the United States. Iron and steel products are defined on page 14 of this Bulletin.

**PURPOSE:** This Bulletin provides information and guidance to effected parties regarding the AIS Requirements mandated by Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A-Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statues mandating domestic preference.

  
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Julie Anderson  
State Engineer  
Water and Environmental Programs

  
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Date



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1. BACKGROUND

- A. Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statues mandating domestic preference. It applies a new American Iron and Steel (AIS) requirement on the Rural Development (RD) WEP program.
- B. Statutory Language: SEC 746 Division A Title VII the Consolidated Appropriations Act of 2017.
  - (1) No Federal funds made available for this fiscal year for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, and 310B of the Consolidated Farm and Rural Development Act (7 USC 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public water or wastewater system unless all of the iron and steel products used in the project are produced in the United States.
  - (2) In this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipe flanges, manhole covers, and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

2. APPLICABILITY

- A. The requirements of AIS apply only to projects that construct, alter, enlarge, extend, maintain, repair or otherwise improve rural water, sanitary sewage, solid waste disposal, and storm wastewater disposal facilities.
- B. The requirements apply to projects using funds from RD WEP. Any amount of funding from this program requires compliance with the AIS requirements. Use of funds from this program is not allowed unless the requirements for AIS are met for the entire project. Projects that leverage funds from other funding sources are also subject to the requirements.
- C. The requirements apply in the United States as defined in Section 746 (g) of the statute and therefore do not apply to projects located in Puerto Rico, the Virgin Islands, or Western Pacific Territories.
- D. The requirements apply to any used iron and steel products to be constructed in the project.
- E. The requirements do not apply to projects for which any funds were obligated on or before May 5, 2017. The requirements therefore do not apply to subsequent obligation of funds for projects which had an initial obligation of funds on or before May 5, 2017.
- F. The requirements do not apply to contracts which were executed prior to or on May 5, 2017, regardless of date of obligation.

- G. The requirements do not apply to projects for which contracts were executed and/or construction is already underway and/or completed prior to applying to USDA for funding.
  - H. The requirements do not apply to products primarily composed of iron and/or steel (composed of more than 50%) if they are not listed in the statute.
  - I. The requirements do not apply to raw materials used in the production of iron or steel such as iron ore, limestone, scrap iron and scrap steel.
  - J. The requirements do not apply to any items that are at the construction site temporarily, such as scaffolding, trench boxes, and equipment temporarily used or stored on site.
  - K. The requirements do not apply when the sole purpose of the loan and/or grant is to fund non-construction activities such as capacity/connection fees or the acquisition of a system.
  - L. The requirements supersede any regulation on full and open competition stated in 7 CFR 1780.70 (b) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer, provided documentation is submitted and verified, sole source procurement of said product may be used.
  - M. The requirements only apply to the final product as delivered to the work site and incorporated into the project. The need for compliance of an item with AIS depends on whether or not the final assembled product is listed. Components of a final product, even if they are listed, do not need to comply with the AIS requirements. In the case of an assembled product where the primary component is not listed in the 2017 Consolidated Appropriations Act and includes components/appurtenances that are specifically listed, said assembled product is not subject to AIS (e.g. pump assembly).
3. IMPLEMENTATION (Agency, Owner, Engineer, Contractor, manufacturer's et al)
- A. There are several parties involved in compliance with the AIS requirement and some requirements are specific to a party.
  - B. The parties that have one or more responsibilities under AIS include: the Agency funding recipients under the Water and Waste Disposal Loan and Grant program and Guaranteed Loan Program, consulting engineers, construction contractors, suppliers, distributors, manufacturers; lenders under the Guaranteed Loan Program; and grantees under 306C and ECWAG programs.



**4. OWNER RESPONSIBILITIES:**

- A. Sign loan resolutions, grant agreements and letters of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.**
- B. Sign Agreement for Engineering Services, executed construction contracts and all other appropriate and necessary documents which include AIS language.**
- C. Acknowledge responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial payment estimates (i.e. C-602 of EJCDC or RD Form 1924-18).**
- D. Obtain the certification letters from the Engineer once substantial completion has been achieved and maintain this documentation for the life of the loan.**
- E. In special cases where the Owner provides its' own engineering and/or construction services, provide copies of Engineer's Certification Letter (Exhibit B) and Contractor's Certification Letter (Exhibit C) to the Agency. Manufacturer's Certification Letter (Exhibit D) must be obtained by the Owner for each AIS qualifying product. All certification letters must be kept in the Engineer's project file and on site during construction. For Owner Construction (Force Account), all AIS clauses from Section 11 must be included in the Agreement for Engineering Services.**

**5. ENGINEER RESPONSIBILITIES**

- A. Costs of compliance with AIS should be included in the engineering fees (if appropriate) and in Engineer's opinions of probable project costs.**
- B. Develop the initial AIS Materials List (Exhibit J) for each contract using project specifications and include the initial qualifying list with the bid documents. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.**
- C. Include AIS language (Section 11) in the Agreement for Engineering Services.**
- D. Plans, specifications, bidding documents and bid addenda must include required AIS language (Section 12). For any AIS products specified by brand names, obtain a Manufacturer's Certification Letter (Exhibit D) from the manufacturer to verify the products comply with AIS.**
- E. Certify that plans, specifications, and bidding documents comply with AIS and commit that bid addenda, executed contracts and change orders will comply with AIS and submit Engineer's Certification Letter (Exhibit B) to the Agency prior to authorization to advertise for bids.**

- F. Provide a copy of the Manufacturer's Certification Letter (Exhibit D) on any specified brand name AIS products in the plans, specifications and bidding documents including any bid addenda to the Contractor.
  - G. Coordinate with the Contractor(s) to compile a complete AIS Materials List (Exhibit J) for each contract, sign and date, and provide a copy to the Agency in the construction contract(s).
  - H. Review shop drawings and change orders to ensure compliance with AIS. For shop drawings under consideration for any brand name, equal and/or substitute, any iron and steel products subject to AIS, obtain the Manufacturer's Certification Letter (Exhibit D) from the Contractor to verify the products comply with AIS.
  - I. Keep all certification letters (including those from the Engineer, Contractor, and any manufacturer providing AIS products) in the Engineer's project file.
  - J. Review AIS Materials List (Exhibit J) submitted with each invoice to verify accuracy and sign and date.
  - K. For any change order under consideration for any AIS products, obtain a Manufacturer's Certification Letter (Exhibit D) from party submitting the change proposal to ensure compliance with AIS.
  - L. Acknowledge responsibility for compliance with AIS requirements by signing change orders (i.e. C-941 of EJCDC or RD Form 1927-7) and partial pay estimates (i.e. C-620 of EJCDC or RD Form 1924-18).
  - M. Upon substantial completion of project, obtain the Contractor's Certification Letter (Exhibit C) and a complete and final AIS Materials List (Exhibit J) to submit to the RD State Engineer. Obtain copies of any/all manufacturers' certification letters for all AIS products used in the project to be kept in the Owner's project file.
  - N. Resident project representative (RPR) reports must include verification, either by picture or written statement, that an item subject to AIS was installed and was in compliance with requirements.
6. CONTRACTOR RESPONSIBILITIES
- A. Review the Engineer's AIS Materials List (Exhibit J) prior to bid preparation.
  - B. Bid submittal with a request for consideration from a proposed equal or substitute should also include a Manufacturer's Certification Letter (see Exhibit D) to verify the products comply with AIS.
  - C. Upon award of the contract, obtain copies of any and all manufacturers' certification letters from the Engineer for brand name products specified by the Engineer.

- D. Work with the Engineer to compile a complete AIS Materials List (Exhibit J) for each contract as bid.
  - E. Shop drawing submittals for proposed equals, substitutes, and any iron and steel product subject to AIS, provide a Manufacturer's Certification Letter (Exhibit D) to verify the product complies with AIS.
  - F. Prior to construction, ensure that copies of any and all manufacturers' certification letters, including those from others (e.g. Engineer, Owner, etc.), for any AIS products to be used in the project are in the project file on site prior to installation.
  - G. Pay request must have an updated AIS Materials List (Exhibit J) submitted with each pay request. All columns must be filled out completely as applicable. Do not complete columns under "De Minimis Materials Only" for qualifying materials. Sign and date. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
  - H. Change orders for any AIS products must include a Manufacturer's Certification Letter (Exhibit D) to the Engineer to verify the products comply with AIS.
  - I. Acknowledge responsibility for compliance with AIS requirement by signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial pay estimates (C-620 of EJCDC or RD Form 1924-18).
  - J. Keep all manufacturer certification letters (including those from the Engineer, Contractor and any manufacturer providing AIS products) on site during construction in the construction project file.
  - K. Upon substantial completion of the project, provide Contractor's Certification Letter (Exhibit C) to the Engineer that all iron and steel products installed comply with AIS
7. MANUFACTURER, SUPPLIER, DISTRIBUTOR RESPONSIBILITIES
- A. If iron and steel products are produced in the United States as defined in this Bulletin, prepare (applicable to manufacturers and fabricators) or obtain (applicable to suppliers, distributors, vendors, etc.) Manufacturer's Certification Letters (Exhibit D) and make available upon request to Engineer, Contractor, etc.
8. RESPONSIBILITIES UNDER THE GUARANTEED LOAN PROGRAM  
AIS applies to projects funded by Section 306A- Guaranteed Loan Program
- A. Lenders are responsible to ensure that loan recipients comply with AIS requirements.
  - B. Loan recipients are ultimately responsible for compliance with AIS requirements.

9. ECWAG

- A. If construction contracts were awarded and/or executed or construction began prior to application, these projects are not subject to AIS (Section 2).
- B. If construction contracts were awarded and/or executed or construction began during the application process, these projects are subject to AIS.

10. AGREEMENT BETWEEN OWNER AND ENGINEER (EJCDC E-500) PROVISIONS

- A. Article 5.01.A: Add the following "Opinions of probable cost and any revisions thereof should reflect compliance with American Iron and Steel (AIS) requirements mandated in the Consolidated Appropriations Act of 2017 and any subsequent mandating domestic preferences."
- B. Add paragraph 5.03.B: "Opinions of total project cost and any revisions thereof should reflect compliance with AIS and any subsequent statutes mandating domestic preference."
- C. Add paragraph A.1.03.A.13: "Services required to determine and certify that to the best of the Engineer's knowledge and belief that all iron and steel products referenced in engineering analysis, the plans, specifications, bidding documents, and associated bid addenda requiring design revisions are either produced in the US or are subject to approved waiver. Services required to determine to the best of the Engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, change orders and partial payment estimates are either produced in the US, or are subject of an approved waiver. The de minimis and minor components waiver {add project specific waivers if applicable} apply to this contract."
- D. Add paragraph A.1.04.A.10: "Provide copies of all manufacturers' certification letters to the Bidders on brand name iron and steel products along with plans, specifications and bidding documents. Manufacturers' certification letters are to be included in the bidding documents and must be kept in the Engineer's project file and in site during construction."
- E. Add paragraph A.1.04.11: "Provide copies of all manufacturers' certification letters to the Contractor on any brand name iron and steel products along with the plans, specifications, bidding documents. Including any bid addenda and change orders. Manufacturers' certification letters must be kept in the Engineer's project file for the duration of construction."
- F. Add paragraph A.1.04.12: "Develop AIS Materials list (Exhibit J) for bidding purposes and finalize with the Contractor for tracking. Review updated AIS Materials list for accuracy each month and include in each pay request. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy."

- G. **Modify A.1.05.A.17: Add the following prior to the first sentence "Review and approve, or take other appropriate action, with respect to shop drawings, samples, and other required Contractor submittals to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference. Any iron and steel products included in any submittal by the Contractor, must include the Manufacturer's Certification Letter (Exhibit D) to verify the products were produced in the U.S. Copies of these letters must be kept in the Engineer's project file and on site during construction."**
  
- H. **Article A.1.05.A.18: Add the following at the end of the paragraph as amended by Kentucky Bulletin 1780-1 "Prior to approval of any substitute "or equal" obtain the Manufacturer's Certification Letter (Exhibit D) to verify the products were produced in the U.S. Manufacturers' certification letters must be kept in Engineer's project file and on site during construction to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference, if applicable."**
  
- I. **Add subparagraph A.1.05.A.19.d: "Receive and review all manufacturers' certification letters for materials required to comply with AIS and any subsequent statutes mandating domestic preference to verify the products were procured in the U.S. Manufacturers' certification letters must be kept in the Engineer's project file on site during construction."**
  
- J. **Add subparagraph (c) to the end of A.1.05.A.20: (c) Review change proposals to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference."**
  
- K. **Add item "a" as a deliverable under paragraph A.1.05.A.25: (s) Obtain the Contractor's Certification Letter (Exhibit C) and copies of manufacturers' certification letters for all AIS used in the project. Upon substantial completion, provide copies of Engineer's, Contractor's, and all manufacturers' certification letters to the Owner. Attach Contractor's Certification Letter (Exhibit C) and a final AIS Materials List (Exhibit J) with letter of substantial completion and submit it to the Agency."**
  
- L. **Add the following language to B.2.02: "Owners are ultimately responsible for compliance with AIS and any subsequent statutes mandating domestic preference and will be responsible for the following:**
  - 1. **Signing loan resolutions, grant agreements and letter of intent to meet conditions which include AIS language, accepting AIS requirements in those documents and in the letter of conditions.**
  - 2. **Signing change orders (i.e. C-941 of EJCDC or RD Form 1924-7) and partial pay estimates (C-620 of EJCDC or RD Form 1924-18) and thereby acknowledging responsibility for compliance with AIS requirements.**
  - 3. **Obtaining all certification letters from the Engineer upon substantial completion of the project and maintaining this documentation for the life of the loan.**

4. Where the Owner provides their own engineering and/or construction services, provide copies of Engineer's, and Contractor's certification letters to the Agency, and obtain all manufacturers' certification letters as required. All certification letters must be kept in the Engineer's project file and on site during construction. For Owner Construction (Force Account), all clauses from Section 11 must be included in the Agreement or Engineering Services.
  5. Where the Owner directly procures AIS products, including AIS clauses in the procurement contracts and obtaining manufacturers' certification letters and providing copies to consulting engineers and contractors.
- M. Add subparagraph D.1.01.C.11.g: "(g) Maintain all manufacturers' certification letters in the project file and on site during construction to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference, as applicable."
- N. Add the following at the end of D.1.01.c.11b: Daily reports should document installation of an AIS material and verify by picture or statement on the report that the manufacturer was the same as that listed on the AIS materials list and complied with AIS requirements.
11. **BIDDING AND CONSTRUCTION CONTRACT DOCUMENTS (EJCDC C-SERIES, 2013)**
- A. **Advertisement for Bids (C-111)**  
Add at the end of C-111 prior to the Owner's name: "Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies, Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies to American Iron and Steel requirement to this project. All listed iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron and steel: lines or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The de minimis and minor components waiver {all project specific waivers as applicable} apply to this contract."
- B. **Instruction to Bidders (C-200)**
1. Article 5.01.C: Delete the semicolon at the end of the article and insert the following "included but not limited to the AIS requirements as mandated and any subsequent statutes mandating domestic preference which apply to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.
  2. Article 11.01: Modify article as previously amended by Kentucky Bulletin 1780-1 by inserting the following sentence after "Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. Each such request shall include the Manufacturer's Certification Letter (Exhibit D) for compliance with AIS requirements and any subsequent statutes mandating domestic preference, if applicable.

3. Article 24.02: Add paragraph 24.02:Section 746 of Title VII Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and any subsequent statues mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be procured in the United States. "Iron and Steel Products" is defined in Section 1.b.2. The de minimis and minor components waivers {add project specific waivers as applicable} apply to this contract."
- C. Bid Form (C-410)
1. Article 3.01.C: Add language at the end of the sentence "...and including all AIS requirements.
  2. Article 7.01: Add 7.01.K "Manufacturer's Certification Letter (Exhibit D) on any approved "or equal" or substitute request to ensure compliance with AIS requirements and any subsequent statutes mandating domestic preference.
- D. Supplementary General Conditions (C-800)
1. SC 1.01.A.51: "Manufacture's Certification Letter (Exhibit D) is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the AIS products to be used in the project are produced in the U.S. in accordance with the AIS requirements.
  2. SC 1.01.A.52: "AIS refers to requirements mandated by Section 746 Title VII of the Consolidated Appropriation s Act of 2017 and any subsequent statutes mandating domestic preference. "Iron and Steel Products" is defined in Section 1.b.2.
  3. SC 7.03: Add sentence "all iron and steel must meet AIS requirements.
  4. SC 7.04.B.1: "Contractor shall include the Manufacturer's Certification Letter (Exhibit D) for compliance with AIS requirements to support data, if applicable. In addition, Contractor shall maintain an updated AIS Materials List (Exhibit J), to ensure that for de minimis waiver, cost is less than 5% of total materials cost for project and for minor components waiver, the cost of the non-domestically produced component is less than 5% of the total materials cost of the product." An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
  5. SC 7.05.A.3.a4: "4) comply with AIS by providing the Manufacturer's Certification Letter (Exhibit D), if applicable.
  6. SC 7.11.A: Modify by inserting the following after "written interpretations and clarifications,"; "Manufacturer's Certification Letter (Exhibit D) is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the iron and steel products to be used in the project are produced in the U.S. in accordance with AIS requirements.
  7. SC 7.16.A.1.e: "e. obtain the Manufacturer's Certification Letter (Exhibit D) for any item in the submittal subject to AIS requirements and include the certificate in the submittal.
  8. SC 7.16.D.9: "Engineer's review and approval of shop drawings or sample shall include review of compliance with AIS requirements, as applicable."

9. SC 7.17.E: "Contractor shall certify upon substantial completion that all work and materials has complied with AIS requirements as mandated and any subsequent statutes mandating domestic preference. Contractor shall provide Contractor's Certification Letter (Exhibit C) to Owner.
10. SC 10.10.A: "A: Services required to determine and certify that, to the best of the Engineer's knowledge and belief, all iron and steel products referenced in the engineering analysis, the plans, specifications, bidding documents, and associated bid addenda requiring design revisions are either produced in the U.S. or are the subject of an approved waiver. Services required to determine, to the best of the Engineer's knowledge and belief, that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, change orders, and partial pay estimates are either produced in the U.S. or are the subject of an approved waiver under the Consolidate Appropriations Act of 2017.
11. SC 11.06.A.1: Modify by inserting the following sentence after "within 15 days after the submittal of the change proposal..." "Include supporting data (project name, name of manufacturer, city and state where the product was manufactured, description of product, signature of authorized manufacturer's representative) in the Manufacturer's Certification Letter (Exhibit D), as applicable."
12. SC 14.03G: Installation of materials that are non-compliant with AIS requirements shall be considered defective work.
13. SC 15.01.B.4: "4. By submitting materials for payment, Contractor is certifying that the submitted materials are compliant with AIS requirements. Manufacturers' Certification letter for Materials satisfy this certification. Refer to Manufacturer's Certification Letter provided in these Contract Documents.
14. SC 15.01.D.2: An updated AIS Materials List (See Exhibit J) included in these contract documents must be dated and signed and submitted with each pay request prior to payment being authorized. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.
15. SC 15.01.C.2d: "d. The materials presented for payment comply with AIS requirements.
16. SC 15.03.A: Modify by adding the following "Services required to determine and certify that, to the best of the Contractor's knowledge and belief, all substitutes, equals, and iron and steel products proposed in the shop drawings, change orders, and partial payment estimates are produced in the U.S. or are the subject of an approved waiver. Services required to certify that, to the best of the Contractor's knowledge, all those products installed for the project are either produced in the U.S. or are the subject of an approved waiver.
17. SC19.14: Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and any subsequent statutes mandating domestic preference applies in AIS requirement to this project. All iron and steel products used in this project must be produced in the U.S. The term "iron and steel products" is defined in Section 1.b.2. The de minimis and minor components waivers {add project specific waivers as applicable} apply to this contract."



18. SC 19.15: add Definitions:

"Assistance recipient" is the entity that received funding assistance from programs required to comply with AIS requirements in the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference. This term includes owner and/or applicant.

"Certifications" means the following:

- *Manufacturers'* certification is the documentation provided by the manufacturer or fabricator to various entities stating that the iron and steel products to be used in the project are produced in the U.S. in accordance with AIS requirements. If items are purchased via a supplier, distributor, vendor, etc. vs. direct from the manufacturer or fabricator directly, then the supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certification letters to the parties purchasing the product.
- *Engineer's* certification is documentation that plans, specifications, and bidding documents comply with AIS.
- *Contractors'* certification is documentation submitted upon substantial completion of the project that all iron and steel products installed were produced in the U.S.

"Coating" means a covering that is applied to the surface of an object. If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the U.S., said product will be considered a compliant product under the AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the U.S. This exemption only applies to coatings on the *external surface* of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in U.S. for the product to be compliant with AIS requirements.

"Contractor" is the individual or entity with which the applicant has contracted (or is expected to) to perform construction services (or for water and waste projects funded by the programs which are subject to AIS requirements). This includes bidders and/or contractors that have received an award from the applicant and any party having a direct contractual relationship with the owner/applicant. A general contractor is often referred to as the prime contractor.

"Construction materials" are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not included mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel".

**Note:** Mechanical and electrical components, equipment, and systems are not considered construction materials. See definition of mechanical and electrical equipment.

"De minimis incidental components" are various miscellaneous low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of incidental components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts, miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for de minimis incidental components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project. The cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

"Engineer" is an individual or entity with which the owner has contracted to perform engineering/architectural services for water and waste projects funded by the programs subject to AIS requirements.

"Iron and Steel Products" are defined as the following products made primarily of iron and steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. Only items on the above list made of primarily iron or steel, permanently incorporated into the project must be produced in the U.S. For example; trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

"Manufacturers" meaning supplier, fabricator, distributor, materialman, or vendor is an entity with which the applicant, general contractor or with any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the applicant, contractor or subcontractor.

"Manufacturing processes" are processes such as melting, refining, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic iron and steel product is taken out of the U.S. for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone, and iron and steel scrap are not covered by the AIS requirements, and the material(s), if any, being applied as coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-U.S. sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

"Mechanical equipment" is typically that which has motorized parts and/or is powered by a motor. "Electrical equipment" is typically any machine powered by electricity and included components that are part of the electrical distribution system. AIS does not apply to mechanical equipment.

"Minor components" are components within an iron or steel product otherwise compliant with the AIS requirements. This is different from the de minimis definition where de minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver would allow non-domestically produced miscellaneous minor components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product to be used. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements. Only minor components within said product and the iron or steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of minor components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low cost items such as small fasteners etc.

"Municipal castings" are cast iron and steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

"National Office" refers to the office responsible for the oversight and administration of the program nationally. The National Office sets policy, develops program regulations, and provides training and technical assistance to help the state offices administer the program. The National Office is located in Washington, D.C.

"Owner" is the individual or entity with which the general contractor has contracted regarding the work, and which has agreed to pay the general contractor for the performance of the work pursuant to the terms of the contract for water and waste projects funded by the programs subject to AIS requirement. For the purpose of this Bulletin, the term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2), and (3), and is an entity receiving financial assistance from the programs subject to AIS requirements.

"Primarily iron or steel" is defined as a product made of greater than 50 percent iron or steel, measured by cost. The cost should be based on the material costs. An exception to this definition is reinforced precast concrete (see Definition). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and steel, the AIS requirements do not apply.

For example, the cost of a fire hydrant includes:

1. The cost of materials used for the iron portion of the fire hydrant (e.g. bonnet, body, and shoe); and
2. The cost to pour and cast and create those components (e.g. labor and energy).

Not included in the cost are:

1. The additional material costs for the non-iron and steel internal working of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
2. The cost to assemble the internal workings into the hydrant body.

"Produced in the United States" means that the production in the United States of the iron or steel products used in the project requires that all manufacturing processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

"Project" is the total undertaking to be accomplished for the applicant by consulting engineers, general contractors, and others, including the planning, study, design, construction, testing, commissioning, and start-up of which the work to be performed under the contract is a part. A project includes all activity that an applicant is undertaking to be financed in whole or part by programs subject to AIS requirements. The intentional splitting of projects to separate into smaller contracts or obligations to avoid AIS requirements is prohibited.

"Reinforced Precast Concrete" may not consist of at least 50 percent iron or steel, but the reinforcing bar and wire must be produced in the United States and meet the same standards for any other iron or steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the United States.

"Steel" means an alloy that includes at least 50 percent iron between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

"Structural steel" is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

"United States" means each of the several states, the District of Columbia, and each Federally Recognized Indian Tribe.

## 12. PURCHASE OF EQUIPMENT AND MATERIALS

Irrespective of who purchases AIS products, owner, contractor or other parties must ensure that the products were produced in the United States as defined in this Bulletin. It is the manufacturers' responsibility to provide manufacturers' certification letters to ensure compliance with AIS requirements. The AIS requirements supersede any regulation on full and open free competition stated in 7 CFR 1780.70(b) and (d) and 2 CFR Part 200.319. For example, if an iron and steel product that is compliant with AIS is made by only one manufacturer, sole source procurement of said product may be used.

## 13. WAIVER PROCESS

### A. General

Each entity that receives financial assistance for the construction, alteration, maintenance, or repair of water and waste infrastructure from programs mandated to comply with the statute, must use iron and steel products produced in the United States. A waiver is a legal document granting a project an exception to AIS requirements, to use iron and steel products of non-domestic origin specified in the waiver(s). More than one waiver could be applied to a project.

Any funding recipient subject to AIS requirements are eligible to apply for waivers as outlined in the statute which states:

"A waiver may be granted by the Secretary of Agriculture or designee, if one or more of the following conditions are met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and Steel products are not produced in the United States in sufficient and reasonably available quantities or of satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the overall cost of the project by more than 25 percent."

Until a waiver is granted by USDA, the AIS requirement stands except with respect to municipalities covered by international agreements (see Section 17).

One public interest waiver has been granted by the Secretary of Agriculture or designee that addresses: (1) de minimis items and (2) minor components. This waiver is national in scope and applies to all projects. The term de minimis applies to products when they occur as a de minimis incidental components as intended for assistance recipients to use for their projects. The term minor components applies to minor components within an iron and/or steel product and is intended for manufacturers to certify that their products comply with AIS requirements. For definitions of de minimis and minor components see Definitions.

**B. Application**

To request a project specific waiver, proper and sufficient documentation must be provided by the assistance recipient (see Exhibit H).

To apply for a waiver under condition one (public interest), applicants and their consulting engineers must demonstrate definitive impacts on the community if a specified product is not utilized. Information must be submitted to the National Office (via [EESEngineering@wdc.usda.gov](mailto:EESEngineering@wdc.usda.gov)), copy to the RD State Engineer and approved by the Administrator of RUS. Public interest waivers national in scope will be identified and approved by the Administrator of RUS.

To apply for a waiver under special condition two (quality or quantity), applicants and their consulting engineers must submit information outlined in Exhibit I and J to the National Office (via [EESEngineering@wdc.usda.gov](mailto:EESEngineering@wdc.usda.gov)).

All waiver applications must be submitted to National Office. If RD State Office receives any waiver requests, the request must be submitted to National Office for approval.

**C. Timing**

Waivers should be submitted prior to and no later than the submission of final plans, specifications, and bidding documents for any iron and steel products of known foreign origin. All waiver requests must be approved by the Agency prior to authorization to advertise for bids. In the event that a waiver is requested during construction such as via change order, it must be approved by the Agency prior to installation.

**D. Evaluation by USDA**

After receiving an application for a waiver of the AIS requirements, USDA National Office will publish the request on its website for 15 days and receive informal comment. National Office will evaluate whether the application adequately documents the statutory basis cited for the waiver. The Secretary or designee will determine whether or not to grant the waiver. Approved and disapproved waivers will be posted on the USDA AIS website. For project specific waivers where EPA and USDA are co-funding and the applicant has already submitted a request to and received an approval waiver from EPA, USDA will review said waiver for the co-funded project. Applicants/owners or their representatives are required to submit approved waiver to EESengineerig@wdc.usda.gov for USDA RD review and concurrence.

All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates. All information presented in waiver requests are subject to verification. Waiver requests deliberately containing false information will be rejected.

**14. MONITORING**

In order to comply with the Executive Order 13788 "Buy American, Hire American", dated April 18, 2017, and AIS requirements, monitoring activities will be completed by the State Office and/or National Office.

**15. NON-COMPLIANCE**

No Federal funds made available for the rural water, waste water, waste disposal, and solid waste management programs authorized by sections 306, 306A, 306C, 306D, 306E, and 310B of the Consolidated Farm and Rural Development Act (7 U.S.C. 1926 et seq.) shall be used for a project for the construction, alteration, maintenance, or repair of a public utility system unless all of the iron and steel products used in the project are produced in the United States.

Noncompliance occurs when funds are used from these programs for construction, alteration, maintenance, or repair using non-domestic iron or steel products and the product is not covered by either a project-specific or a national waiver. Loan and grant recipients should avoid non-compliance at all times as it is a violation of a Federal statute.

**Process for Noncompliance**

- (1) Identify the noncompliant product.
- (2) The loan or grant recipient notifies appropriate USDA RD State or National Office contact.
- (3) If USDA RD State Office is notified, the Program Director will notify the National Office, Director of EES.
- (4) USDA will apply remedies for noncompliance as per 2 CFR 200 338-342.

**16. INTERNATIONAL AGREEMENTS**

The AIS requirements apply in a manner consistent with United States obligations under international agreements. In a few cases where such an agreement exists between a loan and/or grant recipient and an international entity, the recipient is under the obligation to determine the applicability of the AIS requirements and document the actions taken to comply with these requirements.

**17. USE OF EXHIBITS**

The following explains the purpose of each Exhibit to this Bulletin:

- A. **AMERICAN IRON AND STEEL:** Exhibit A is to be read by the RD Specialist at the pre-construction and signed by all parties subject to the AIS requirements on the project. Signature of this form will serve as certification of advisement and acknowledgement of the AIS requirements.
- B. **ENGINEER'S CERTIFICATION OF COMPLIANCE:** Exhibit B consists of a letter to be completed and signed by the consulting engineer certifying that he/she will ensure that plans, specifications, bidding documents, and associated bid addenda, executed contracts and change orders for this project will comply with the AIS requirements. This certification letter is to be submitted to the Agency for approval prior to the Advertisement for Bids and must be kept in the engineer's project file and on-site during construction.
- C. **GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE**  
Exhibit C consists of a letter to be completed and signed by the general contractor certifying that he/she will ensure that all iron and steel products installed for this project, comply with the AIS requirements. This includes not only installation and/or construction by their own company, but any and all subcontractors and manufacturers their company has contracted with on this project. This certification letter is to be submitted upon substantial completion of the project to the project engineer.
- D. **EXAMPLE OF A MANUFACTURER'S CERTIFICATION LETTER OF COMPLIANCE:** Exhibit D is an example of a letter to be completed and signed by the manufacturer certifying that he/she will ensure that all iron and steel products and/or materials shipped or provided for the subject project are in full compliance with the AIS requirements. This includes listing each individual item/product/material provided to the project and providing the location of this/these item(s) being manufactured, including assembly. All manufacturers' certification letters must be kept in the engineer's project file and on site during construction.
- E. **EXAMPLES OF MUNICIPAL CASTINGS:** Exhibit E provides a sample list of iron and steel products that are subject to the AIS requirements. This list is not exhaustive and is meant only to provide examples. A unique list should be completed for each specific project/contract.



- F. **EXAMPLES OF CONSTRUCTION MATERIALS:** Exhibit F provides a sample list of construction materials that are subject to the AIS requirements. This list is not exhaustive and is meant only to provide examples.
- G. **EXAMPLES OF NON-CONSTRUCTION MATERIALS:** Exhibit G provides a sample list of items that are not subject to AIS requirements. This list is not exhaustive and is meant only to provide examples.
- H. **INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST:** Exhibit I is a checklist that is to be completed by the applicant and/or consulting engineer to help ensure that all appropriate and necessary information is submitted with the request to USDA. This checklist should not be used for public interest waiver. It is for informational purposes only and does not need to be included as part of the waiver application. Project specific waivers may be requested if one or more of the following conditions applies: (1) The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of satisfactory quality; (2) The inclusion of iron and/or steel products produced in the United States will increase the overall cost of the project by more than 25 percent. All approved waivers must be included in the bidding documents, any bid addenda, change orders, and partial estimates. All information presented in waiver requests are subject to evaluation. Waiver requests deliberately containing false information will be rejected.
- I. **EXAMPLE COST TABLE FOR A PROJECT COST WAIVER:** Exhibit I is an example of a table that must be included with any cost based project waiver request. Information included in the table; product reference in the specification, brief description of the product, quantity, unit, unit price and two costs of the item: (1) cost of an AIS compliant product and (2) cost of a non-domestic product. The total cost for all items will be part of the evaluation. Waiver requests deliberately containing false information in order to receive a project cost waiver will be rejected.
- J. **AIS MATERIALS TRACKING:** Exhibit J is a spreadsheet to track all AIS products, de minimis components, and minor components. An updated list must be signed and dated and submitted to the Engineer by the Contractor with each pay request. Once reviewed for accuracy, the signed and updated list must be submitted to the Agency with each pay request. If an AIS qualifying or de minimis material is delivered more than once, a new line will be required for each delivery of that material. An excel version that will compute all totals can be obtained from the RD State Office that can be used as a working copy.



**AMERICAN IRON AND STEEL COMPLIANCE STATEMENT**

"Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A- Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project.

All parties are required to comply with these requirements and to ensure that all iron and steel products used on this project are produced in the United States. The term "iron and steel products" means the following products made of primarily iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials."

\_\_\_\_\_  
**RD Specialist Signature**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Printed Name**

\_\_\_\_\_  
**Borrower Signature or Approved Representative**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Printed Name**

\_\_\_\_\_  
**Engineer's Signature**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Printed Name**

\_\_\_\_\_  
**Contractor's Signature**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Printed Name**



**ENGINEER'S CERTIFICATION LETTER**

DATE:

RE: APPLICANT  
PROJECT NAME  
CONTRACT NUMBER

I hereby certify that to the best of my knowledge and belief, iron and steel products referenced in the Plans, Specifications, and Bidding Documents for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee. This certification is not intended to be a warranty in any way, but rather the designer's professional opinion that to the best of their knowledge, the products comply.

I hereby commit that to the best of my ability, all iron and steel products that will be referenced in the Bid Addenda, Executed contracts, and Change Orders will comply with Section 746 of the Title VII of the Consolidated Appropriations Act, 2017 and any subsequent statutes mandating domestic preference or are/will be the subject of a waiver approved by the Secretary of Agriculture or designee.

\_\_\_\_\_  
Name of Engineering Firm (Print)

\_\_\_\_\_  
By Authorized Representative (Signature)

\_\_\_\_\_  
Title

This document is to be submitted prior to Agency authorization for Advertisement for Bids.



**CONTRACTOR'S CERTIFICATION LETTER**

DATE:

**RE: APPLICANT  
PROJECT NAME  
CONTRACT NUMBER**

I hereby certify that, to the best of my knowledge and belief, all iron and steel products installed for this project by my company and by any and all subcontractors and manufacturers my company has contracted with for this project, comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 and any subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

\_\_\_\_\_  
Name of Construction Company (Print)

\_\_\_\_\_  
By Authorized Representative (Signature)

\_\_\_\_\_  
Title

This certification is to be submitted upon completion of the project to the project engineer.





**MANUFACTURER'S CERTIFICATION LETTER**

Date:

Company Name:

Company Address:

Subject: AIS Step Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the mandated AIS requirements.

Item, Products and/or Materials, and location of delivery (City, State)

- 1.
- 2.
- 3.

Such process for AIS took place in the following location:

---

City, State

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

---

Authorized Company Representative

(Note: *Authorized signature shall be manufacturer's representative and not the materials distributor or supplier*)



**EXAMPLES OF MUNICIPAL CASTINGS** *(includes but not limited to):*

Access Hatches  
Ballast Screen  
Benches (Iron or Steel)  
Bollards  
Cast Bases  
Cast Iron Hinged Hatches, Square and Rectangular  
Cast Iron Riser Rings  
Catch Basin Inlet  
Cleanout/Monument Boxes  
Construction Covers and Frames  
Curb Corner Guards  
Curb Openings  
Detectable Warning Plates  
Downspout Shoes (Boot, Inlet)  
Drainage Grates, Frames and Curb Inlets  
Inlets  
Junction Boxes  
Lampposts  
Manhole Covers, Rings and Frames, Risers  
Meter Boxes  
Service Boxes  
Steel Hinged Hatches, Square and Rectangular  
Steel Riser Rings  
Trash Receptacles  
Tree Grates  
Tree Guards  
Trench Grates  
Valve Boxes, Covers and Risers

**EXAMPLES OF CONSTRUCTION MATERIALS (included but not limited to)**

Wire rod, bar, angles  
Concrete reinforcing bar, wire, wire cloth  
Wire rope and cables  
Tubing  
Framing  
Joists  
Trusses  
Fasteners (i.e., nuts and bolts)  
Welding rods  
Decking  
Grating  
Railings  
Stairs  
Access ramps  
Fire escapes  
Ladders  
Wall panels  
Dome structures  
Roofing  
Ductwork  
Surface drains  
Cable hanging systems  
Manhole steps  
Fencing and fence tubing  
Guardrails  
Doors  
Stationary screens

**EXAMPLES OF NON-CONSTRUCTION MATERIALS-** (includes but not limited to):

(Note: includes appurtenances necessary for their intended use and operation and are not subject to AIS requirements)

Pumps

Motors

Gear Reducers

Drives (including variable frequency drives (VFD's)

Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators).

Mixers

Gates (e.g. sluice and slide gates)

Motorized screens (such as traveling screens)

Blowers/aeration equipment

Compressors

Meters (flow and water meters)

Sensors

Controls and switches

Supervisory control data acquisition (SCADA)

Membrane filtration systems (includes RO package plants)

Filters

Clarifier arms and clarifier mechanisms

Rakes

Grinders

Disinfection systems

Presses (including belt presses)

Conveyors

Cranes

HVAC (excluding network)

Water heaters

Heat exchangers

Generators

Cabinetry and housing (such as electrical boxes/enclosures)

Lighting fixtures

Electrical conduit

Emergency life systems

Metal office furniture

Shelving

Laboratory equipment

Analytical instrumentation

Dewatering equipment

**INFORMATIONAL CHECKLIST FOR PROJECT SPECIFIC WAIVER REQUEST**

Please reference the specifications of the product.

<b>Information</b>	<input type="checkbox"/>	<b>Note</b>
<p><b>General</b></p> <ul style="list-style-type: none"> <li>• Waiver request includes the following information:               <ul style="list-style-type: none"> <li>— Description of the foreign and domestic construction materials</li> <li>— Unit of measure</li> <li>— Quantity</li> <li>— Price</li> <li>— Date that product is needed (e.g. time of delivery or availability)</li> <li>— Location of the construction project</li> <li>— Name and address of the proposed supplier</li> <li>— A detailed justification for the use of foreign construction materials</li> </ul> </li> <li>• Waiver request was submitted according to the instructions in the memorandum</li> <li>• Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime</li> </ul>		
<p><b>Cost Waiver Requests</b></p> <ul style="list-style-type: none"> <li>• Waiver request includes the following information:               <ul style="list-style-type: none"> <li>— Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products (Exhibit J)</li> <li>— Relevant excerpts from the bid documents used by the contractors to complete the comparison</li> <li>— Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers</li> </ul> </li> </ul>		
<p><b>Availability Waiver Requests</b></p> <ul style="list-style-type: none"> <li>• Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested:               <ul style="list-style-type: none"> <li>— Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials</li> <li>— Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers.</li> <li>— Date that product is needed (e.g. time of delivery or availability) to provide justification</li> <li>— Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials</li> </ul> </li> <li>• Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought</li> <li>• Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?</li> </ul>		

EXAMPLE COST TABLE FOR A PROJECT COST WAIVER

AIS/Non-AIS Cost Comparison Table											
Specification	Item or Description	Quantity	Unit	Unit Price	Cost if applying AIS	Cost if a waiver to AIS is applied					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
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					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
					\$ -	\$ -					
<b>TOTAL COST:</b>					<b>\$0.00</b>	<b>\$0.00</b>					





# **SECTION 5**

## **TECHNICAL SPECIFICATIONS**



SECTION 5  
TECHNICAL SPECIFICATIONS

**CONTRACT "G-1" – WATER BOOSTER PUMP STATION – UPGRADES**

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SECTION 01010

GENERAL REQUIREMENTS

CONTRACT "G-1" –WATER BOOSTER PUMP STATION - UPGRADES

SUMMARY OF WORK

PART 1 - GENERAL

1.0 WORK COVERED BY CONTRACT DOCUMENTS

1.1 SCOPE

Division 1 - General Requirements shall apply to all Divisions of the Specifications. Any conflict shall be called to the attention of the Engineer for clarification and ruling.

1.2 GENERAL DESCRIPTION

A. These Specifications and Drawings accompanying them describe the work to be done and the materials to be furnished for installation of all specified work, on **Contract "G-1" - Water Booster Pump Station – Upgrades.**

B. By submission of his bid, the Contractor acknowledges that he has acquainted himself with all conditions which may affect the work as would be evident from a thorough investigation of the job site, and these Specifications covering the work for the purpose of coordinating his work and cost, and agrees that the Owner will not be held liable for any additional costs incurred by the Contractor for causes or conditions which could or should have been determined by such an investigation.

1.3 MANAGER'S NAME AND PHONE NUMBER

Mr. Sherman “Randy” McDaniel  
Big Sandy Water District  
18200 S.R. No. 3  
Catlettsburg, Kentucky 41129  
(606) 928-2075

1.4 The Drawings and Specifications are intended to be fully explanatory, however, should anything be shown, indicated or specified on one and not the other, it shall be done the same as if shown, indicated or specified in both.

1.5 It shall be the responsibility of all Contractors and subcontractors to carefully examine all Drawings, Specifications and Contract Documents pertaining to all phases of the construction in order that Contractor and Subcontractors may foresee all requirements for coordination of their work. Submission of a bid shall be construed as evidence that such

an examination has been made. Claims based on unforeseen requirements will not be considered.

- 1.6 Should any error or inconsistency appear in Drawings or Specifications, the Contractor, before proceeding with the work, must make mention of the same to the Engineer for proper adjustment, and in no case proceed with the work in uncertainty or with insufficient drawings.
- 1.7 Contractors shall follow sizes in Specifications or figures on Drawings, in preference to scale measurements and follow detail drawings in preference to general drawings.
- 1.8 Where it is obvious that a drawing illustrates only a part of a given work or of a number of items, the remainder shall be deemed repetitious and so constructed.

## PART 2 - SCOPE OF WORK

### 2.1 WORK COVERED BY CONTRACT DOCUMENTS

#### 2.2 GENERAL

- A. The work to be performed consists of furnishing all materials, labor, equipment and the execution of all operations necessary for the completion of **Contract "G-1" - Water Booster Pump Station – Upgrades**, for the Big Sandy Water District.

The major items of work include but are not limited to:

1. Construction of **Contract "G-1" - Water Booster Pump Station – Upgrades**. All miscellaneous items of work shown by the Drawings and/or described in the Specifications.

#### 2.3 NOTICE AND SERVICE THEREOF

- A. Any notice to the Contractor from the Owner relative to any part of this Contract, shall be in writing and considered delivered and the service thereof completed, when such notice is posted, by mail, to the Contractor at his last given address, or delivered in person to the Contractor or his authorized representative on the work site.

#### 2.4 DIVISION OF SPECIFICATIONS

Division of Specifications into sections is done for convenience of reference and is not intended to control Contractors in dividing work among subcontractors or to limit scope of work performed by any trade under any given section.

## 2.5 CONFLICTS

- A. If and when doubt exists in the mind of the Bidder as to the true meaning of any part of the Bidding Documents, the Bidder shall request interpretation thereof in accordance with the Instructions to Bidders. Alleged "answers by telephone" will not be adjudged as legitimate interpretations of conflicting information. Official interpretations shall be by Addendum only, within the time frame indicated in the Instructions to Bidders and/or the individual sections of the Specifications.
- B. If a conflict occurs in or between bidding documents regarding methods of performing the work or the material required, and the Bidder does not obtain a written decision (official Addendum) with respect thereto prior to submitting his proposal, he shall be deemed to have bid upon the more expensive way of doing the work and the better quality of material. If the Owner and/or Engineer later elects to use the less expensive method, less expensive quality or less quantity of material the Owner shall receive a suitable credit.
- C. Refer to the General Conditions and Special Conditions for Contract requirements.
- D. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the work. Anything called for in the Specifications and not shown on the Drawings or shown on the Drawings and not called for in the Specifications, shall be included in the Contractor's work, the same as if included in both. In the event of a doubt arising as to the true intent and meaning of the Drawings and Specifications, the Contractor shall report it at once to the Engineer. The Engineer shall furnish, with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. The work shall be executed in conformity therewith and the Contractor shall do no work without proper drawings and instructions. In case of conflicts between the various Contract Documents, the order of precedence will be set out in Special Conditions at paragraph 12.
- E. The Contractor shall make a thorough examination of the site and study all Drawings and Specifications and all conditions relating to the erection of the work. Materials or labor evidently necessary for the proper and complete execution of the work, which are not specifically mentioned although reasonably inferred therefrom, shall be included in the work.

## 2.6 BENEFICIAL USAGE (SUBSTANTIAL COMPLETION)

- A. The date of beneficial usage of the project, or a designated portion thereof, is the date where construction is sufficiently completed on the project for the use for

which it is intended.

- B. Corrective work and the replacement of defective equipment or materials and the adjustment of control apparatus shall not delay the determination of beneficial usage.
- C. When the majority of the work is complete and ready for operation, but cannot be certified as substantially complete because of incomplete items impossible to complete due to weather conditions, payments will be authorized for the amount of work completed, withholding reasonable amounts to cover the incomplete work. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims, and shall not terminate the contract.
- D. When the Owner begins to use the facilities or any portion thereof, prior to Contract completion, the operation, maintenance, utilities and insurance become the responsibility of the Owner.

## 2.7 LIQUIDATED DAMAGES

Should the Contractor fail to complete the work under his Contract and make the Project available for Beneficial Usage on or before the date stipulated for Beneficial Usage (or such later date as may result from extensions in the Contract Time granted by the Owner), the Contractor agrees that the Owner is entitled to, and shall pay the Owner, as liquidated damages, the sum of **Five Hundred Dollars (\$500.00)** for each consecutive calendar day until Beneficial Usage (Substantial Completion) is reached as described herein.

## 2.8 SUBSTITUTION - MATERIALS AND EQUIPMENT

- A. Substitution of major equipment and materials previously submitted by the Contractor and reviewed by the Engineer will be considered only for the following reasons:
  - 1. Unavailability of the material or equipment due to conditions beyond the control of the supplier.
  - 2. Inability of the supplier to meet Contract schedule.
  - 3. Technical noncompliance to Specifications.
- B. Substitution of other equipment and materials named in the Specifications will be considered, provided the proposed substitution will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function of that specified. The burden for proving equality is that of the Contractor.

- C. Inclusion of a certain make or type of materials or equipment in the Contractor's estimate shall not obligate the Owner to accept such material or equipment if it does not meet the requirements of the Plans and Specifications.
- D. Also, see Section 01600.

### PART 3 - CONTRACTOR USE OF PREMISES

#### 3.1 RELEASE OF SITE

- A. All access to the site shall be as defined by the Owner.
- B. Contractor shall insure that no hazardous situations exist at the site during working hours or are left during non-working hours.

#### 3.2 SCHEDULING OF WORK

- A. The work shall be scheduled so the project can be put into service at the earliest possible date. A start up meeting must be scheduled prior to opening the valve at the tapping sleeve and valve installed by Ashland.
- B. All work shall be completed within time limits established in other portions of the Contract Documents.

#### 3.3 TRAFFIC MAINTENANCE

- A. All traffic must be maintained at all times on public streets and roadways. No road or street shall be closed without special written permission from the Owner.
- B. Traffic must be maintained on State maintained roads in accordance with the Standard Drawings, details and Specification Section 01570. Contractor will be required to adhere to all provisions of the Kentucky Transportation Cabinet Permit for the project.

END OF SECTION



SECTION 01030  
LABOR PROVISIONS

PART 1 - GENERAL

1.1 FUNDING SOURCES

This project is being funded by USDA-Rural Development grant and loan and local contribution.

1.2 WORK INCLUDED

The Contractor shall conform to all provisions of the Kentucky Department of Labor and Revised Statutes as they may apply to the work to be accomplished under these Specifications. The Contractor shall also conform to all provisions of Federal Labor Laws and Regulations that govern the work that supplement or supplant the Kentucky Department of Labor regulations.

1.3 WAGE RATES

**The Applicable State & Federal Wage Decisions DO NOT apply.**

1.4 HOURS OF WORK

Hours of work shall be as set by the latest State and Federal Wage Laws and Regulations. Overtime shall be determined and paid pursuant to the latest State Wage Laws.

Whenever overtime work is scheduled, the Contractor shall give prior notice to the Owner & Engineer.

1.5 NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246 AND 41 CFR PART 60-41)

The following Notice shall be included in, and shall be a part of all solicitations for offers and bids in all Federal and federally assisted construction contracts or subcontracts in excess of \$10,000.00.

The Contractor's or Bidder's attention is called to the "Equal Opportunity Clause" and the Standard Federal Equal Employment Opportunity Construction Contract Specifications set forth herein.

PART 2 – PRODUCTS - **NOT USED**

PART 3 – EXECUTION - **NOT USED**

- END OF SECTION -





## SECTION 01040

## COORDINATION

## PART 1 - GENERAL

## 1.1 COORDINATION OF THE WORK

The Contractor shall coordinate the work of all the crafts, trades, and subcontractors engaged on the Work, and he shall have final responsibility as regards the schedule, workmanship, and completeness of each and all parts of the Work.

All crafts, trades, and subcontractors shall be made to cooperate with each other and with others as they may be involved in the installation of work which adjoins, incorporates, precedes, or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to the execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade, and subcontractor shall be made responsible to the Owner, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing, and cleaning as required to satisfactorily perform the Work.

The Contractor shall be responsible for all cutting, digging, and other action of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations, and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to the Owner.

Each subcontractor is expected to be familiar with the General requirements and all sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work and to the end that complete coordination between trades will be affected. Each Contractor shall consult with the Engineer if conflicts exist on the Drawings.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION



## SECTION 01060

## REGULATORY REQUIREMENTS

1.0 CODES

All construction work shall be done in strict accordance with the latest edition of the Kentucky Building Code, National Electrical Code (NEC) and supplements, the requirements of the local electrical utility company, local codes, and as specified herein. All work shall be performed by skilled workmen in a neat manner and all equipment shall be cleaned before final acceptance. A partial list of codes is as follows:

- Kentucky Building Code
- City and/or County Building Inspector
- National and Local Electrical Codes
- National Fire Protection Association (NFPA)
- State Fire Marshal
- Local Fire Marshal
- Standards of Safety
- O.S.H.A.
- KY Division of Water

END OF SECTION



## SECTION 01070

## ABBREVIATIONS AND SYMBOLS

## PART 1 - GENERAL

## 1.1. REQUIREMENTS INCLUDED

Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth as follows.

## 1.2. QUALITY ASSURANCE

- A. For the products or workmanship specified by association, trades, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
- C. When required by individual Specifications section, obtain a copy of standard. Maintain a copy at job site during submittals, planning and progress of the specific work, until Substantial Completion.

## 1.3. SCHEDULE OF REFERENCES

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronic Engineers, Inc.
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute

ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CS	Commercial Standard
IBR	Institute of Boiler and Radiator Manufacturers
IPS	Iron Pipe Size
JIC	Joint Industry Conference Standards
KDOH	Kentucky Department of Highways
NBS	National Bureau of Standards
NEC	National Electrical Code; latest edition
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
Fed.	Federal Specifications issued by the Federal Supply Spec. Service of the General Services Administration, Washington, D.C.
125-lb ANSI	American National Standard for Cast-Iron Pipe
150-lb ANSI	Flanges and Flanged Fittings, Designation B16.24 (1991), for the appropriate class
AWG	American or Brown and Sharpe Wire Gage
NPT	National Pipe Thread
OS&Y	Outside screw and yoke
Stl.Wg	U. S. Steel Wire, Washburn and Moen, American Steel and Wire or Roebling Gage

UL	Underwriters' Laboratories
USS	United States Standard Gage
WOG	Water, Oil, Gas
WSP	Working Steam Pressure

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION





SECTION 01090

REFERENCE STANDARDS

PART 1 – GENERAL

1.1. QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trades, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Material shall bear Underwriters' Laboratories label where such a standard has been established and listed by Underwriters' Laboratories, Inc. All materials, equipment and appliances shall conform to requirements of standards referenced here.
- C. Conform to reference standard by date of issue current on date of Contract Documents.
- D. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.2. SCHEDULE OF REFERENCES

- ACI American Concrete Institute  
Box 19150  
Reford Station  
Detroit, MI 48219
- AGC Associated General Contractors of America  
1957 E Street, N.W.  
Washington, DC 20006
- AITC American Institute of Timber Construction  
7012 South Revere Parkway, Suite 140  
Englewood, CO 80112
- ANSI American National Standards Institute  
1819 L. Street, N.W. (6<sup>th</sup> Floor)  
Washington, D.C. 20036

- ASTM American Society for Testing and Materials  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959
- CDA Copper Development Association  
260 Madison Avenue  
New York, NY 10016
- CRSI Concrete Reinforcing Steel Institute  
933 Plum Grove Road  
Schaumburg, IL 60173-4758
- FCC Federal Communications Commission  
DOT, M443.2  
Utilization and Storage Section  
Washington, DC 20590
- FM Factory Mutual System  
500 River ridge Drive  
Norwood, MA 02062
- IEEE Institute of Electrical and Electronics Engineers  
445 Hoes Lane, P.O. Box 1331  
Piscataway, N.J. 08855-1331
- NEMA National Electrical Manufacturers' Association  
1300 N. 17<sup>th</sup> Street, Suite 1847  
Rosslyn, VA 22209
- NFPA National Fire Protection Association  
1 Buttery March Park  
P.O. Box 9101  
Quincy, MA 02269-9101
- PCA Portland Cement Association  
5420 Old Orchard Road  
Skokie, IL 60077
- REA Rural Electrification Administration  
USDA-REA-ASD  
Room 0180  
ATTN: Publications  
14th and Independence Avenue, S.W.  
Washington, DC 20250

UL Underwriters' Laboratories, Inc.  
333 Pfingston Road  
Northbrook, IL 60062-2096

## PART 2 – REFERENCED STANDARDS

All work performed in connection with this contract shall be in accordance with the latest version of the following standards:

Occupational Safety and Health Administration (OSHA)

Applicable Telecommunications Standards

National Fire Protection Association

National Electrical Code (NEC)

National Electrical Safety Code (NESC)

Federal Communications Commission

National Telecommunications and Information Administration

Electronics Industries Association (EIA)

American National Standards Institute

Rural Electrification Administration

## PART 3 – EXECUTION

NOT USED.

END OF SECTION



## SECTION 01300

## SUBMITTALS

## PART 1 - GENERAL

## 1.1. WORK INCLUDED

Shop drawings, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished as set out in paragraph 1.5 hereinafter and shall be checked and reviewed and stamped and signed as approved by the Contractor before submission to the Engineer. The review of the Drawings by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such drawings will not relieve the Contractor of the responsibility for any errors which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

## 1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. General Conditions.
- B. Section 01720 - Project Record Documents (As Built).

## 1.3. DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

## 1.4. GENERAL CONDITIONS

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quality, quantity, materials, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from the responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents.

Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

#### 1.5. GENERAL REQUIREMENTS FOR SUBMITTALS

##### A. Shop Drawings

1. Shop drawings shall be prepared by a qualified detailer. Details shall be identified by reference to sheet and detail numbers shown on Contract Drawings. Where applicable, show fabrication, layout, setting, and erection details.
2. Shop drawings are defined as original drawings prepared by the Contractor, subcontractors, suppliers, or distributors performing work under this Contract. Shop drawings illustrate some portion of the work and show fabrication, layout, setting, or erection details of equipment, materials, and components. The Contractor shall, except as otherwise noted, have prepared the number of reviewed copies required for Contractor distribution plus three (3), which will be retained by the Engineer. Shop drawings shall be folded to an approximate size of 8-1/2" x 11" and in such manner that the title block will be located in the lower right-hand corner of the exposed surface.

B. Project data shall include manufacturer's standard schematic drawings modified to delete information which is not applicable to the Project, and shall be supplemented to provide additional information applicable to the Project. Each copy of descriptive literature shall be clearly marked to identify pertinent information as it applies to the Project.

C. Where samples are required, they shall be adequate to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged. Provide sufficient size and quantity to clearly illustrate functional characteristics of product and material, with integrally related parts and attachment devices, along with a full range of color samples.

D. All submittals shall be referenced to the applicable item, section, and division of the Specifications, and to the applicable Drawing(s) or Drawing schedule(s). All submittals shall bear the Engineer's project code as noted in the upper right corner of this sheet.

- E. The Contractor shall review and check submittals. Including those of any subcontractor(s) and shall indicate his review and approval by placing and executing the following on all shop drawings:

This shop drawing has been reviewed by [Name of Contractor] and approved with respect to the mean, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incidental thereto. [Name of Contractor] also warrants that this shop drawing complies with contract documents and comprises no variation thereto.

By: \_\_\_\_\_

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

- F. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineers, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted items.
- G. Additional information if the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold red mark. Any additional costs for modifications shall be borne by the Contractor.
- H. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- I. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing leads, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- J. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers, and fabricators; the Contractor shall be responsible for ensuring the compatibility of such coatings with the field-applied paint products and systems.

- K. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- L. Where manufacturers' brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions, and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- M. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- N. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be saved and transmitted to the Owner through the Engineer.

#### 1.6. CONTRACTOR RESPONSIBILITIES

- A. Verify field measurements, field construction criteria, catalog numbers, and similar data.
- B. Coordinate each submittal with requirements of Work and of Contract Documents.
- C. Notify Engineer, in writing at time of submission, of deviation in submittals from requirement of Contract Documents.
- D. Begin no work, and have no material or products fabricated or shipped which require submittals until return of submittals with Engineer's stamp and initials or signature indicating review.

#### PART 2 - PRODUCTS

NOT USED.

#### PART 3 - EXECUTION

NOT USED

END OF SECTION



SECTION 01400  
QUALITY CONTROL

1 PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance - control of installation.
- B. Tolerances
- C. References and standards.
- D. Inspecting and testing laboratory services.
- E. Manufacturers' field services.

1.2 RELATED SECTIONS

- A. Section 01090 - Reference Standards.
- B. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.
- C. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.

- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

#### 1.4 TOLERANCES

- A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust Products to appropriate dimensions; position before securing Products in place.

#### 1.5 REFERENCES AND STANDARDS

- A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

#### 1.6 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer 10 days in advance of required observations.

- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01300 - SUBMITTALS, MANUFACTURERS' FIELD REPORTS article.

2 PART 2 - PRODUCTS

NOT USED.

3 PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION



## SECTION 01410

## TESTING LABORATORY SERVICES

## PART 1 - GENERAL

## 1.1. REQUIREMENTS

- A. The Contractor shall employ and pay for the services of a certified independent testing laboratory to perform specified services and testing.
- B. It is the Contractors responsibility to verify that the laboratory meets the required standards and qualifications.

## 1.2. RELATED REQUIREMENTS

- A. CONDITIONS OF THE CONTRACT
- B. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- C. Testing laboratory inspection, sampling and testing is required for the following sections and as specified:

Section 03300: Concrete

## 1.3. QUALIFICATION OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification": published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction."
- C. Authorized to operate in the state in which the project is located.
- D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection with memorandum of remedies of any deficiencies reported by the inspection.
- E. Test Equipment
  - 1. Calibrated at reasonable intervals by devices of accuracy traceable to either:
    - a. National Bureau of Standards.
    - b. Accepted values of natural physical constants.

#### 1.4. LABORATORY DUTIES.

- A. Cooperate with Owner, Engineer and Contractor; provide qualified personnel after due notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
  - 1. Comply with specified standards.
  - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection; one copy each to Engineer, Owner, Contractor, and one copy to Record Documents File. Submittal schedule for each time of test shall be approved by Engineer prior to construction of any item that requires testing. Each report shall include:
  - 1. Date issued.
  - 2. Project title and number.
  - 3. Testing laboratory name, address and telephone number.
  - 4. Name and signature of laboratory inspector.
  - 5. Date and time of sampling or inspection.
  - 6. Record of temperature and weather conditions.
  - 7. Date of test.
  - 8. Identification of product and specification section.
  - 9. Location of sample or test in the project.
  - 10. Type of inspection or test.
  - 11. Results of tests and compliance with Contract Documents.
  - 12. Interpretation of test results, when requested by Engineer or owner.
- E. Perform additional tests required by Engineer or the Owner.

#### 1.5. LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
  - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
  - 2. Approve or accept any portion of the work.
  - 3. Perform any duties of the Contractor.

#### 1.6. CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and provide access to work as required.
- B. Secure and deliver to the laboratory adequate quantities of representational sam-

ples of materials proposed to be used and which require testing.

- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
  - 1. To provide access to work to be tested.
  - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. To facilities inspections and tests.
  - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
  - 1. When tests of inspections cannot be performed after such notice, reimburse laboratory personnel for expenses incurred due to negligence.
- G. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required.
  - 1. For convenience.
  - 2. When initial tests indicate work does not comply with Contract Documents.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED.

END OF SECTION





## SECTION 01440

## CONTRACTOR QUALITY CONTROL

## PART 1 - GENERAL

## 1.1. WORK INCLUDED

- A. The General Contractor shall set forth for immediate execution a detailed and well organized quality control plan and implementation program.

## 1.2. CODES, STANDARDS AND INDUSTRY SPECIFICATIONS

- A. Material or operations specified by reference to published specifications of a manufacturer, testing agency, society, association or other published standards shall comply with requirements in latest revisions thereof and amendments or supplements thereto in effect on date of (Advertisement for Bids).
- B. Discrepancies between referenced codes, standards, specifications and Contract Documents shall be governed by the latter unless written interpretation is obtained from Engineer.
- C. Material or work specified by reference to conform to a standard, code, law or regulation shall be governed by Contract Documents when they exceed requirements of such references; referenced standards shall govern when they exceed Contract Documents.
- D. Proof of Compliance

Whenever Contract Documents require that a project be in accordance with Federal specification, ASTM designation, ANSI specification, or other association standard, at Engineer request, Contractor shall present an affidavit from manufacturer certifying that product complies therewith. Where requested or specified, submit supporting test data to substantiate.

- E. PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices and/or lump-sum prices contained in the Bidding Schedule.

## PART 2 – PRODUCTS

NOT USED

## PART 3 – EXECUTION

### 3.1. GENERAL

The General Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

### 3.2. QUALITY CONTROL PLAN

#### A. General

The General Contractor shall furnish for review by the Engineer and Owner not later than 30 days after receipt of notice to proceed, a Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Engineer will consider an interim plan for the first 30 days of operation.

#### B. Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Engineer/Owner reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.3. SUBMITTALS

Submittals shall be as specified in Section 01300 SUBMITTAL. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

### 3.4. CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be

keyed to the proposed construction sequence.

### 3.5. TESTS

#### A. Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. Testing includes operation and/or acceptance tests when specified. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with Contract requirements.
2. Verify that facilities and testing equipment are available and comply with testing standards.
3. Check test instrument calibration data against certified standards.
4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
5. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Engineer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Engineer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract.

#### B. Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor.

### 3.6. COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time, the Contractor shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved Plans and Specifications. Such a list of deficiencies shall be included in the CQC documentation, and shall include the estimated date by which the deficiencies will be corrected. The Contractor shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Engineer. These inspections and any deficiency corrections required by this paragraph

will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

### 3.7. DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall include factual evidence that required quality control activities and/or tests have been performed, including but not limited to the following:

- A. Contractor/subcontractor and their area of responsibility.
- B. Operating plant/equipment with hours worked, idle, or down for repair.
- C. Work performed today, giving location, description, and by whom.
- D. Test and/or control activities performed with results and references to Specifications/Plan requirements.
- E. Material received with statement as to its acceptability and storage.
- F. Identify submittals reviewed, with contract reference, by whom, and action taken.
- G. Off-site surveillance activities, including actions taken.
- H. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- I. List instructions given/received and conflicts in Plans and/or Specifications.
- J. Contractor's verification statement.
- K. These records shall indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Engineer weekly within 20 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. All calendar days shall be accounted for throughout the life of the Contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the Contractor. The report from the Contractor shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.8. SAMPLE FORMS

Sample forms for Daily Construction Quality Control Report and Deficiency shall be provided by the General Contractor and submitted to Engineer for acceptance.

3.9. LINES AND GRADES

- A. Be responsible for properly laying out work, and for lines and measurements for the work executed under Contract Documents. Verify figures indicated on Drawings before laying out work, and report errors or inaccuracies in writing to the Engineer before commencing work.
- B. All trades shall be responsible for layout of their work, based on reference lines and measurements established by the General Contractor.
- C. Establish and maintain permanent hubs and other control points throughout construction.

END OF SECTION



SECTION 01530

BARRIERS

PART 1 - GENERAL

1.1. DESCRIPTION

- A. Temporary Railing: Temporary railing shall be provided around open pits and other locations where needed, to prevent accidents or injury to workers and/or public.
- B. Temporary Barriers: Temporary barriers shall be provided for safety for traffic control purposes.

1.2. COST

- A. The Contractor shall pay all costs for barriers and railings used on this project

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION





SECTION 01540

SECURITY

PART I - GENERAL

1.1. WORK INCLUDED

- A. Provide barricades, lanterns, and other signs and signals as may be necessary to warn of the dangers in connection with open excavation and obstructions.
- B. Temporary Railing: Temporary railing shall be provided around open pits and other locations where needed, to prevent accidents or injury to workers and/or public.
- C. Perimeter of the site shall be secured with a 6' chain link fence at all times when Owner or Contractor personnel are not present.

1.2. COSTS

- A. Contractor shall pay all costs for protection and security systems.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01550

ACCESS ROADS AND PARKING AREAS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Access Roads
- B. Parking Areas
- C. Graveled Areas

2.2. REFERENCES

- A. Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, Latest Edition.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate shall be size No. 57, Size No. 610, or Size No. 710 and shall meet the requirements of Section 805 of the KDOH Specifications.
- B. Filter fabric as set out in Standard Details in Drawings.

PART 3 – EXECUTION

3.1. GENERAL

- A. Access Roads and areas shall be constructed of one or more courses of coarse aggregate uniformly spread on a prepared subgrade to the width and depth specified.
- B. Compaction will be accomplished by traffic maintenance.

3.2. PLACING AGGREGATES

- A. Distribution of aggregate, in general, shall proceed from the point on the project nearest the source of supply so that as much compaction as possible may be gained from the passage of hauling equipment over the previously laid aggregate. Hauling equipment shall be routed uniformly over all portions of the previously laid courses of the base. The procedure for distribution of the aggregate may be revised with permission or as directed.

- B. The aggregate shall be spread in the number of courses and at the rate of application indicated in the contract, unless otherwise directed. The Contractor shall hold in reserve a quantity of the aggregate for the purpose of strengthening weakened areas that may develop during construction operation.
- C. The material applied each day shall be shaped by means of a grader, as directed. In addition, the Contractor shall be required to make one complete round trip with the grader at least twice each week, and more often when deemed necessary, by the Engineer until the work is accepted as completed.

### 3.3. DRAINAGE

- A. Ditches and drainage elements shall be constructed and/or maintained as shown on the Contract Drawings and Details.

END OF SECTION

## SECTION 01570

## TRAFFIC REGULATION

## PART 1 - GENERAL

## 1.01 REQUIREMENTS INCLUDED

- A. Construction parking control.
- B. Flagmen.
- C. Flares and lights.
- D. Haul routes.
- E. Traffic signs and signals.
- F. Removal.

## 1.02 RELATED REQUIREMENTS

- A. Section 01530 - Barriers.
- B. Section 01580 - Project Identification and Signs.

## PART 2 - PRODUCTS

## 2.01 SIGNS, SIGNALS, AND DEVICES

- A. Post-mounted and wall-mounted traffic control and informational signs.
- B. Automatic Traffic Control Signals: As approved by local jurisdictions.
- C. Traffic Cones and Drums, Flares, and Lights: As approved by local jurisdictions.
- D. Flagman and Equipment: As required by local jurisdictions.
- E. All traffic control means and methods on state roads shall meet KDOH Standards.

## PART 3 - EXECUTION

## 3.01 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in nondesignated areas.

## 3.02 TRAFFIC CONTROL

- A. Whenever and wherever, in the Engineer's opinion, traffic is sufficiently congested or public safety is endangered, Contractor shall furnish uniformed officers to direct traffic and to keep traffic off the highway area affected by construction operations.

- B. Contractor shall abide by local regulations governing utility construction work.
- C. **Traffic control shall be provided according to the Kentucky Department of Highways Manual for Uniform Traffic Control Devices for Streets and Highways. Traffic control will be strictly enforced by KDOH.**
- D. **The KDOH will strictly enforce the tracking of mud or dirt onto State Roads or allowing drainage caused by construction to run onto roadways. Necessary brooms or other equipment for keeping roads clean is required.**

### 3.03 FLAGMEN

Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

### 3.04 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

### 3.05 HAUL ROUTES

- A. Consult with authorities, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

### 3.06 TRAFFIC SIGNS AND SIGNALS

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
- B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
- C. Relocate as work progresses, to maintain effective traffic control.

### 3.07 REMOVAL

Remove equipment and devices when no longer required. Repair damage caused by installation. Remove post settings to a depth of 2 feet.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGN

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. The Contractor shall provide signs required by these Specifications near the site of the work. The signs shall set forth the description of the work and the names of the Owner, Engineer and Contractor as shown hereinafter in these Specifications.
- B. The Contractor for **Contract "G-1" - Water Booster Pump Station - Upgrades** shall furnish and install two (2) project signs as described in previous paragraph and as detailed hereafter.

PART 2 - PRODUCTS

2.1. SIGNS.

- A. The signs shall be constructed of 3/4" thick APA A-B Exterior grade or marine plywood. Posts shall be 4" x 4" of fencing type material. Prime all wood with white primer.

PART 3 - EXECUTION

3.1. MAINTENANCE

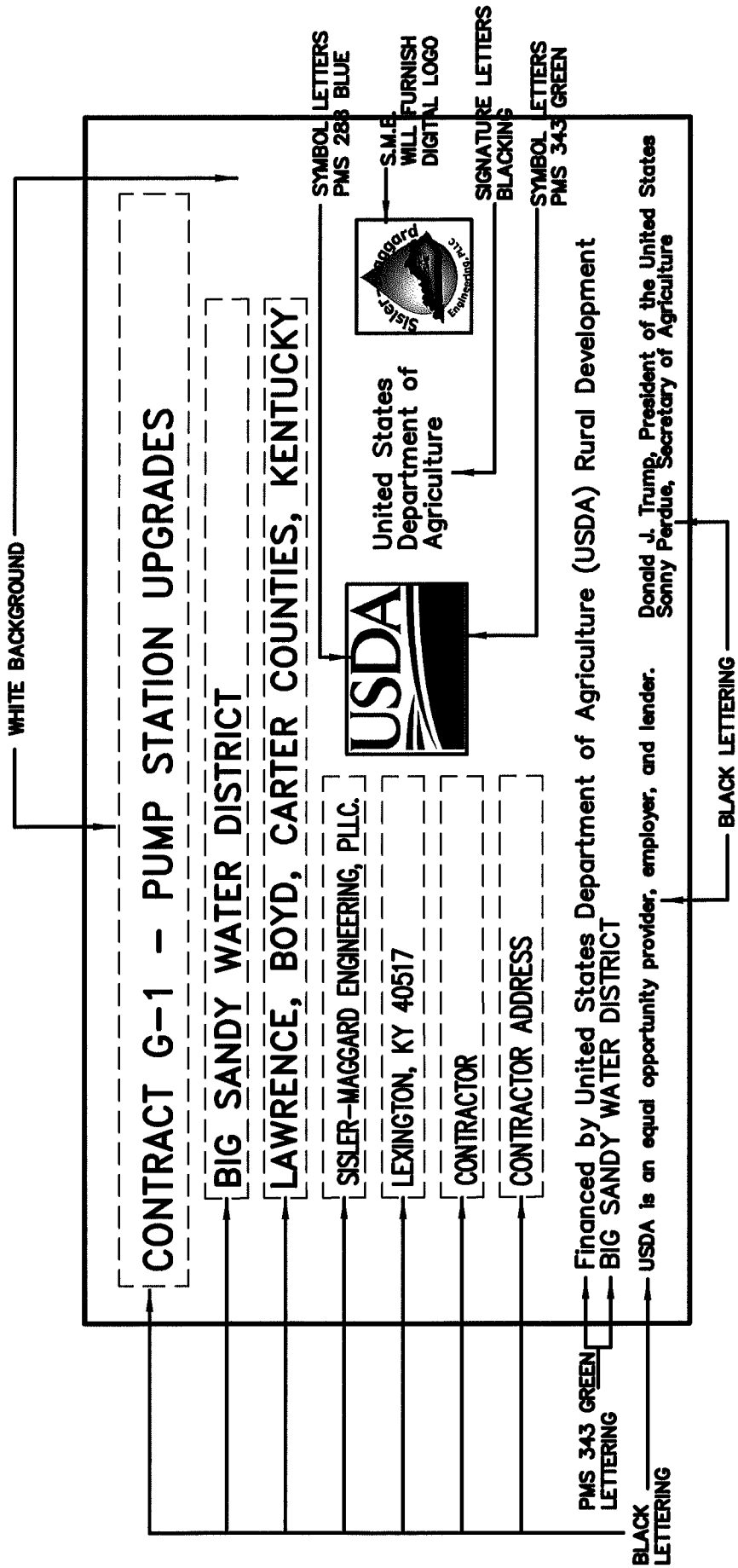
- A. The signs shall be maintained in good condition until completion of the Project. The signs shall be removed at completion of project.

3.2. LOCATION OF SIGNS.

The signs called for in these Specifications shall be placed at the locations selected by the Engineer. One sign at Pump Station site and one sign at intersection of US23 and S. R. 538.





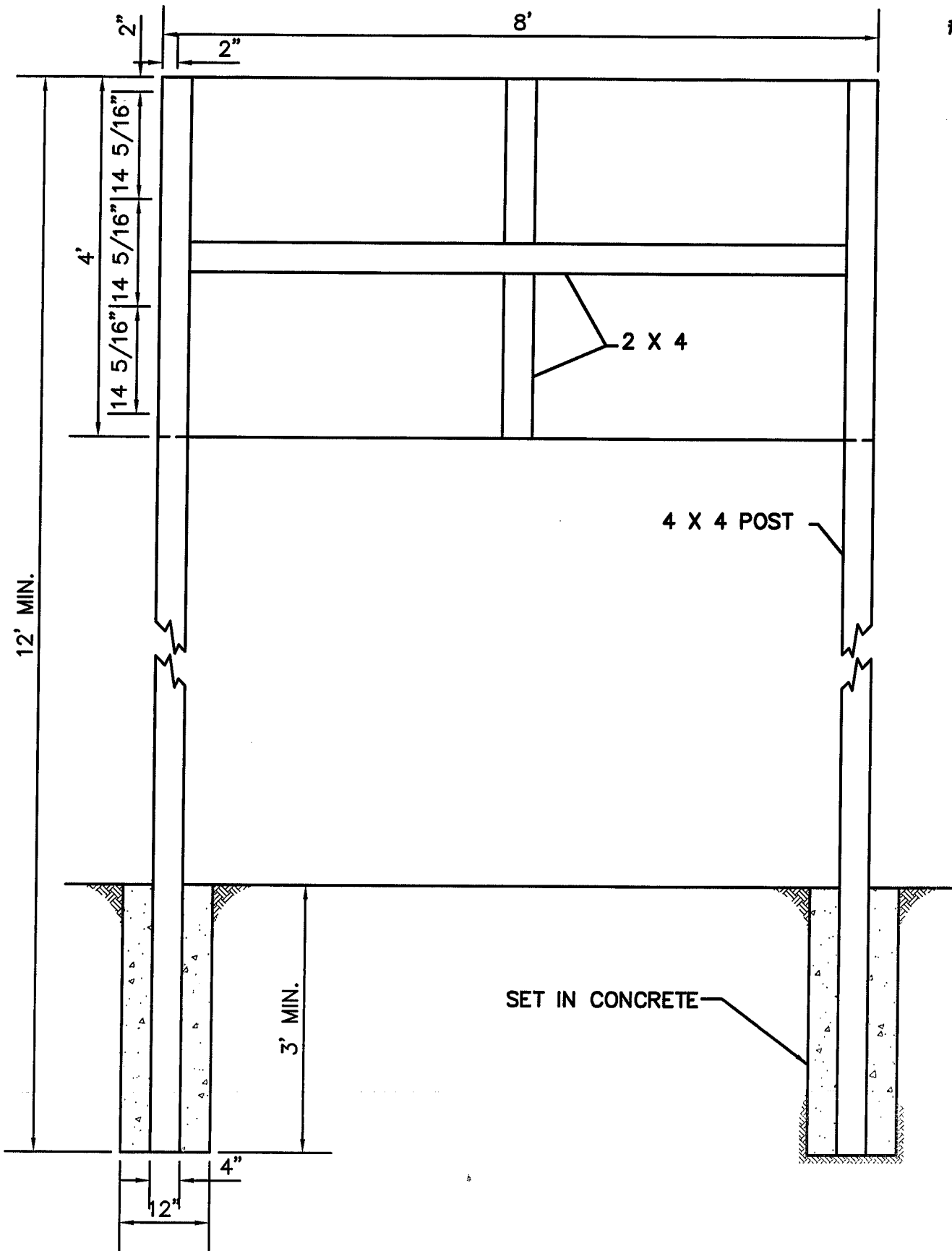


01580-2

SIGN DIMENSIONS: 1200mm X 2400mm X 19mm (approx. 4' X 8' X 3/4")  
 PLYWOOD PANEL (APA RATED A-B GRADE - EXTERIOR)

#15030





# ASSEMBLY OF PLYWOOD SIGN

NOT TO SCALE

END OF SECTION  
01580-3



## SECTION 01600

## SPECIAL PROVISIONS FOR MATERIALS AND EQUIPMENT

## 1.01 SERVICES OF MANUFACTURERS' REPRESENTATIVE AND OPERATING MANUALS

- A. Bid prices for equipment furnished under Divisions 11, 13, 15 and 16, shall include the cost of written operation and maintenance instructions and the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment, and testing of the equipment and to instruct the OWNER'S operating personnel and the ENGINEER'S representative on operation and maintenance. This supervision and instruction may be divided into two or more time periods as required by the installation program, and shall be scheduled at the convenience of the OWNER.
- B. Unless otherwise specified with the equipment, equipment manufacturers shall provide a minimum of 2 separate repeated training sessions for the OWNER'S staff. Each session shall be at least 2 hours in length, but not more than 4 hours. Manufacturer's agenda and schedule for the training shall be submitted to and approved by the OWNER prior to conducting the training. No training will be scheduled until the equipment has been installed, satisfactorily tested, and is ready for operation.
- C. The manufacturer's representative shall have complete knowledge of the proper installation, lubrication, operation and maintenance of the equipment provided and shall be capable of instructing the representatives of the OWNER and ENGINEER on proper start-up, shut-down, on-line operations, lubrication and preventive maintenance of the equipment. Outlines of lesson plans and proposed training schedule shall be submitted to the ENGINEER for review 30 days prior to the desired instructional period. Specific requirements for furnishing the services of manufacturer's representatives are indicated under detailed Specifications. This work may be conducted in conjunction with Inspection and Testing, whenever possible, as provided under Part 3 of EXECUTION of detailed specification. Should difficulties in operation of the equipment arise due to the manufacturer's design or fabrication, additional services shall be provided at no cost to the OWNER.
- D. A certificate from the manufacturer stating that the installation of the equipment is satisfactory, that the unit has been satisfactorily tested, is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit shall be submitted to the ENGINEER.
- E. For equipment furnished under other Divisions, the CONTRACTOR, unless otherwise specified, shall furnish the services of accredited representatives of the

manufacturer only when some evident malfunction or over-heating makes such services necessary.

F. Four complete sets of operation and maintenance instructions covering all equipment furnished under Divisions 11, 13, 15 and 16, shall be delivered directly to the ENGINEER, unless a different number are called for in an item's section of the Specifications.

1. The manual for each piece of equipment shall be a separate document with the following specific requirements:

a. Contents:

Table of contents and index

Brief description of each system and components

Starting and stopping procedures

Special operating instructions

Routine maintenance procedures

Manufacturer's printed operating and maintenance instructions, parts list, illustrations, and diagrams. These shall be specific to the material supplied under the Contract, and not a manufacturer general brochure.

One copy of each wiring diagram

One final accepted copy of each shop drawing and each CONTRACTOR'S coordination and layout drawing

List of spare parts, manufacturer's price, and recommended quantity

Manufacturer's name, address, and telephone number

Name, address, and telephone number of manufacturer's local representative

B. Material:

Loose leaf on punched paper. Holes reinforced with plastic, cloth or metal. 8-1/2" x 11" paper size.

Diagrams and illustrations, attached foldouts as required of original quality, reproducible by dry copy method

Covers: oil, moisture, and wear resistant 9" x 12" size

c. Submittals to the ENGINEER:

- (1) Three preliminary copies of manuals, no later than 15 days following final review of the shop drawings for each piece of equipment and 4 final copies of complete manuals prior to Field Tests.

## 1.02 INSTALLATION OF EQUIPMENT

- A. Special care shall be taken to ensure proper alignment of all equipment with particular reference to the pumps, blowers and electric drives. The units shall be carefully aligned on their foundations by qualified millwrights after their sole plates have been shimmed to true alignment at the anchor bolts. The anchor bolts shall be set in place and the nuts tightened against the shims. After the foundation alignments have been reviewed by the ENGINEER, the bedplates or wing feet of the equipment shall be securely bolted in place. The alignment of equipment shall be further checked after securing to the foundations, and after conformation of all alignments, the sole plates shall be finally grouted in place. The CONTRACTOR shall be responsible for the exact alignment of equipment with associated piping, and under no circumstances, will "pipe springing" be allowed.
- B. All wedges, shims, filling pieces, keys, packing, red or white lead grout, or other materials necessary to properly align, level, and secure apparatus in place shall be furnished by the CONTRACTOR. All parts intended to be plumb or level must be proven exactly so. Any grinding necessary to bring parts to proper bearing after erection shall be done at the expense of the CONTRACTOR.

## 1.03 GREASE, OIL AND FUEL

- A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The OWNER shall be furnished with a one year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied under Divisions 11, 13, 15 and 16.
- B. All lubricants and fuels shall be properly labeled, using an indelible marker and writing on the lubricant container or drum, specifying the type and brand name of the lubricant supplied. A Master Lubrication list must be submitted to the ENGINEER for approval clearly stating which lubricants are to be used in the various pieces of plant equipment and the quantity supplied for one years' use by each unit.

#### 1.04 TOOLS AND SPARE PARTS

- A. Any special tools (including grease guns or other lubricating devices) which may be necessary for the adjustment, operation, and maintenance of any equipment shall be furnished with the respective equipment.
- B. All spare parts shall be properly protected for long periods of storage (contained in plastic bags or cardboard containers) and labeled for easy identification without opening.

#### 1.05 MAINTENANCE AND LUBRICATION SCHEDULES

- A. The CONTRACTOR'S attention is directed to the General Conditions and Section 01300 for all requirements relative to the submission of shop drawings for the mechanical equipment. For all mechanical and electrical equipment furnished, the CONTRACTOR shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted along with shop drawings. Submission shall be in 4 copies.

#### 1.06 STORAGE AND HANDLING OF EQUIPMENT

- A. Special attention shall be given to the storage and handling of equipment. As a minimum, the procedure outlined below shall be followed:
  1. Equipment shall not be shipped until all pertinent shop drawings are reviewed by the ENGINEER.
  2. All equipment having moving parts such as gears, electric motors, etc., and/or instruments shall be properly stored until such time as the equipment is to be installed.
  3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
  4. Manufacturer's storage instructions shall be carefully studied by the CONTRACTOR and reviewed with the ENGINEER. These instructions shall be followed and a written record of this kept by the CONTRACTOR.
  5. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding." Upon installation of the equipment, the CONTRACTOR shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.



6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
  7. Prior to acceptance of the equipment, the CONTRACTOR shall have the manufacturer inspect the equipment and certify in writing that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a written certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the CONTRACTOR'S expense.
- B. The OWNER reserves the right to withhold payment for any materials improperly stored and maintained.

#### 1.07 PARTIAL UTILIZATION

- A. During the course of construction partial occupation and utilization of completed portions of the work may be required.
- B. When deemed necessary, the OWNER or the CONTRACTOR may request use of completed work.

#### 1.08 EQUIPMENT WARRANTY

- A. The CONTRACTOR shall provide the OWNER a minimum 1 year warranty on all equipment, or a warranty of the length as is specified in the specific equipment section of the Specifications, in accordance with the General Conditions. The warranty period for each item of equipment shall be a minimum of 1 year, or as specified otherwise, from the date of the OWNER'S acceptance of the equipment item.

#### 1.09 ADJUSTMENTS AND CORRECTIONS OF EQUIPMENT AND APPURTENANCES DURING OPERATION

- A. Some items of functional nature included in this Contract cannot be tested as to performance and quality at the time of completion of their installation. They must wait for necessary testing and proper performance until such functions are possible during later portions of this Contract. Such testing, specified performance and proper instructions to the OWNER's operators (as to their maintenance and operation) is deemed a portion of this Contract, and payment shall be retained by the OWNER for equipment delivered to the site and for Work completed to cover

such service. Such service replacements and performance shall take precedence over expiration of the one year guarantee period.

- B. The CONTRACTOR shall expedite the completion of such service by all Suppliers and Subcontractors and shall render competent supervision of such service. The CONTRACTOR shall also expedite the replacement of defective and unaccepted parts and equipment. Unnecessary delay in delivery and installation of corrective parts and equipment may constitute damage to the OWNER for which the CONTRACTOR can be held liable.

#### 1.10 INSTALLING NEW EQUIPMENT IN EXISTING STRUCTURES

- A. Where new equipment is planned and/or specified as being installed in existing structures, the CONTRACTOR shall verify all dimensions and locations of existing facilities prior to ordering the new equipment. Existing anchor bolts shall be used when possible, and new equipment shall be fabricated to conform to the existing dimensions, shapes, and locations as required.

END OF SECTION

SECTION 01610

TRANSPORTATION AND HANDLING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. Handling and Distribution:

1. The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.
2. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

B. Storage of Materials and Equipment

1. All excavated materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all public utility installations in the vicinity of the work.
2. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants, and occupants.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01650  
STARTING OF SYSTEMS

PART 1 - GENERAL

1.1. WORK INCLUDED:

- A. Starting systems
- B. Demonstration and instructions
- C. Testing, adjusting, and balancing

1.2. RELATED SECTIONS

- A. Section 01420 - Inspection Services: Certificates.
- B. Section 01500: Field Office Temporary Facilities and Controls.
- C. Section 01700 - Project Closeout: System operation and maintenance data and extra materials.

1.3. STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer and Owner ten days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.
- D. Verify that tests, meter readings, signal strengths, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative and/or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

#### 1.4. DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

#### PART 2 - PRODUCTS

NOT USED.

#### PART 3 - EXECUTION

NOT USED.

END OF SECTION

SECTION 01700  
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Liquidated Damages: BID PROPOSAL, AGREEMENT AND GENERAL CONDITIONS
- B. Cleaning: Section 01710
- C. Project Record Documents: Section 01720

1.2. SUBSTANTIAL COMPLETION

- A. Contractor:
  - 1. Submit written certification to Engineer that Project is substantially complete.
  - 2. Submit list of items to be completed or corrected.
- B. Engineer will make an inspection within seven days after receipt of certification, together with Owner's and Contractor's Representatives.
- C. Should Engineer consider the project substantially complete:
  - 1. Contractor shall prepare and submit to Engineer a list of items to be completed or corrected, as determined by the inspection.
  - 2. Engineer will prepare and issue a Certificate of Substantial Completion containing:
    - a. Date of Substantial Completion.
    - b. Contractor's list of items to be completed or corrected, verified and/or amended by Engineer.
    - c. The time within which Contractor shall complete or correct work of listed items.
    - d. Time and date Owner will assume possession of project or designated portion thereof.
    - e. Responsibilities of Owner and Contractor for:
      - i. Insurance
      - ii. Utilities
      - iii. Operation of mechanical, electrical, and other systems
      - iv. Maintenance and cleaning
      - v. Security

- f. Signatures of:
  - i. Contractor
  - ii. Engineer
  - iii. Owner
- 3. Owner occupancy of Project or Designated Portion of Project:
  - a. Contractor shall:
    - i. Obtain certificate of occupancy.
    - ii. Perform final cleaning in accordance with Section 01710.
  - b. Owner will occupy Project under provisions stated in Certificate of Substantial Completion.
- 4. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Engineer consider that work is not substantially complete:
  - 1. He shall immediately notify Contractor, in writing, stating reasons.
  - 2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of Project is substantially complete.
  - 3. Engineer and Owner will re-inspect work.

### 1.3. FINAL INSPECTION

- A. Contractor shall submit written certification that:
  - 1. Contract Documents have been reviewed.
  - 2. Project has been inspected for compliance with Contract Documents.
  - 3. Work has been completed in accordance with Contract Documents.
  - 4. Equipment and systems have been tested in presence of Engineer and Owner's Representative and are operational.
  - 5. Project is completed and ready for final inspection.
- B. Engineer will make final inspection within seven (7) days after receipt of certification.
- C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should Engineer consider that work is not finally complete:



1. He shall notify Contractor, in writing, stating reasons.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
3. Engineer and Owner will re-inspect work.

#### 1.4. FINAL CLEANING UP

The Work will not be considered as completed and final payment made until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer and Owner. See Section 01710 for detailed requirements.

#### 1.5. CLOSEOUT SUBMITTALS

Project Record Documents: See requirements of Section 01720.

#### 1.6. FINAL APPLICATION FOR PAYMENT

Contractor shall submit final applications for payment in accordance with requirements of GENERAL CONDITIONS (Section 19).

#### 1.7. FINAL CERTIFICATE FOR PAYMENT

- A. Engineer will issue final certificate in accordance with provisions of GENERAL CONDITIONS.
- B. Should final completion be materially delayed through no fault of Contractor, Engineer may issue a Semi-Final Certificate for Payment.

### PART 2 - PRODUCTS

NOT USED.

### PART 3 - EXECUTION

NOT USED.

END OF SECTION



## SECTION 01710

## CLEANING

## PART 1 - GENERAL

## 1.1. WORK INCLUDED

- A. During its progress, the work and the adjacent areas affected thereby shall be kept cleaned up and all rubbish, surplus materials, and unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.
- B. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the project. The ditches, channels, drains, pipes, structures, and any other work shall, upon completion of the work, be left in a clean and neat condition.
- C. On or before the completion of the project, the Contractor shall, unless otherwise specifically directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic in, under, and around privies, hoses and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- D. The Contractor shall thoroughly clean all materials and equipment installed by him and his subcontractors, and on completion of the project shall deliver it undamaged and in fresh and new appearing conditions.
- E. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration. The restoration of existing property or structures shall be done as promptly as practicable as work progresses and shall not be left until the end of the contract period.

## 1.2. DESCRIPTION

### A. Related Requirements Specified Elsewhere:

Project Closeout: Section 01700.

B. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish caused by operations.

C. At completion of project, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

## 1.3. SAFETY REQUIREMENTS.

### A. Hazards Control:

1. Store volatile wastes in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or fuel in open drainage ditches or storm or sanitary drains.
3. Do not dispose of wastes in streams or waterways.

## PART 2 - PRODUCTS

### 2.1. MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

## PART 3 - EXECUTION

### 3.1. DURING CONSTRUCTION

- A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. At reasonable intervals during progress of Work, clean site and public properties, and properly dispose of waste materials, debris, and rubbish.
- D. Provide on-site containers for collection of waste materials, debris, and rubbish.
- E. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- F. The Contractor shall thoroughly clean all materials and equipment installed.

### 3.2. FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. The Contractor shall restore or replace existing property or structures as promptly and practicable as work progresses.

END OF SECTION



## SECTION 01720

## PROJECT RECORD DOCUMENTS

## PART 1 - GENERAL

## 1.1. WORK INCLUDED

The Contractor shall obtain from the Engineer one (1) set of blueline prints of the Contract Drawings. These prints shall be kept and maintained in good condition at the project site and qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual "as built" record of the construction progress. Entries and notations shall be made in a neat and legible manner and these prints shall be delivered to the Engineer upon completion of the construction. APPROVAL FOR FINAL PAYMENT WILL BE CONTINGENT UPON COMPLIANCE WITH THIS PROVISION.

## 1.2. RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Maintain at job site, one copy of:
  - 1. Contract Drawings
  - 2. Specifications
  - 3. Addenda
  - 4. Reviewed Shop Drawings
  - 5. Change Orders
  - 6. Other Modifications to Contract.
- B. Store documents in approved location, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry, legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

## 1.3. MARKING DEVICES

Provide colored pencil or felt-tip pen for all marking.

## 1.4. RECORDING

- A. Label each document "PROJECT RECORD" in 2-inch high printed letters.
- B. Keep record documents current.

- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings: Legibly mark to record actual construction:
  - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
  - 2. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
  - 3. Field changes of dimension and detail.
  - 4. Changes made by Change Order or Field Order.
  - 5. Details not on original Contract Drawings.
- E. Specifications and Addenda: Legibly mark up each Section to record:
  - 1. Manufacturer, trade name, catalog number, and supplier or each product and item of equipment actually installed.
  - 2. Changes made by Change Order or Field Order.
  - 3. Other matters not originally specified.
- F. Shop Drawings: Maintain as record documents; legibly annotate Shop Drawings to record changes made after review.

#### 1.5. SUBMITTAL

- A. At completion of project, deliver record documents to Engineer.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
  - 1. Date Project Title and Number Contractor's Name and Address
  - 2. Title and Number of each Record Document
  - 3. Certification that each Document as Submitted is Complete and Accurate
  - 4. Signature of Contractor or his authorized Representative.

#### PART 2 - PRODUCTS

NOT USED

#### PART 3 - EXECUTION

NOT USED.

END OF SECTION



SECTION 01740  
BASIS FOR PAYMENT

**Contract “G-1” - Water Booster Pump Station - Upgrades**

PART 1 - GENERAL

All payment for work done under the provisions of this Contract shall be in accordance with this basis for payment for the specific items listed herein and in the bid proposal. The item numbers in this section correspond with the item numbers in the bid proposal.

**Item 1 & 2 – Booster Pump Station**

Payment for these item shall be made at the lump sum price bid for furnishing and installation of the pump stations. This shall include all work and materials necessary for the complete installation of the pump stations as shown on the PLANS and called for in the SPECIFICATIONS, including excavation and site grading, access road with site stone and filter fabric, tie-in of new pump station to the water main, on site piping, electrical service, including electrical power service from the drop pole to the new pump station, two (2) pumps, concrete block building, valves, all controls, including electrical service for telemetry, turbine meter, gauges, backfill, painting, sediment control, cleanup, seeding, start-up of all components, testing, fencing, and all other items in accordance with the Technical Specifications, Drawings and details. **Electric service from Power Company to drop pole shall be provided by the Owner.**

The cost of all associated items not specifically listed for separate payment in the proposal shall be included as an incidental expense.

**Rock excavation is not a separate pay item.**

**Item 3 & 4 – VFD’s @ Existing Pump Stations (U.S. 60 & The Point)**

Payment for these items shall be made at the lump sum price bid for furnishing and installing the new VFD’s for each **existing** pump station called for in these documents. This shall include all work and materials necessary for furnishing the VFD systems including programming, connection to existing electrical systems and pumps, startup and testing at the pump stations as called for in the Specifications. This pay item includes training and O & M manuals.

The labor and materials for installing the VFD’s with the necessary electrical requirements shall be the responsibility of the general contractor under this Bid item.

The cost of all associated items not specifically listed for separate payment in the proposal shall be included as an incidental expense.

END OF SECTION



SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. DEFINITIONS

1. Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

2. Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

B. PAYMENT

1. Cost associated with Clearing and Grubbing shall be incidental to facilities being placed.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1. CLEARING

- A. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and

construction operations by the erection of barriers or by such other means as the circumstances require.

- B. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

### 3.2. GRUBBING

- A. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved.
- B. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

### 3.3. TREE REMOVAL

- A. Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING.
- B. Where Trees shall be disposed of in an approved manner.

### 3.4. DISPOSAL OF MATERIALS

- A. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations shall be disposed of by the Contractor in an approved manner. The Contractor shall be responsible for compliance with all Federal and State laws and regulations and with reasonable practice relative to the disposal of the material.
- B. Disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

END OF SECTION

SECTION 02202  
ROCK REMOVAL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Removal of discovered rock during excavation.
- B. Use of explosives for rock removal.

1.2. RELATED WORK

- A. Geotechnical data as indicated on the Drawings.
- B. Section 02221 - Excavation.

1.3. QUALITY ASSURANCE

- A. Explosives Firm: Company specializing in explosives for disintegration of subsurface rock with a certified blaster in the State of Kentucky.
- B. Contractor shall conform to all State, Federal, and Local laws, ordinances and regulations in regard to transportation, use, and handling of explosives.

1.4. OUTSIDE SERVICES

- A. Contractor shall employ the above mentioned experts if necessary during blasting, to protect workers, property and public.

1.5. SHOP DRAWINGS

- A. Submit means and methods under provisions of Section 01300.
- B. Indicated proposed method of blasting, delay pattern, explosives types, type of blasting mat or cover, and intended rock recovery method.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Rock Definition: Solid mineral material or man made material that cannot be removed with a power shovel or as defined by KDOH specifications.

- B. Explosives: Type recommended by explosives firm and required by authorities having jurisdiction.
- C. Delay Devices: Type recommended by explosives firm and conforming to State regulations.
- D. Blasting Materials: Type recommended by explosives firm and conforming to State regulations.

## PART 3 - EXECUTION

### 3.1. INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning work of this Section means acceptance of existing condition.

### 3.2. ROCK REMOVAL

- A. Excavate for and remove rock by a mechanical method.
- B. Cut away rock at excavation bottom to form even surface.
- C. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.
- D. Correct unauthorized rock removal in accordance with backfilling and compaction requirements of Section 02221, paragraph 3.04.

### 3.3. ROCK REMOVAL – EXPLOSIVES METHODS

- A. If rock is uncovered requiring the explosives method for rock disintegration, notify the Engineer.
- B. Advise Owners of adjacent building or structures in writing prior to setting up seismographs. Describe blasting and seismic operations.
- C. Peak particle velocity will be limited to 4.0 in./sec.
- D. Provide seismographic monitoring during progress of all blasting operations, or as required by State regulations.
- E. Distinguish rock and remove from excavation.

3.4. FIELD QUALITY CONTROL.

- A. Engineer or his representative shall approve the depth of the final rock cut.

3.5. HAUL

- A. No payment will be made separately or directly for haul on any part of the work for removed rock. All haul will be considered a necessary and incidental part of the work, and the cost thereof shall be considered by the Contractor in the contract unit price for the pay items of the work involved.

3.6. ROCK REMOVAL

- A. **Rock removal is not a pay item. Cost associated with rock removal shall be incidental to the project and shall be considered by the Contractor in the unit price for the pay items of the work involved.**

END OF SECTION





## SECTION 02220

## EXCAVATION

## PART 1 – GENERAL

All excavation on this Project is unclassified.  
Rock removal is not a pay item.

## PART 2 – PRODUCTS

Not used.

## PART 3 – EXCAVATION FOR TRENCHES

## 3.01 INSPECTION

- A. All excavation on this Project is unclassified. Rock removal is not a pay item.
- B. If the foundation is good firm earth and the machine excavation has been accomplished, the remainder of the material shall be excavated by hand and the earth pared or molded to give full support to the lower quadrant of the barrel of each pipe. Where bell and spigot pipe are involved, bell holes shall be excavated during this latter operation to prevent the bells from being supported on undisturbed earth. If for any reason the machine excavation in earth is carried below an evaluation that will permit the type of bedding in undisturbed earth, then a layer of granular material shall be placed so that the lower quadrant of the pipe will be securely bedded in the granular fill as shown on the Plans.
- C. If the foundation is rock and the excavation has been undercut as set out hereinbefore, a bed of No. 9 crushed stone aggregate shall be placed to provide continuous support for the lower quadrant of the pipe. This bedding is incidental cost of construction and is not a pay item.
- D. Trenches shall be of sufficient width to provide free working space on each side of the pipe and to permit proper backfilling around the pipe, but unless specifically authorized by the Engineer, trenches shall in no case be excavated or permitted to become wider than 2'-6" plus the nominal diameters of the pipe at the level of or below the top of the pipe. Trenches cut in roads and streets shall not exceed a maximum width of 3'-6" plus the nominal diameters of the pipe at the level of the road or street surface.
- E. All excavated materials shall be placed a minimum of 2 feet back from the edge of the trench.
- F. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew for a total of 1000 feet of open ditch. Watchmen or barricades, lanterns, and other such signs and signals as may be necessary to warn the

public of the dangers in connection with open trenches, excavations, and other obstructions, shall be provided by and at the expense of the Contractor.

- G. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
- H. Where existing drainage ditches coincide with the proposed gravity sewer alignment, the Contractor shall re-establish the drainage ditch after the sewer line has been laid and properly backfilled. The drainage ditch shall be of equal size as the previously existing one and free of any restrictions which might impede flow.

### 3.02 REMOVAL OF WATER

- A. The Contractor, at his own expense, shall provide adequate facilities for promptly and continuously removing water from all excavation.
- B. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to intercept and/or remove promptly and dispose properly for all water entering trenches and other excavations. Such excavation shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged.
- C. All water pumped or drained from the work shall be disposed of in a suitable manner without undue interference with other work, damage to pavements, other surfaces, or property. Suitable temporary pipes, flumes, or channels shall be provided for water that may flow along or across the site of work.
- D. If necessary, the Contractor shall dewater the excavations by means of an efficient drainage wellpoint system which will drain the soil and prevent saturated soil from flowing into the excavation. The wellpoints shall be designed especially for this type of service. The pumping unit shall be designed for use with the wellpoints, and shall be capable of maintaining a high vacuum and of handling large volumes of air and water at the same time.
- E. The installation of the wellpoints and pump shall be done under the supervision of a competent representative of the manufacturer. The Contractor shall do all special work such as surrounding the wellpoints with sand or gravel or other work which is necessary for the wellpoint system to operate for the successful dewatering of the excavation.

**3.03 DISPOSITION OF EXCAVATED MATERIAL**

Material excavated for gravity sewers, manholes, or other structures shall be disposed of by the Contractor at his own expense. All excavated material which is not needed or is unacceptable for backfilling purposes shall be disposed of by the Contractor in a manner satisfactory to the Engineer.

**3.04 UNAUTHORIZED EXCAVATION**

Whenever the excavation is carried beyond or below the required lines and grades, the Contractor, at his own expense, shall refill said excavated space with suitable material in a manner approved by the Engineer.

**3.05 EXISTING UTILITIES AND OTHER OBSTRUCTIONS**

The Engineer has endeavored to show all existing utilities and or obstructions to the best of his ability within the confines of information furnished by others. It is the full responsibility of the Contractor to verify locations as set out hereinafter and open sufficient ditch in advance to assure no conflicts. Relocations, adjustments, and damages due to improper planned methods and procedures will be at the cost of the Contractor. Any conflicts or damages by this Project with existing utilities shall be immediately brought to the attention of the Engineer. If any utility is damaged or disrupted the Contractor must take what ever measures necessary to restore service immediately at his cost.

Prior to the commencement of construction on the Project, the Contractor shall contact the utility companies whose lines (above and below ground) may be affected during construction and verify the locations of the utilities as shown on the Contract Drawings. The Contractor shall ascertain from said companies if he will be allowed to displace or alter, by necessity, those lines encountered or replace those lines disturbed by accident during construction, or if the companies themselves are only permitted by policy to perform such work. If the Contractor is permitted to perform such work, he shall leave the lines in as good condition as were originally encountered and complete the work as quickly as possible. All such lines or underground structures damaged or disrupted in the construction shall be replaced at the Contractors expense, unless, in the opinion of the Engineer, such damage was caused through no fault of the Contractor.

END OF SECTION



SECTION 02221

EXCAVATION, TRENCHING, AND BACKFILLING  
FOR UTILITIES SYSTEMS

PART 1 – GENERAL

1.01 WORK INCLUDED, EXCAVATION, TRENCHING AND BACKFILLING FOR THE  
FOLLOWING SYSTEMS

- A. Water Systems.

1.02 RELATED WORK

- A. Section 02202 - Rock Removal
- B. Section 02270 - Erosion Control
- C. Section 02480 - Seeding

1.03 Applicable Publications

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION  
OFFICIALS (AASHTO)

AASHTO T 180 (1986) Moisture-Density Relations of Soils Using a 10-lb.  
Rammer an 18-in Drop

- B. AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM D 2487 (1985) Classification of Soils for Engineering Purposes

1.04 DEFINITIONS

Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in -AASHTO T 180-, Method D.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Satisfactory Materials

Satisfactory materials shall consist of any material classified by -ASTM D 2487-  
as GW, GP, and SW.

**B. Unsatisfactory Materials**

Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches, and materials classified in ASTM D 2487, as PT, OH, and OL. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.

**C. Cohesionless and Cohesive Materials**

Cohesionless materials shall include materials classified in -ASTM D 2487- as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are non-plastic.

**D. Rock - See Section 02202****E. Unyielding Material**

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

**F. Unstable Material**

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

**G. Select Granular Material**

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be 1 inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

**H. Initial Backfill Material**

Initial backfill shall consist of select granular material or satisfactory materials free from rocks 3 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 2 inches in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

## PART 3 – EXECUTION

### 3.01 EXCAVATION

Excavation shall be performed to the lines and grades indicated. Rock excavation shall include removal and disposition of material. Earth excavation shall include removal and disposal of material not classified as rock excavation. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation.

### 3.02 Trench Excavation

The trench shall be excavated as specified for applicable utility. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 4 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe or cable shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Owner.

### 3.03 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

### 3.04 Removal of Unyielding Material

Where over-depth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 4 inches below the required grade and replaced with suitable materials as provided in paragraph "BACKFILLING AND COMPACTION."

### 3.05 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph "BACKFILLING AND COMPACTION." When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

### 3.06 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Engineer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections.

### 3.07 Stockpiles

Stockpiles of satisfactory and wasted materials shall be placed and graded. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government.

3.08 Placement of facilities (pipe, cable, ducts) may be on solid good clean compacted earth. See details.

### 3.09 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

### 3.10 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

#### A. Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.



B. Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

C. Bedding and Initial Backfill

Bedding of bank run sand or #9 gravel 4" thick shall be placed under water lines. Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or cable. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

D. Final Backfill

The remainder of the trench, shall be filled with satisfactory material. Backfill material shall be placed and compacted as follows:

Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12-inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

END OF SECTION



## SECTION 02270

EROSION CONTROL, SEDIMENTATION, AND CONTAINMENT  
OF CONSTRUCTION MATERIALS

## PART 1 - GENERAL

## 1.1. WORK INCLUDED

- A. The Contractor shall do all work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands.
- B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline, or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage, and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

## PART 2 - PRODUCTS

## 2.1. METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches, and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area, which must be entered for the construction of temporary, or permanent facilities. The Engineer has the authority to limit the surface area of awardable earth material erodible by clearing and grubbing, excavation, borrow and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, or other control devices or methods as necessary to control erosion.
- C. Excavated soil material shall not be placed adjacent to the wetlands or watercourses in a manner that will cause it to be washed away by high water or

runoff. Earth berms or diversions constructed to intercept outlets shall be stable or shall be stabilized by means acceptable to the Engineer. If for any reason construction materials are washed away during the course of construction, the Contractor shall remove those materials from the fouled areas as directed by the Engineer.

- D. For work within easements, all materials used on construction such as excavation, backfill, roadway and pipe bedding and equipment, shall be kept within the limits of the easements.
- E. The Contractor shall not pump silt-laden water from trenches or other excavations into the wetlands or adjacent watercourses. Instead, silt-laden water from his excavations shall be discharged within areas surrounded by baled hay or into sediment traps to ensure the only sediment-free water is returned to the watercourses. Damage to vegetation by excessive watering or silt accumulation in the discharge area shall be avoided.
- F. Prohibited construction procedures include, but are not limited to, the following:
  - 1. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
  - 2. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
  - 3. Pumping of silt-laden water from trenches or excavations into surface waters or wetlands.
  - 4. Damaging vegetation adjacent to our outside of the construction area limits.
  - 5. Disposal of trees, brush, debris, paints, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
  - 6. Open burning of debris from the construction work.
- G. Any temporary working roadways required shall consist of clean fill approved by the Engineer. In the event fill is used, the Contractor shall take every precaution to prevent the fill from mixing with native materials of the site. All such foreign materials shall be removed from the site following construction.

## 2.2. EROSION CHECKS

- A. The Contractor shall furnish and install baled hay or straw erosion checks in all locations indicated on the Drawings, surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer.
- B. Checks, where indicated on the Drawings, shall be installed immediately after the

site is cleared and before trench excavation is begun at the location indicated. Checks located surrounding stored material shall be located approximately 6 feet from that material.

- C. Bales shall be held in place with two 2-inch by 2-inch by 4-foot wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short-circuiting of the erosion check.

END OF SECTION



SECTION 02480

SEEDING, FERTILIZING AND MULCHING

PART 1 - GENERAL

1.1. WORK INCLUDED

A. CONDITIONS

1. General provisions of CONTRACT DOCUMENTS apply to this section.

B. DESCRIPTION OF WORK

1. Provide labor, material, equipment and services necessary for proper and complete seeding, fertilizing and mulching.
2. Seed all new and disturbed lawn areas not otherwise indicated to be sodded.

1.2. QUALITY ASSURANCE

- A. The intent of these Specifications is to require the Contractor to provide, in all areas to be seeded, fertilized and mulched, a smooth uniform turf of the grasses specified free from bare spots, eroded areas, weeds or other deficiencies. Acceptance by the Engineer is conditional upon compliance with this intent after initial growing season.
- B. Areas outside limits of construction, damaged by work under this Contract, shall be repaired as required to match existing conditions. This includes borrow areas for excavation.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Mulch shall be straw or hay mulch, tacked with asphalt, straw or hay mulch fixed in place with disk land packers or disk harrows; or fiber mulch applied simultaneously with grass seed and fertilizer by the use of hydroseeding machinery.
  1. Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material. Straw shall be in an air-dry condition suitable for placing with blower equipment.
  2. Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, free from noxious weeds, mold or other

objectionable material. Hay shall be in an air-dry condition and suitable for placing with blower equipment.

3. Wood cellulose fiber for use with hydraulic application or grass seed and fertilizer shall consist of specially prepared wood cellulose fiber or a combination of wood cellulose and recycled newsprint fibers, processed to contain no growth or germination - inhibiting factors and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus 3 percent at the time manufactured. The combination of wood cellulose and recycled newsprint fibers shall contain a maximum of 10 percent moisture plus or minus 3 percent at the time of manufacture. The pH range for either mix shall be between 4.5 and 6.5.

- B. Commercial fertilizer shall be a complete commercial fertilizer of 10-10-10 formula, uniform in composition, dry and free flowing. Fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.
- C. Limestone shall be finely pulverized (calcium carbonate) containing equivalent of at least 45% calcium oxide, and so pulverized that the residue on #30 and #200 sieves is not more than 0.5% and 15% respectively.
- D. Seed Mixture  
Lawn seed shall be guaranteed by dealer and distributed as follows:

50% Fine Leaf Falcon Fescue  
20% Kentucky Bluegrass "Ken-Blue"  
30% Perennial Ryegrass

## 2.2 SOIL IMPROVEMENTS

- A. A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified. Cost of soil tests is not a pay item and is an incidental cost to the Contractor.
- B. Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.
- C. Fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage or hydroseeding operation.



## 2.3 SEEDING AND MULCHING

- A. Planting Seasons and Conditions: Planting shall not be done when the ground is frozen, snow-covered, or in an unsatisfactory condition for planting. Spring seeding season shall be between February 15 and April 15. Fall seeding shall be between August 15 and October 15.
- B. Seeding seasons may be extended only at direction of Engineer.
1. Seeding:
    - a. Seed shall be broadcast uniformly by approved sowing equipment at the rate of 5 pounds per 1,000 square feet over a designated area. One half of the seed shall be sown in one direction, and the remainder shall be sown at right angles to the first sowing. The seed shall be covered to an average depth of (0.2-0.4) inch by means of spike tooth harrow, cultipaker, or other approved device. Seed shall not be broadcast when winds are above 10 miles per hour.
    - b. Drill seeding shall be accomplished using approved equipment such as cultipaker seeders and grass seed drills. The seed shall be drilled uniformly to an average depth of (0.2-0.4) inch at a rate of 5 pounds per 1,000 square feet.
    - c. When hydroseeding, the (seed and fertilizer), (seed, fertilizer, and approved mulch material) shall be mixed in the required amount of water to produce a homogeneous slurry and then uniformly applied. Wood cellulose or straw mulch shall be added after the seed and fertilizer have been thoroughly mixed. Lime, when applied hydraulically, shall be a single, separate operation.
    - d. Immediately after seeding, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with a cultipacker-type seeder or if seed is applied in combination with hydromulching, rolling will not be required.
  2. Mulching (Straw and Asphalt):
    - a. All seeded areas indicated or directed by the Engineer shall be mulched with a straw and asphalt mat. Mulching shall follow seeding operation not later than 48 hours. The asphalt mat will not be required on areas adjacent to buildings, sidewalks or concrete curbs.
    - b. Straw and asphalt mat shall be applied at rate of two and one-half (2½) tons of straw per acre, and 200 gallons of asphalt per acre. Asphalt shall either be emulsified RS-1 grade or cutback RC-1 grade. Method of application may be:

- 1) by spreading straw evenly over seeded area after which asphalt tie-down is sprayed over straw in a solid pattern, or
- 2) by applying mat in one operation by a jet type mulch spreader in which straw and asphalt are sprayed in mixture evenly over area.

## 2.4 SEED PROTECTION ON SLOPES

- A. Cover seeded slopes where grade is 3:1 or greater with jute matting. Roll matting down over slopes without stretching or pulling.
- B. Lay matting smoothly on soil surface, boring top end of each section in narrow 6-inch trench. Leave 12 inches overlap from top roll over bottom roll. Leave 4 inches overlap over adjacent section.
- C. Staple outside edges and overlaps at 36-inch intervals.
- D. Lightly dress slopes with topsoil to ensure close contact between matting and soil.
- E. In ditches, unroll matting in direction of flow. Overlap ends of strips 6 inches with upstream section on top.

## 2.5 WATERING

- A. Immediately following seeding, the Contractor shall water areas thoroughly, including subgrade.
- B. The prepared area is to be watered a minimum of two times per week until it has been accepted. This will not be required if sufficient rain occurs during the week.

## 2.6 CLEAN-UP

- A. Soil, peat or similar material which has been brought onto paved areas within or outside construction limit by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times.
- B. Upon completion of seeding, all excess soil, stones and debris which have not previously been cleaned up shall be removed from site or disposed of as directed by the Engineer.
- C. All attended areas shall be prepared for final inspection.

## 2.7 MAINTENANCE

- A. Maintenance shall begin immediately following last operation of seeding and shall continue until turf is formally accepted.

- B. Maintenance shall include watering, weeding, cultivating, mulching, regular mowing or seeded areas, and removal of dead materials.

## 2.8 INSPECTION FOR ACCEPTANCE

- A. Inspection of work of this section to determine completion, exclusive of possible replacement of seed, will be made by the Engineer upon written notice requesting such inspection submitted at least ten (10) days prior to anticipated date of inspection and provided that an 80% minimum coverage per square foot for all seeded areas has been established. Contractor shall guarantee, at the time of compliance with the intent of this Specification described herein. This guarantee shall apply to all permanent seeding performed in conjunction with project, regardless of type protection used or season in which seeding performed.
- B. When seeding does not meet guarantee requirements at time of inspection, the Contractor will be advised of amount and location of corrective work deemed necessary. Additional work required may include preparation of a new seedbed, refertilizing, reseeding, remulching, or any erosion control items that were originally required. Contractor shall perform all corrective work as soon as favorable working conditions occur after being advised of corrective work required. Corrective work and materials required to fulfill guarantee requirements will not be paid for, except as hereinafter provided for unavoidable damage.
- C. When unavoidable damage occurs after date project is declared complete and before inspection previously described, then payment will be made at original contract unit prices for additional seeding and protection work ordered by the Engineer. Unavoidable damage may result from slides, vehicular traffic, fires, and deluges. Failure of seed to sprout and grow will not be considered unavoidable damage.
- D. From time seeding and protection work begins until date project is declared complete, keep all seeded areas in good condition at all times. Damage to seeded areas or to mulch materials shall be promptly repaired as directed. All work and materials necessary to protect, maintain and restore seeded areas during life of contract shall be performed at no additional cost to Owner, except additional work caused by changes in project by the Engineer.
- E. When it becomes necessary to disturb previously seeded areas at direction of the Engineer, payment for a reasonable amount of additional work, as determined by the Engineer, will be made at original contract unit price. No payment will be made for additional work due to changes made for benefit of Contractor, nor will payment be made for corrective work required because Contractor has failed to properly coordinate his entire erosion control schedule thus causing previously seeded areas to be disturbed by operations that could have been performed prior to seeding.

- F. After inspection, the Contractor will be notified in writing by the Engineer of acceptance of all work of this Section and the Contractor will be notified in writing if there are deficiencies of requirements for completion of work. Replacements, maintenance or repair work remaining to be done shall be subject to re-inspection before acceptance.

## 2.9 PLANT WARRANTY AND REPLACEMENT

- A. The Contractor shall warrant 80% coverage per square foot of established grass area for duration of one (1) growing season after final acceptance of seeding by the Owner. Seed shall be alive and in satisfactory growth at end of warranty period.
- B. The Owner will be responsible for all maintenance necessary to keep grass alive and healthy between time lawns are accepted and end of warranty period. Basic needs of lawn during this period are for adequate water and protection from insects and other similar pests.
- C. Should the Contractor find the lawn is not receiving proper maintenance at any time prior to end of the warranty period, he shall advise the Engineer and Owner immediately in writing so corrective measures may be initiated.

END OF SECTION

## SECTION 02701

POLYVINYL CHLORIDE PIPE  
(WATER MAINS)

## PART 1 - GENERAL

## 1.01 DESCRIPTION

- A. Polyvinyl chloride (PVC) pressure pipe two inches through twelve inch shall conform to the American Society for Testing and Materials (ASTM) Standard ASTM D-2241.
- B. Pressure class shall be 200 psi with a standard dimension ratio (SDR) of 21 or 250 psi with SDR of 17 as called for on plans and of the size noted on the Plans and/or C900 DR 18.
- C. Molecular oriented PVC pressure pipe (PVCO) may be substituted as an "or equal" for **six inch Class 200 PVC pipe only**.

## 1.02 RELATED SECTIONS

- A. Section 01300 Submittals
- B. Section 01600 Material & Equipment

## PART 2 - PRODUCTS

## 2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. **Unless shown otherwise on the Plans** or in the Contract Documents, the Contractor may use any of the following types of PVC pipe.
  - 1. PVC pipe meeting the requirements of AWWA C 900, Standard Specification for Polyvinyl Chloride (PVC) Pressure Pipe, 4-Inch through 12-inch. PVC pipe meeting the requirements of AWWA C 905, Standard Specification for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch. The minimum pressure class allowed shall be Class 200 (DR 18).

Joints shall be gasket, bell and spigot, push-on types, which meet the requirements of AWWA C 900. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

- 2. PVC pipe meeting the requirements of ASTM D 2241, Standard Specification for Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR

Series). The minimum pressure rating shall be 200 psi.

Joints shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

3. Molecular oriented PVC pressure pipe (PVCO) may be substituted as an "or equal" for **six inch and above Class 200 PVC pipe only**. Molecular oriented PVC pressure pipe, PVCO, shall conform to latest revisions of ASTM F-1483. Pipe must be manufactured from rigid polyvinyl chloride compound having a cell classification of 1245-B in conformance with ASTM D-1784 having a hydrostatic design stress (HDS) of 2,000 psi. The finished PVCO pipe shall have a HDS of 3,550-psi minimum. The pipe shall have steel pipe (IPS) O.D.'s. PVCO pipe shall have an operating pressure of 200 psi and shall be as manufactured by Uponor-ETI or approved equal.

## 2.02 ANCHORING ASSEMBLIES

- A. Anchoring assemblies will be required for all fire hydrants and hydrant valves. Anchoring assemblies will be required for setting other valves and bends, as shown on the Drawings and details.
- B. Special anchoring will be required at other places along the pipelines. Where the Construction Drawings call for special anchoring, it shall include ductile iron pipe with mechanical joint anchoring fittings, locked mechanical joints, pipe or positively restrained push-on joint type ductile iron pipe and fittings which allow for the deflection at the joint after assembly, such as "Super-Lock" manufactured by the Clow Corporation or approved equal.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. The installation of PVC pipelines is intended to conform to AWWA Specifications C900 latest revision and Appendix A as if they were totally incorporated herein, except where these Specifications direct otherwise.

### 3.02 FITTINGS

- A. All fittings for 3" and above PVC pipe shall be a ductile iron push-on joint Class 250 tar coated outside, cement lined inside in accordance with ANSI/AWWA Specifications C110/A21.10, C111/A21.11 or ductile iron fittings in accordance with AWWA C153. All fittings for C900 called for on Drawings shall be ductile iron as called for above with mechanical joints.

- B. All fittings for PVC pipe smaller than 3" shall be PVC push-on socket type with rubber gasket, SDR 21, 200 psi based on SDR working pressure. Fittings shall meet all requirements of ASTM Specifications D3139 and shall be suitable for a working pressure of 200 psi unless the water line is designated Class 250. If the water line is designated Class 250 then fittings must be Class 250.

### 3.03 TIE-INS TO EXISTING LINES

- A. The Contractor, in conjunction with the Owner may shut the specific line down for prearranged minimum periods, to make these connections. However, the Contractor will be required to disinfect and flush the affected lines to assure proper levels of chlorine residual.

END OF SECTION





## SECTION 02710

## VALVES

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Work addressed in this Section includes furnishing all labor, tools, materials, equipment, supplies and services necessary for installation of all ductile iron piping, valves and appurtenances as shown on Contract Drawings and specified herein.
- B. Excluded from this Section are piping and appurtenances discussed under disinfections, plumbing, laboratory fixtures, water supply, floor drains, sanitary waste lines, vents, HVAC venting and distribution equipment, and all gas and air lines.

## PART 2 - PRODUCTS

## 2.1 GATE VALVES

- A. Underground.

All underground gate valves shall be of the double-disc, parallel seat-type, iron body, non-rising stem, fully bronze mounted, tar-coated outside, and suitable for working water pressures of 150 psi unless otherwise shown on the plans. Valves shall be of standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA Specification C-500.

Valves shall be furnished with bell, flanged or mechanical joint end connections suitable for connection to the pipe with which they are to be used.

Underground valves shall be nut operated, unless otherwise shown on the plans. Valve supplier shall furnish two standard stem iron wrenches for turning nut operated valves. All underground valves which have nuts deeper than 30 inches below the top of valve box shall have extended stems with nuts located within 2 feet of valve box cap.

## B. Housed.

Gate valves, 3" and larger, for fabricated pipe systems shall be double-disk, parallel seat-type, iron body, flanged, fully bronze mounted with O-ring seals, tar-coated outside, and suitable for working water pressures of 150 psi unless otherwise shown on the plans. Valves shall be standard manufacture and of the highest quality both of materials and workmanship and shall conform to the latest revision of AWWA Specifications C-500.

Unless otherwise shown on the plans, all housed valves and valves in basins shall be handwheel operated. Handwheels shall have not less than the following diameters:

Size Valves	Diameter
1"	3 1/8"
1 1/2"	4 1/4"
2"	6"
3"	8"
4"	10"
6"	12"
8"	14"
10"	16"
12"	18"
14"	20"
16"	22"
18"	24"

Valve stand handwheels and handwheels on extended stems, shall have the same minimum diameters as those shown for handwheels directly on valves. Extension stems shall have adjustable cast iron guides per each ten (10) feet of extension stem length. All extension stems shall be connected with suitable coupling castings for connection to and removal from valves and stands. Nuts and bolts on all extension stem connections shall be stainless steel.

## 2.2 SWING CHECK VALVES

Check valves shall be swing gate type. All check valves shall be iron body with straightway passage of full pipe area when swing gate is open. The valve shall be of the outside lever and weight operating type. The valve must be tight sealing and must operate without hammer or shock. The seat ring or lining must be renewable. The valve should be bronze-mounted and may contain a rubber or neoprene lining in accordance with the manufacturer's recommendations. Valves shall be as manufactured by M & H, Clow or equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

Piping valves and equipment shall be stored and installed in accordance with the installation manual furnished by the manufacturer. After installation the completely assembled valve shall be operated through one full cycle to demonstrate satisfactory operation. Such adjustments as necessary will be made until operation is approved. When required, the valve shall be subjected to leakage tests and pass the standard requirements for maximum leakage as specified in AWWA standards.

- END OF SECTION -



## SECTION 02720

## PRESSURE PIPELINES INSTALLATION

## PART 1 - GENERAL

## 1.01 WORK INCLUDED

- A. The Contractor shall complete all excavations; shall protect all existing structures, utilities, and services; shall furnish all suitable tools and appliances for the safe and convenient handling of all materials to be used on the work; shall lay the pipelines, including valves, valve boxes, fire hydrants, and all other appurtenances thereto; shall install or replace any or all service connections if specified; shall test the lines; shall disinfect water lines; shall replace all walks, driveways, grass plots, or paving; shall remove all surplus materials of every kind; and leave the entire site of the work in a presentable and satisfactory condition; all as specified herein under the various sections.
- B. The specifications for installing pressure mains are intended to conform with the latest revision of AWWA C600, "Installation of Ductile Iron Water Mains and their Appurtenances," and/or AWWA C605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water". The Engineer shall require compliance with those specifications the same as if they were totally incorporated herein, except where these Specifications direct otherwise.

## PART 2 - PRODUCTS - NOT USED.

## PART 3 - EXECUTION

## 3.01 HANDLING AND STORAGE OF MATERIALS

- A. Pressure main pipe, fittings, valves, hydrants, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.
- B. Pipe shall be so handled that the coating and lining will not be damaged. If however, any part of the coating or lining is damaged the repair shall be made by the Contractor at his expense in a manner satisfactory to the Engineer.
- C. The Contractor shall be responsible for the safe storage of material furnished by or to him, and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of all pipes, fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants shall be drained and stored in a manner that will protect them from damage by freezing.

### 3.02 INSPECTION AND RESPONSIBILITY FOR MATERIAL

- A. All pipeline materials shall be carefully inspected for cracks and other defects prior to installation. All material found during the progress of the work to have cracks, flaws, or other defects, shall be rejected by the Engineer. All defective materials furnished by the Contractor shall be promptly removed by him from the site of the project.
- B. The Contractor shall be responsible for all materials furnished by him and shall replace at his own expense all such material found defective in manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work.

### 3.03 INSTALLATION OF PRESSURE PIPELINES

- A. Pressure mains shall be laid and maintained to the required lines and grades with fittings, valves, and hydrants at the required locations; spigots centered in bells; and all valve and hydrant stems plumb.
- B. Proper implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment in such a manner as to prevent damage to pipe main materials and protective coatings and linings. Under no circumstances shall pipe main materials be dropped or dumped into the trench.
- C. All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately before installation in final position. Spigot ends shall be examined with particular care. Defective pipe or fittings shall be laid aside as previously specified.
- D. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the pipe laying crew cannot put the pipe into the trench and in place without getting earth into it, the Engineer may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, or other materials shall be placed in the pipe.
- E. As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material tamped under it except at

the bells. Precautions shall be taken to prevent dirt from entering the joint space.

- F. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Engineer. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.
- G. The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or lining so as to leave a smooth end at right angles to the axis of the pipe.
- H. Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the Engineer. Where pipe is laid on a grade of ten (10) percent or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe upgrade.

#### 3.04 PLACING PIPELINE FITTINGS

- A. Pipeline fittings, plugs and caps shall be furnished and installed of the type indicated and at the location shown on the Plans or as directed by the Engineer. It will be the responsibility of the Contractor to furnish and install all proper size pipe bends for both horizontal and vertical deflections that are required to construct the pressure main to the line and grade as shown on the Plans or as set by the Engineer. The fittings, plugs, and caps shall be set and joined to the pipe in the manner heretofore specified for installation.

#### 3.05 ANCHORAGE

- A. The Contractor shall provide pipeline restraint at all locations shown on the Plans or as required by the Engineer. Anchorage shall be in the form of harnessed or restrained joints for the lengths of pipe and fittings shown.

#### 3.06 TESTING PRESSURE MAINS

- A. The Contractor shall subject the completed pressure pipelines to a leakage test. The test shall be performed on all newly laid pipes in lengths not to exceed 2,000 feet or any valved section thereof. The length of the test section shall exceed the specified maximum limit only with the explicit approval of the Engineer. The test may be conducted after the trench has been backfilled but must be completed before replacement of pavements and final restoration. All testing shall be done in the presence of the Engineer.
- B. The Contractor shall furnish the pump, pipe connection, temporary testing plugs and caps, if required, all necessary apparatus including the pressure gauges and meters and a supply of approved water. The Contractor shall make all necessary taps into the lines. The Contractor shall be responsible for all labor and equipment necessary to conduct the tests, including excavating and backfilling the test pit at

the locations approved by the Engineer.

- C. The pipe shall first be completely flushed out. Then each valved section shall be slowly filled with water. All air shall be expelled from the pipe at high points by means of test plugs in valve bonnets, fire hydrants or through corporation stops installed by the Contractor for this purpose. After all the air has been expelled, the openings shall be closed and the test pressure applied by means of the test pump connected to the pipe in a manner satisfactory to the Engineer.
- D. The test pressure for the leakage test shall be fifty (50) percent above the normal operating pressure of the lowest point in the section of line under the test and corrected to the elevation of the test gauge. The duration of each leakage test shall be two (2) hours.
- E. The exposed piping and/or the top of the trench shall be carefully inspected during the leakage test for any signs of leakage. Any cracked or defective pipe, fittings, valves or hydrants discovered in consequence of the leakage test shall be removed and replaced by the Contractor with sound material and the test shall be redone until satisfactory results are obtained. The Contractor is responsible for locating, excavating and backfilling the defective pressure pipeline trench at no cost to the Owner, in addition to replacing the defective material if the leakage test is conducted on a backfilled pressure pipeline. The Contractor shall maintain the hydrostatic pressure at all times during the leakage test through his test pump.
- F. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the air has been expelled, the pipe has been filled with water, and the pressure initially applied.
- G. No pipe installation will be accepted if the amount of leakage is greater than specified in Table 7, Allowable Leakage, AWWA C600, or calculated by the following equation:

$$L = \frac{SDv(P)}{133,200}$$

Where

L = allowable leakage, gallons per hour.

S = Length of pipe to be tested, ft.

D = Nominal diameter of pipe, in.

P = Average test pressure, psig.

### 3.07 DISINFECTION OF WATER MAINS

- A. All new water mains and repaired sections or extensions to existing water mains



shall be chlorinated before being placed in service so that a chlorine residual of not less than ten (10) ppm remains in the water in the test section after twenty-four (24) hours standing in the pipe. The procedures for disinfecting the water mains and the chemicals to be used shall be in accordance with the requirements of AWWA C601 and C651.

- B. If liquid chlorine is used, a chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device; or, if approved by the Engineer, the dry gas may be fed directly through proper devices for regulating the rate of flow and providing effective diffusion of the gas into the water within the pipe being treated. Chlorinating devices for feeding solutions of the chlorine gas or the gas itself must provide means for preventing the backflow of water into the chlorine cylinder.
- C. A mixture of water and a chlorine-bearing compound of known chlorine content may be substituted for liquid chlorine. Approved types are calcium hypochlorite or sodium hypochlorite. Commercial types of calcium hypochlorite are known as HTH, Perchloron and Pittchlor. Sodium hypochlorite is known commercially as liquid laundry bleach.
- D. High-test calcium hypochlorite or bleaching powder must be prepared as a water mixture for introduction into the water mains. The powder should first be made into a paste and then diluted to approximately a one (1) percent chlorine solution (10,000 ppm). The preparation of a one (1) percent chlorine solution requires the following proportions of powder to water:

Amount of: Product	Compound	Quantity of Water Gallon
High-test calcium hypochlorite (65-70% Cl)	1 lb.	7.50
Liquid laundry bleach (5.25%)	1 gal.	4.25

- E. The chlorinating agent shall be injected into the beginning of the new pipeline extension or any valved section through a corporation stop inserted by the Contractor. The Contractor shall supply the proper type chemical pump, piping and make up water to inject the solution into the main. The application shall be the amount necessary to apply 25 ppm of chlorine to the test section. The amount of one (1) percent chlorine water solution required to give 25 ppm chlorine in 1,000 feet of various size water mains is as follows:

<u>Diameter</u>	<u>Gallons</u>
6"	4
8"	8
10"	10
12"	15
16"	26
20"	40
24"	60
30"	90

- F. Water from the existing distribution system shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The rate of chlorine mixture flow shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall produce at least ten (10) ppm, after twenty-four (24) hours standing. This may be expected with an application of twenty-five (25) ppm, although some conditions may require that more valves be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.
- G. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipeline at its extremities until the replacement water throughout its length shall, upon test, be proved comparable in quality to the water serving the public from the existing water supply system and approved by the public health authority having jurisdiction. This satisfactory quality of water delivered by the new main should continue for a period of at least two (2) full days as demonstrated by laboratory examination of samples taken from a tap located and installed in such a way as to prevent outside contamination. Samples shall not be taken from an unsterilized hose or from a fire hydrant, because such samples will seldom meet bacteriological standards.
- H. Should the initial treatment fail to result in the conditions specified, the original chlorination procedure shall be repeated until satisfactory results are obtained.

### 3.08 PRESSURE PIPELINES NOT INSTALLED IN TRENCH

- A. All applicable provisions of this item of work shall also apply to the furnishing of materials and installation procedures for constructing pressure pipelines not installed in a trench condition.

### 3.09 SPECIAL REQUIREMENTS FOR PIPELINE CONSTRUCTION ON STATE RIGHT OF WAY

- A. Pressure pipelines to be laid on backside of all entrance culverts unless otherwise

specified.

- B. All pressure pipelines to be laid on backside of ditch line unless otherwise specified.
- C. All slip areas to be open cut, backfilled and tamped at a maximum of 150' sections.
- D. All pressure pipeline crossing of highway culverts (RCP, CMP, Box Culverts) shall have a minimum of 1 foot clearance above or below the culvert.
- E. Efforts have been made to indicate accurate locations of some existing structures, piping and utilities. However, the contractor shall familiarize himself with the site and other existing conditions and notify the engineer of any discrepancies between information depicted by the construction drawings and actual field conditions which would significantly alter the design intent of the Plans prior to commencing his construction operations. Dimensions of existing structures and/or site restrictions are approximate. It is the contractor's responsibility to obtain and confirm all dimensions and elevations of existing structures and topography in the field necessary for his construction operation.
- F. The Contractor shall use all possible care during excavation on this project so as not to disturb or damage any existing utility or structure not scheduled for demolition whether depicted or not in the construction drawings. Any damage to the aforementioned items caused directly or indirectly by the contractor shall be repaired or replaced by the contractor at no cost to the owner to a condition equal to or better than that which existed prior to being damaged.
- G. The Contractor's attention is called to the presence of existing utilities in close proximity to the project site. The Contractor is advised to carefully review the project requirements regarding utility reallocations. The contractor can call 1-800-752-6007 a minimum of two and no more than ten business days prior to excavation for information on the location of existing underground utilities which subscribe to the Before-U-Dig (BUD) Service. Additionally it is the contractor's responsibility to contact all existing utility owners and have them field locate their existing utilities prior to any construction activities.
- H. Unless otherwise noted, all buried pipes shall have 36" minimum cover as measured from finished grade to the outside surface of the pipe.
- I. All bores under state highways right-of way shall be a minimum, of 36" depth under bottom of ditch line to top of the proposed bored and/or casing pipe on both sides of the highway.
- J. There shall be no blasting within state right-of-way without written consent from the Kentucky Transportation Cabinet.

- K. Care shall be taken by the contractor to avoid cracking or breaking the bituminous paving. The contractor at no cost to the Dept. of Highways shall repair all damage to the existing paving caused by the contractor's operation. Paving protection shall be accomplished by the use of rubber and street padded machinery or other approved equipment well suited for this type of construction.
- L. During construction, all embankments, refills and excavations shall be kept shaped and drained by the contractor. Ditches and drains along the highways shall be maintained in such a manner as to drain effectively at all times.
- M. All roadways and driveways within the work limits of state right-of-ways shall be refilled to the natural surface of the ground with approved material and methods. The material shall be placed and compacted to smoothness suitable for traffic. The contractor shall note that all private businesses and residences along the route of the proposed water main must have access to their properties at all time during construction. Additionally, the contractor shall replace existing entrance pipes, retaining walls, catch basins, fences and other property improvements, ditches, guardrail, signs, storm drains, etc. that are damaged by construction unless said facilities are specifically shown to be removed. In particular, all drainage ditches shall be restored to a condition equal or better than existed prior to construction.
- N. Concrete thrust or "kicker" blocks shall be installed in all pressurized lines at intersections and changes of direction to resist forces acting upon the pipeline.
- O. Concrete anchors shall be provided when the pipe slope exceeds twenty percent.
- P. Sewers shall be laid at least ten feet horizontally from any existing or proposed water main. This distance shall be measured edge to edge. If field conditions do not allow this condition to be met, then the sewer shall be construction of mechanical joint ductile iron pipe (pressure tested to 150 psi) and encased in concrete. Sewers shall cross under water mains with a minimum of eighteen inches of separation between the crown of the sewer and in the invert of the water main. If field conditions are such that this separation can not be maintained, the sewer shall be constructed of mechanical joint ductile iron pipe which shall be pressure tested to 150 psi. The ductile iron pipe must be centered on the crossing so that the joints are at least ten feet on either side of the crossing.
- Q. Traffic control is to be as per MUTCD standards.
- R. Reclamation is to be accomplished as per the general notes of the approved encroachment permit provided by the Kentucky Dept. of Highways.
- S. Valve locations cannot be shown with precision of the supplied mapping. Valve locations shall be coordinated with the resident inspector prior to installation.
- T. Numerous drop box inlets are located next to some of the state and federal

highways within the project limits. These inlets have concrete aprons that are 9' x 9'. Many of the inlets are set against the backside of the rock cut along the highway. The contractor may do one of two things. (1) He may either saw cut the backside of the Surface drain and without damaging the drainage box install the pipe. If the drainage box does get damaged in any way then the contractor will restore the drainage box and surface drain back to its original condition. (2) The contractor shall install the force main under the culvert pipe. If the culvert pipe is damaged in any fashion then the contractor shall replace the portion that is damaged to its original condition.

- U. Proposed utilities must go under or around existing highway culvert pipes. Utilities may not be placed over existing highway culverts. Minimum separation between culvert pipe and force main is five feet.
- V. Track vehicles must be isolated from pavement with an earth cushion or protective mate. In no event shall track vehicles be operated directly on paved surfaces.

END OF SECTION



## SECTION 02722

## DUCTILE IRON PIPE

## PART 1 - GENERAL

## 1.1 RELATED SECTIONS

- A. 01300 – Submittals
- B. 01600 - Material and Equipment

## PART 2 - PRODUCTS

## 2.1 PIPE

- A. Ductile cast iron pipe shall conform to the American Standard for "Ductile Iron Pipe Centrifugally Cast in Metal Molds for Water or Other Liquids", ASA A21.5 (AWWA C151).
- B. The pipe shall be Thickness Class 51, unless otherwise noted.

## 2.2 JOINTS

- A. Mechanical joints, bell and spigot joints and flange joints for ductile iron pipe in sizes from 2-inches through 48-inches in diameter shall conform to all of the dimensions, shapes and requirements of ASA A21.10 (AWWA C110), "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids." The mechanical joint shall also conform in all respects to ASA A21.11 (AWWA C111), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings."
- B. Push-on joints shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe and forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. The push-on type joint shall conform to the requirements of ASA A21.10 (AWWA C110) and ASA A21.11 (AWWA C111) where applicable.
- C. Where ductile iron pipe with ball and socket type joints are specified, they shall be of the mechanical gland type. Provisions shall be made for longitudinal expansion and contraction with a positive stop against disengagement of the joint. Up to fifteen (15) degrees angular deflection shall be accommodated without leakage and without decrease in full diameter of pipe.

### 2.3 FITTINGS

- A. Ductile iron fittings in sizes 2-inches through 48-inches for mechanical joints, bell and spigot joints and flange joints shall conform to all the requirements of ASA A21.10 (AWWA C110), "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids," and to the requirements of ASA A21.11 (AWWA C111), "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings," for mechanical joints and push-on type joints. Push-on joints for cast iron fittings shall be as described in Section 2 of this section.
- B. Ductile iron fittings in sizes larger than 12-inch shall have a pressure rating of 150 psi unless the proposal sheets and/or the construction drawings stipulate that 250 psi cast iron fittings are required.
- C. Unless specifically described on the proposal sheets and/or Plans, the cast iron fittings may be supplied in gray iron or ductile iron.

### 2.4 COATINGS FOR DUCTILE IRON PIPE AND FITTINGS

- A. The ductile iron pipe and cast iron or ductile iron fittings for water service shall be furnished with cement mortar lining in accordance with ASA Specifications A21.4 (AWWA C104), "Cement Mortar Lining for Cast Iron Pipe and Fittings." The lining will be 1/16-inch thick for pipe sizes 4-inches through 12-inches in diameter and 3/32-inch thick for sizes 14-inch through 24-inches in diameter. A bituminous seal coat shall be applied to the lining surface immediately following the lining operation to prevent loss of moisture and insure proper curing of the cement mortar. The outside of the iron pipe shall be furnished with a protective coating as outlined in Section 09900, "Painting."
- B. All ductile iron pipe and fittings not installed in a trench condition shall not be coated with a coal-tar pitch on the outside. The pipe and fitting shall be coated in accordance with the Section 09900, "Painting".

### 2.5 MISCELLANEOUS JOINTING MATERIAL

- A. Victaulic couplings for ductile iron pipe shall consist of malleable iron housing-clamps in two (2) or more parts, a single C-shaped rubber gasket and two (2) or more track-head steel bolts as required to assemble the housing clamps. The coupling shall be of the proper type to encircle the outside diameter of the ductile iron pipe as specified. The malleable iron in the segmental casting shall conform to ASTM A47. The track-type oval neck bolts shall conform to ASTM A183. The rubber gasket shall be Grade "R" natural rubber.
- B. Ductile iron pipe and fittings to be joined with victaulic couplings shall be furnished with shoulders to engage the entire inner circumference of the housing-



clamp. The outside surface of the pipe between the shoulder and the pipe end must be smooth and free from deep pits or swells to provide a leaktight seal for the victaulic gasket.

- C. Compression sleeve couplings for plain end ductile iron pipe shall consist of one cylindrical steel middle ring with a pipe stop, two (2) resilient wedge-shaped gaskets, two (2) steel follower rings and a set of high strength steel track-head bolts. The number of bolts furnished will depend on the diameter of the couplings.

## PART 3 – EXECUTION

### 3.1 ANCHORING ASSEMBLIES

- A. Anchoring assemblies for setting valves, fire hydrants, and special bends shall consist of two (2) mechanical joint cast iron or ductile iron gland fittings cast integrally with the pipe nipple.
- B. The anchor assembly fittings shall have a laying length of fourteen (14) inches. Anchoring pipe shall be used where long lengths of pipe are required to anchor fire hydrants. Anchoring pipe may be furnished with regular anchoring glands cast with the pipe or with a ring gland which will allow free movement of the standard mechanical joint tee and anchoring piece for fire hydrant installations where applicable.

### 3.2 JOINTING PIPE

- A. Joints for buried cast iron or ductile iron pressure main shall be mechanical joint, rubber compression type (push-on joint), poured bell and spigot or victaulic. Cast iron or ductile iron joints within structures may also be flange type or compression sleeve type as shown on the Plans. The joints shall be made in the following manner.
- B. Mechanical Joint - The mechanical joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings." All surfaces that come in contact with the rubber gasket shall be brushed thoroughly with a wire brush just prior to assembly to remove all rust or foreign material. The clean surface and the rubber gasket shall then be brushed with soapy water. The iron gland shall then be placed on the spigot end with the lip extension facing the joint. The rubber gasket shall then be slipped on the pipe with the thick end toward the gland. The spigot end of the pipe shall then be pushed into the bell seat after which the rubber gasket shall be forced into its retaining space in the bell. Care shall be taken to assure an even seat all around the inner surface of the bell. The gland shall be moved into place for bolting; the bolts shall be inserted and the nuts made up tightly with the fingers only.

- C. The normal range of bolt torques to be applied and length of wrench to produce that torque to the standard cast iron bolts in a joint are as follows:

Size of Bolt Inches	Range of Torque Ft.-Lbs	Length of Wrench Inches
3/4	60 - 90	10
1	70 - 100	12
1-1/4	90 - 120	14

- D. The gland shall be brought up toward the pipe flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket when tightening bolts. It shall be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last the remaining bolts. This process shall be repeated until all bolts are within the specified range of torque. If effective sealing is not attained at the maximum torque, the joint shall be disassembled and reassembled after thorough cleaning. The bolts shall not be overstressed to compensate for poor assembly.
- E. Rubber Seal Type Joint (Push-On Joint) - The push-on type joint shall conform to the requirements of AWWA A21.11, "Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings." Before assembly of the rubber seal type joint, the inside of the bell and the rubber gasket shall be wiped clean with a cloth. The gasket should then be placed in the groove of the bell in the manner that conforms to the contour of the bell. A thin film of special lubricant, of the type recommended by the manufacturer of the pipe, is then applied to the inside of the gasket by brush or hand.
- F. Flanged Joints - The flanged joints shall conform to the requirements of AWWA A21.10, "Cast Iron Fittings, 2-Inches through 48-Inches, for Water and Other Liquids." Flanged joints shall be assembled with bolts and flat ring gaskets of the size and number as specified for "Cast Iron Pipe Flanges and Flanged Fittings," ASA B16.1 for Class 125. The Plans will show the details of ASA B16.1b, Class 250 flange assemblies, if such are required. Stud or tap bolts shall be furnished when shown on the Plans, and when required to complete special assemblies. All exposed bolts, heads, and nuts shall be coated with two (2) coats of asphaltum or other approved metal coating after the joint has been completed.
- G. Restrained Joints - Special anchorage shall include the use of mechanical joint anchoring fittings, couplings and pipe or positively restrained push-on type pipe and fittings which allow for deflection at the joint after assembly, the equal of "Super-Lock" manufactured by the Clow Corporation. No reduction in pipe wall thickness from that specified shall be permitted in connection with a restrained joint.

### 3.3 DEFLECTION OF DUCTILE IRON PIPE

Whenever it is desirable to deflect mechanical-joint or push-on joint pipe in order to form a long radius curve, the amount of the deflection shall not exceed the maximum limits shown for the respective type pipe.

TABLE 1

#### Maximum Permissible Deflection in Laying Mechanical-Joint Pipe

Size of Pipe in Inches	Maximum Permissible Deflection Per Length - Inches			
	12-Ft. Length	16-Ft. Length	18-Ft. Length	20-Ft. Length
6	18	24	27	
8	13	18	20	
10	13	18	20	
12	13	18	20	22
16	9	12	13-1/2	15
20	7-1/2	10	11	12
24	6	8	9	10

TABLE 2

#### Maximum Permissible Deflection in Laying Push-On-Joint Pipe

Size of Pipe in Inches	Maximum Permissible Deflection Per Length - Inches			
	12-Ft. Length	16-Ft. Length	18-Ft. Length	20-Ft. Length
6	12	17	19	21
8	12	17	19	21
10	12	17	19	21
12	12	17	19	21
16	7-1/2	10	11	12
20	7-1/2	10	11	12
24	7-1/2	10	11	12

END OF SECTION



SECTION 02831  
FENCES AND GATES

1. GENERAL

1.01 DESCRIPTION

- A. This section will cover fences to be constructed at locations and in the manner shown on the Plans.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. General submittal requirements are including in Section 01300.

1.03 CONTRACTOR SUBMITTALS

- A. The CONTRACTOR shall comply with the provisions of the Specifications regarding submittals (See Section 01300).

2. PRODUCTS

2.01 GENERAL

- A. Fencing shall be of non-climbable type as manufactured by the Cyclone Fence company, Academy Fence Company, or approved equal. It shall be standard overall height of seven (7) feet and constructed of chain link fabric with three rows of barb wire on top of steel brackets. Chain link fabric shall be one foot less than complete overall height of fence.
- B. Vehicular gates shall be of single swing type having opening of 12 feet, unless otherwise shown on the Plans. The hinges shall allow for a 90 degree swivel in either direction. 180 degree adapters shall be provided.

2.02 BASIC MATERIALS

- A. All fencing materials shall conform to applicable portions of the Standards of the Chain Link Fence Manufacturers Institute (CLFMI). Material for framework shall be open hearth, copper-bearing steel conforming to the applicable

- requirements of the latest ASTM for Standard Specifications, Serial Designation A7 for Steel for Bridges and Buildings.
- B. End corner, angle and pull post shall be 2-7/8 inch outside diameter, standard tubular steel weighing not less than 5.79 pounds per linear foot. Line posts shall be 2-1/4 inch structural "H" sections weighing 4.1 pounds per linear foot or 2-3/8 inch outside diameter steel pipe weighing 3.65 pounds per linear foot. Top rail shall be 1-5/8 inch outside diameter steel pipe weighing 2.27 pounds per linear foot or "H" section weighing 2.27 pounds linear foot. Top rails shall be provided with expansion rail couplings spaced at not less than 20 foot intervals. Gate posts for pedestrian gates shall be 2-7/8 inch outside diameter pipe weighing 5.79 pounds per linear foot. Gate posts for vehicular gates shall be 4 inch outside diameter pipe weighing 9.1 pounds per linear foot.
- C. Braces shall be provided at all corners and wherever fabric is not continuous, such as at gates or at other openings. Braces shall be of the same material as top rail. Extension arms on intermediate posts shall be of pressed steel. Extension arms shall carry 3 barbed wires. Fittings used in connection with the fence and gates shall be malleable iron or pressed steel. Barbed wire shall be four-point pattern, two strand, No. 12-1/2 gauge, copper-bearing steel wire, heavily hot galvanized after weaving, with large barbs placed 3 inches apart. Chain link fabric shall be copper-bearing base metal No. 9 gauge wire heavily zinc coated by hot dip process after weaving. The fabric shall have a knuckled selvage along the top rail and a twisted and barbed selvage at the bottom. The barbing shall be done by cutting the wire on a bias, creating sharp points. A 2-inch padlock and chain shall be furnished with each gate. Three keys shall be furnished with each padlock. Chain shall be welded to the gate
- D. Cantilever Slide Gate (5" bottom)
1. The structural cantilever slide gate shall be a Fortress gate as manufactured by: The Tymetal Corp., 2566 State Route 40, Greenwich, New York 12834 (800/328-4283) or approved equal.
  2. The gate frame shall be fabricated from 6063-T5 aluminum alloy extrusions. The top member is a 3"x5" aluminum structural channel/tube weighing not less than 3.0 lbs/lf. This is also referred to as a "5" extrusion" or "large primary". This member shall be "keyed" to interlock with the "keyed" track member. If fabricated as a single horizontal piece, the bottom member shall be a 2"x5" aluminum structural tube weighing not less than 2.0 lbs/lf. If fabricated in two horizontal pieces, the bottom member shall be a 5" aluminum structural channel weighing not less than 2.65 lbs/lf. The two horizontal pieces or sections shall be spliced in the field.
  3. Splicing: A 1/4" x 5" x 24" galvanized steel splice plate shall be used to secure the two bottom channel members together utilizing eight (8) 3/8" x 1 1/2"

plated carriage bolts with lock nuts (Each top track will be spliced together in the same manner on both sides of the top primary). The track is overlapped 36" onto the opposing section in an alternating fashion, interlocked with the top primary member and vertically secured in place using six (6) 1/4" x 1/2" drive rivets and horizontally secured in place using six (6) 5/16" x 1 1/2" plated hex head cap screws. On one side the track overlaps the front section and on the other side, the track overlaps the back section. The respective splice end vertical member shall be a 1"x2" weighing not less than .82 lbs/lf. The 1"x2" members will be joined in place utilizing 5/16" x 2 3/4" plated hex head cap screws (One for each foot of gate height).

4. The vertical members at the ends of the opening portion of the frame shall be "P" shaped in cross section with a nominal base dimension of no less than 2"x2" and weighing not less than 1.6 lbs/lf. The intermediate vertical members shall alternate between 2"x2" and 1"x2" in cross section weighing not less than 1.1 lbs/lf and .82 lbs/lf respectively. The spacing for the vertical intermediates shall be no greater than half the height of the gate.
5. The gate frame shall be fabricated in one or multiple sections depending on size requirements/constraints.
6. The gate shall have two separate semi-enclosed "keyed" tracks, extruded from 6105-T6 aluminum alloy, weighing not less than 2.9 lbs/lf. Track members to be located on each side of the top member. When interlocked with the "keyed" top member and welded to it, it forms a composite structure with the top of the gate frame. Welds to be placed alternately along the top and side of the track at 9" centers with welds being a minimum of 2" long.
7. The gate frame is to be supported from the tracks by four (4) swivel type, self-aligning, 4-wheeled, sealed lubricant, ball-bearing truck assemblies. These are to be attached to double 4"O.D. support posts, the bottom of which shall be equipped with two pairs of 3" rubber guide wheels.
8. Diagonal "X" bracing of 3/16" minimum diameter stainless steel aircraft cable shall be installed to brace the gate panels and to provide a ready means of vertical adjustment.
9. The gate shall be completed by installation of approved filler as specified. It shall extend the entire length of the gate which (including the opening and counterbalance) and shall be secured at the ends by standard fence industry tension bars and tied with standard fence industry ties at each vertical member.
10. All openings shall be screened from the bottom of the gate to a minimum height of 48" above grade. The applied screening shall be of sufficient size to prevent a 2 1/4" diameter sphere from passing through openings anywhere in the gate.

11. Double support posts shall be 4" OD galvanized steel with concrete footings as specified by the engineer.

### 3. EXECUTION

#### 3.01 GENERAL REQUIREMENTS

- A. Installation shall be in accordance with the Manufacturer's requirements and the referenced codes and specifications.

#### 3.02 INSTALLATION; CONSTRUCTION; ERECTION; APPLICATION

- A. All equipment furnished under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detailed drawings, specifications, engineering data, instructions, and recommendations furnished by the equipment manufacturer.
- B. The gate and installation shall conform to ASTM F-1184 standards for aluminum cantilever slide gates, Type II, Class 2.
- C. Excavate, place concrete and install 4" OD cantilever gate posts in footings as detailed, and in accordance with the engineer's design. Install hanger brackets and guide roller assemblies, attach truck assemblies to hangers, and make final adjustments to align gate with latch.
- D. End, corner and gate posts shall be set in a concrete base not less than 18 inches in diameter which shall extend at least three inches below the bottom of the post. The post shall extend to a depth of at least three feet below the surface of the ground. A brace shall be spaced midway in height of each end, corner and gate post and shall extend to the first line post. Braces shall be securely fastened to posts by means of malleable iron connections and trussed from line post back to end, corner or gate post with a 3/8 inch diameter rod.
- E. Line posts shall be set in a concrete base not less than 12 inches in diameter which shall extend at least three inches below the bottom of the post. The post shall extend to a depth of at least thirty inches below the surface of the ground. Line posts shall be equally spaced along the line of fence at intervals not to exceed ten (10) feet.
- F. Galvanized steel pipe sleeves, 4 inch O.D. for corner, pull and gate posts and 3-1/2 inch O.D. for line posts shall be embedded in concrete as shown on the plans for all fence posts to be installed on concrete structures.



- G. Top rail shall be installed between line posts. Fabric shall not be erected until concrete has had sufficient time to cure. Chain-link fabric shall be stretched to uniform tightness on the outside of the posts with suitable tools and shall be attached with No. 6 gauge galvanized wire clips securely clinched and attached by means of adjustable clamps. Fabric shall be fastened to line posts at 14 inch intervals. Fabric shall be attached to rail at 24 inch intervals by galvanized wires. A No. 7 coil spring galvanized wire shall be stretched along the bottom of the fence and securely fastened to the posts. The chain-link fabric shall be attached to the tension wire at intervals not to exceed two feet.

END OF SECTION



SECTION 02940

TEMPORARY SILT AND EROSION CONTROL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. This work shall consist of furnishing all labor, material, equipment, and incidentals for the construction of silt control structures to reduce the amount of sediment delivered to waterways. Silt control structures shall be constructed as required to control any silt runoff into streams or at the locations directed by the Engineer or his designated Representative.
- B. A written silt control plan shall be prepared and submitted to the Owner for approval before start of construction.
- C. During the life of the contract, the silt control structures shall be maintained by the Contractor, and silt accumulations which threaten to damage the structures, or preclude their effective operation as determined by the Engineer, shall be removed and replaced.

1.2. RELATED SECTIONS

- A. 01600 – Materials and Equipment

PART 2 - PRODUCTS

2.1. STRAW OR HAY BALE SILT CHECK

- A. This silt check shall be constructed with straw or hay bales firmly bound by twine and solidly staked to remain in place, as shown on the Standard Details.
- B. The location of straw or hay bale silt checks shall be as shown on the Plan drawings, or as directed by the Engineer at the time of construction. When the usefulness of the silt checks has ended, they shall be removed, and surplus materials shall be disposed of properly.

PART 3 - EXECUTION

3.1. MEASUREMENT AND PAYMENT

- A. Payment for installation and maintenance of the temporary silt and erosion control structures shall be considered an incidental expense to the construction. All costs for same shall be included in the prices bid for the items included with the project.

END OF SECTION



SECTION 03100  
CONCRETE FORMWORK

PART 1 - GENERAL

1.1. WORK INCLUDED

This Section shall cover Concrete Forms, Metal Forms, Form Ties and Form Release Agents

1.2. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

**AMERICAN CONCRETE INSTITUTE (ACI)**

ACI 347 (1999) Concrete Formwork

**AMERICAN HARDBOARD ASSN (AHA)**

AHA A135.4 (1995) Basic Hardboard

**THE ENGINEERED WOOD ASSOCIATION (APA)**

APA F405 (1995) Product Guide Performance Rated Panel

1.3. SUBMITTALS - NOT APPLICABLE

1.4. DESIGN

- A. **METHODOLOGY:** Formwork shall be designed in accordance with methodology of ACI 347 for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION.
- B. **PRESSURES:** Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

## PART 2 - PRODUCTS

### 2.1. FORM MATERIALS

- A. FORMS FOR CLASS B FINISH: Forms for Class B finished surfaces shall be plywood panels conforming to APA F405, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels.
- B. FORMS FOR CLASS D FINISH: Forms for Class D finished surfaces, except where concrete is placed against earth, shall be wood or steel or other approved concrete form material.
- C. FORM TIES: Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spill concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter. Removable tie rods shall be not more than 1-1/2 inches in diameter.
- D. FORM RELEASING AGENTS: Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds

## PART 3 - EXECUTION

### 3.1. INSTALLATION

- A. Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements specified in Section 03300 CONCRETE FOR BUILDING CONSTRUCTION and conforming to construction tolerance given in TABLE 1.
- B. Where concrete surfaces are to have a Class B finish, joints in form panels shall be arranged as approved.
- C. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar.
- D. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface.

- E. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse.
- F. Form ties that are to be completely withdrawn shall be coated with a non-staining bond breaker.

### 3.2. CHAMFERING

Except as otherwise shown, external corners that will be exposed shall be chamfered, beveled, or rounded by moldings placed in the forms

### 3.3. COATING

- A. Forms for Class B finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions.
- B. Forms for Class C and D finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures coating shall be mandatory.
- C. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

### 3.4. REMOVAL OF FORMS

- A. Forms shall be removed in a manner that will prevent injury to the concrete and ensure the complete safety of the structure.
- B. Formwork for walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement.
- C. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads.
- D. In no case will supporting forms or shores be removed before the concrete strength has reached 70 percent of design strengths as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of forming and shoring system.

- E. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

TABLE 1

TOLERANCES FOR FORMED SURFACES

1. Variations from the plumb:
  - a. In any 10 feet of length - 1/4 inch
  - b. In the lines and surfaces of piers, walls and in arises:
    - i. Maximum for entire length - 1 inch
  - c. For exposed corner piers, control-joint grooves, other conspicuous lines:
    - i. In any 20 feet of length - 1/4 inch
    - ii. Maximum for entire length - 1/2 inch
2. Variation from the level or from the grades indicated on the drawings:
  - a. In any 10 feet of length - 1/4 inch
  - b. In any bay or in any 20 feet of length - 3/8 inch
3. Variation of the linear building lines from established position in plan
  - a. In any 20 feet - 1/2 inch
  - b. Maximum - 1 inch
4. Variation of distance between walls, partitions:
  - a. 1/4 inch per 10 feet of distance, but not more than 1/2 inch in any one bay and not more than 1 inch total variation
5. Variation in the sizes and locations of sleeves, floor openings, and wall opening:
  - a. Minus - 1/4 inch
  - b. Plus - 1/2 inch



6. Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls:
  - a. Minus - 1/4 inch
  - b. Plus - 1/2 inch
  
7. Footings:
  - a. Variation of dimensions in plan when formed or plus 3 inches when placed against unformed excavation
    - i. Minus - 1/2 inch
    - ii. Plus - 2 inches
  
  - b. Misplacement of 2 percent of the footing width in eccentricity the direction of misplacement but not more than - 2 inches
  
  - c. Reduction in thickness Minus - 5 percent of specified thickness

END OF SECTION



## SECTION 03200

## CONCRETE REINFORCEMENT

## PART 1 - GENERAL

## 1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

**AMERICAN CONCRETE INSTITUTE (ACI)**

ACI 318 (1999) Building Code Requirements for Reinforced Concrete

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

ASTM A 53 (1999) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

ASTM A 82 (1997) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 184 (1996) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement

ASTM A 185 (1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement

ASTM A 497 (1999) Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement

ASTM A 499 (1997) Steel Bars and Shapes, Carbon Rolled from "T" Rails

ASTM A 615 (2000) Deformed and Plain Billet Steel Bars for Concrete Reinforcement

ASTM A 675 (1995) Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties

ASTM A 706 (2000) Low-Alloy Steel Deformed Bars for Concrete Reinforcement

**AMERICAN WELDING SOCIETY (AWS)**

AWS D1.4 (1998) Structural Welding Code - Reinforcing Steel

**CONCRETE REINFORCING STEEL INSTITUTE (CRSI)**

CRSI MSP-1 (1996) Manual of Standard Practice

1.2. SUBMITTALS

Submit shop drawings and product data under provisions of Section 01300.

1.3. QUALIFICATIONS

- A. Welders shall be qualified in accordance with AWS D1.4.
- B. Qualification test shall be performed at the worksite and the Contractor shall notify the Owner 24 hours prior to conducting tests. .
- C. Welding procedures qualified by others and welders qualified by another employer may be accepted as permitted by AWS D1.4.

1.4. DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 - PRODUCTS

2.1. DOWELS

- A. Dowels shall conform to ASTM A 675, Grade 80, or ASTM A 499.
- B. Steel pipe conforming to ASTM A 53, Schedule 80, may be used as dowels provided the ends are closed with metal or plastic inserts or with mortar.

2.2. FABRICATED BAR MATS

Fabricated bar mats shall conform to ASTM A 184.

2.3. REINFORCING STEEL

- A. Reinforcing steel shall be deformed bars conforming to ASTM A 615 or ASTM A 706, grades and sizes as indicated.

#### 2.4. WELDED WIRE FABRIC

Welded wire fabric shall conform to ASTM A 185 or ASTM A 497.

#### 2.5. WIRE TIES

Wire ties shall be 16 gauge or heavier black annealed steel wire.

#### 2.6. SUPPORTS

- A. Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI MSP-1 and shall be steel or precast concrete blocks.
- B. Precast concrete blocks shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete.
- C. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be plastic protected or of stainless steel.
- D. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface.
- E. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire fabric supports fabricated of plastic.

### PART 3 - EXECUTION

#### 3.1. REINFORCEMENT

- A. Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318.
- B. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete.
- C. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety.
- D. PLACEMENT: Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318 at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints

and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

- E. SPLICING: Splices of reinforcement shall conform to ACI 318 and shall be made only as required or indicated. Splicing shall be by lapping or by mechanical or welded butt connection; except that lap splices shall not be used for bars larger than No. 11 unless otherwise indicated. Welding shall conform to AWS D1.4. Welded butt splices shall be full penetration butt welds. Lapped bars shall be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than one-fifth the required length of lap or 6-inches. Mechanical butt splices shall be in accordance with the recommendation of the manufacturer of the mechanical splicing device. Butt splices shall develop 125 percent of the specified minimum yield tensile strength of the spliced bars or of the smaller bar in transition splices. Bars shall be flame dried before butt splicing. Adequate jigs and clamps or other devices shall be provided to support, align, and hold the longitudinal centerline of the bars to be butt spliced in a straight line.

### 3.2. WELDED-WIRE FABRIC

- A. Welded-wire fabric shall be placed in slabs as indicated. Fabric placed in slabs on grade shall be continuous between expansion, construction, and contraction joints.
- B. Lap splices shall be made in such a way that the overlapped area equals the distance between the outermost crosswires plus 2 inches. Laps shall be staggered to avoid continuous laps in either direction.
- C. Fabric shall be wired or clipped together at laps at intervals not to exceed 4 feet.
- D. Fabric shall be positioned by the use of supports.

### 3.3. DOWELS

- A. Dowels shall be installed in slabs on grade at locations indicated and at right angles to joint being doweled.
- B. Dowels shall be accurately aligned parallel to the finished concrete surface and rigidly supported during concrete placement.
- C. One end of dowels shall be coated with a bond breaker.

END OF SECTION

SECTION 03210  
REINFORCING STEEL

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Section 03210 - Reinforcing steel.
- B. Section 01300 – Submittals.

1.2. RELATED WORK

- A. Section 03300 - Concrete.

1.3. REFERENCES

- A. ASTM A-615
- B. ASTM A-616
- C. ASTM A-617
- D. ACI 351
- E. ASTM A-120

PART 2 – PRODUCTS

2.1. SUBMITTALS

- A. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615, A-616, or A-617. All bar reinforcement shall be deformed.
- B. Smooth dowels shall be plain steel bars conforming to ASTM A-615, Grade 60, or steel pipe conforming to ASTM A-120, Schedule 80. Pipe, if used, shall be closed flush at each end with mortar or metal or plastic cap.
- C. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall be of stainless steel or shall have approved high density polyethylene tips so that the metal portion shall be at least one quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks. Particular attention is directed to the requirements of paragraph 5.5.3 of ACE Standard 301. These requirements

apply to all reinforcement, whether in walls or other vertical elements, inclined elements or flatwork.

## 2.2. FABRICATION

- A. Reinforcement shall be bent cold. It shall be bent accurately to the dimensions and shapes shown on the plans and to within tolerances specified in the CRSI Manual of Standard Practice.
- B. Reinforcing shall be shipped with bars of the same size and shape, fastened securely with metal identification tags giving size and mark.

## PART 3 - EXECUTION

### 3.1 PLACING AND FASTENING

- A. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond.
- B. Reinforcement shall be accurately placed in positions shown on the Drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied at all intersections except where spacing is less than one foot in both directions, then alternate intersections may be tied.
- C. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks for holding the reinforcement from contact with the forms shall be precast mortar blocks or approved metal chairs. Metal chairs which are in contact with the exterior surface of the concrete shall be galvanized. Layers of bars will be separated by precast mortar blocks or other equally suitable devices; the use of pebbles, pieces of broken stone or brick, metal pipe and other such blocks will not be permitted. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.
- D. Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.
- E. Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the Plans. Splicing of bars, except where shown on the Plans, will not be permitted without the concurrence of the Engineer. Where splices are made, they shall be staggered insofar as possible.

END OF SECTION



## SECTION 03300

## CONCRETE

## PART 1 GENERAL

## 1.1 WORK INCLUDED

- A. Admixtures
- B. Cementitious Materials
- C. Aggregates
- D. Curing Materials
- E. Embedded Items
- F. Non-shrink Grout
- G. Non-slip Surfacing Material
- H. Floor Hardener
- I. Perimeter Insulation
- J. Vapor Barrier
- K. Water

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

**AMERICAN CONCRETE INSTITUTE (ACI)**

- |           |   |
|-----------|---|
| ACI 211.1 | (1991) Selecting Proportions for Normal, Heavyweight, and Mass Concrete |
| ACI 211.2 | (1998) Selecting Proportions for Structural Lightweight Concrete        |
| ACI 301   | (1999) Structural Concrete for Buildings                                |
| ACI 305R  | (1999) Hot Weather Concreting   |

ACI 318 (1999) Building Code Requirements for Reinforced Concrete

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

ASTM C 31 (1991) Making and Curing Concrete Test Specimens in the Field

ASTM C 33 (1999) Concrete Aggregates

ASTM C 39 (1993) Compressive Strength of Cylindrical Concrete Specimens

ASTM C 42 (1990) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

ASTM C 78 (1994) Flexural Strength of Concrete (Using Simple Beam With Third Point Loading)

ASTM C 94 (1994) Ready Mixed Concrete

ASTM C 109 (1992) Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)

ASTM C 143 (2000) Slump of Portland Cement Concrete

ASTM C 150 (1999) Portland Cement

ASTM C 171 (1997) Sheet Materials for Curing Concrete

ASTM C 172 (1999) Sampling Freshly Mixed Concrete

ASTM C 173 (1994) Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C 192 (2000) Making and Curing Concrete Test Specimens in the Laboratory

ASTM C 231 (1997) Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C 260 (2000) Air-Entraining Admixtures for Concrete

ASTM C 309 (1998) Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C 330	(2000) Lightweight Aggregates for Structural Concrete
ASTM C 494	(1992) Chemical Admixtures for Concrete
ASTM C 552	(2000) Cellular Glass Thermal Insulation
ASTM C 567	(2000) Unit Weight of Structural Lightweight Concrete
ASTM C 578	(1995) Preformed, Cellular Polystyrene Thermal Insulation
ASTM C 595	(2000) Blended Hydraulic Cements
ASTM C 597	(1997) Pulse Velocity Through Concrete
ASTM C 618	(2000) Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 803	(1997) Penetration Resistance of Hardened Concrete
ASTM C 805	(1997) Rebound Number of Hardened Concrete
ASTM C 989	(1999) Ground Iron Blast Furnace Slag for Use in Concrete and Mortars
ASTM C 1017	(1992) Chemical Admixture for Use in Producing Flowing Concrete
ASTM 1019	(2000) Sampling and Testing Grout
ASTM D 98	(1998) Calcium Chloride
ASTM E 96	(2000) Water Vapor Transmission of Materials

#### **FEDERAL SPECIFICATIONS (FS)**

FS HH I-530	(Rev B; Int Am 1) Insulation Board, Thermal, Unfaced, Polyurethane or Polyisocyanurate
COE CRD-C318	(1997) Cloth, Burlap, Jute (or Kenaf)
<b>NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)</b>	
NRMCA QC3	(Jan 1, 1984) Certification of Ready Mixed Concrete Production Facilities
NRMCA CPMB 100	(1996) Concrete Plant Standards &

NRMCA TMMB-01 (1994) Truck Mixer Agitator Standards and Front Discharge Concrete Carrier Standards.

### 1.3 SUBMITTALS

- A. Submit shop drawings and product data under provision of Section 01300.

### 1.4 GENERAL REQUIREMENTS

#### A. Strength Requirements

Structural concrete for all work shall have a 28-day compressive strength of 4000 pounds per square inch. Concrete slabs on-grade as indicated shall have a 28-day flexural strength of 600 pounds per square inch. Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II Portland cement.

#### B. Air Entrainment

Concrete may, at the option of the Contractor, be air entrained to produce concrete with 3 to 5 percent total air.

#### C. Special Properties

Concrete may contain other admixtures, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete only specifically when approved by the Engineer.

#### D. Slump

Slump shall be within the following limits:

Structural Element	Slump in inches	
	Minimum	Maximum
Walls, columns and beams	2	4
Foundation walls, substructure walls, footings, pavement, and slabs	1	3
Any structural concrete approved for placement by pumping	None	6

\*Where use of superplasticizers is approved to produce flowing concrete these

slump requirements do not apply.

E. Technical Service for Specialized Concrete

The service of a technical representative shall be obtained to oversee proportioning, batching, mixing, placing, consolidating and finishing of specialized structural concrete, such as lightweight or flowing concrete until field controls indicate concrete of specified quality is furnished.

1.5 PROPORTIONS OF MIX

A. Mixture Proportioning, Normal Weight Concrete

Trial batches shall contain materials proposed to be used in the project. Trial mixtures having proportions, consistencies and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios. Trial mixes shall be proportioned to produce concrete strengths specified. In the case where ground iron blast-furnace slag is used, the weight of the slag will be substituted in the equations for the term P which is used to denote the weight of pozzolan. Trial mixtures shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested at 7 and 28 days in accordance with ASTM C 39. From these test results a curve shall be plotted showing the relationship between water-cement ratio and strength.

B. Average Strength

In meeting the strength requirements specified, the selected mixture proportion shall produce an average compressive strength exceeding the specified strength by the amount indicated below. Where a concrete production facility has test records, a standard deviation shall be established. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected; shall represent concrete produced to meet a specified strength or strengths within 1000 psi of that specified for proposed work; and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at other test age designated for determination of the specified strength.

1. Test Records Exceeding 29

Required average compressive strength used as the basis for selection of concrete proportions shall be the larger of the specified strength plus the standard deviation multiplied by 1.34 or the specified strength plus the

standard deviation multiplied by 2.33 minus 500.

## 2. Test Records Less Than 29

Where a concrete production facility does not have test records meeting the above requirements but does have a record based on 15 to 29 consecutive tests, a standard deviation may be established as the product of the calculated standard deviation and a modification factor from the following table:

No. of tests (1)	Modification factor for standard deviation
less than 15	See Note
15	1.16
20	1.08
25	1.03
30 or more	1.00

(1) Interpolate for intermediate numbers of tests.

When a concrete production facility does not have field strength test records for calculation of standard deviation or the number of tests is less than 15, the required average strength shall be:

- a. The specified strength plus 1000 specified strength of less than 3000 psi.
- b. The specified strength plus 1200 for specified strengths of 3000 to 5000 psi.
- c. The specified strength plus 1400 for specified strengths greater than 5000 psi.

## 1.6 STORAGE OF MATERIALS

Cement and pozzolan shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Reinforcing bars and accessories shall be stored above the ground on platforms, skids or other supports. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing shall not be used unless retested and proven to meet the specified requirements.

PART 2 PRODUCTS

2.1 ADMIXTURES

Admixtures shall conform to the following:

A. Accelerating Admixture

ASTM C 494, Type C or E; or calcium chloride conforming to ASTM D 98.

B. Air Entraining Admixture

ASTM C 260.

C. Flowing Concrete Admixture

ASTM C 1017, Type 1 or 2.

D. Water-Reducing or Retarding Admixture

ASTM C 494, Type A, B, D, F, or G.

2.2 CEMENTITIOUS MATERIALS

Cementitious materials shall each be of one type and from one source when used in concrete which will have surfaces exposed in the finished structure. Cementitious materials shall conform to one of the following:

A. Cement

ASTM C 150, Type I or II low alkali.

B. Portland Blast-Furnace-Slag Cement

ASTM C 595, Type IS.

C. Portland-Pozzolan Cement

ASTM C 595, Type IP.

D. Pozzolan

ASTM C 618, Class F.

E. Ground Iron Blast-Furnace Slag

ASTM C 989, Grade 120.

2.3 AGGREGATES

Aggregates shall conform to the following:

A. Lightweight Aggregate

ASTM C 330

B. Normal Weight Aggregate

ASTM C 33.

2.4 CURING MATERIALS

A. Burlap

COE CRD-C318.

B. Impervious Sheets

ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

C. Membrane-Forming Compounds

ASTM C 309, Type 1-D, Class A or B.

2.5 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application.

2.6 NONSHRINK GROUT

Non-shrink grout shall conform to ASTM C1019 and shall be a formulation suitable for the application.

2.7 FLOOR HARDENER

Floor hardener shall be a colorless aqueous solution containing zinc silicofluoride, magnesium silicofluoride, or sodium silicofluoride. These silicofluoride can be used individually or in combination.



## 2.8 PERIMETER INSULATION

Perimeter insulation shall be as noted on plans, polystyrene conforming to ASTM C 578, Type II; polyurethane conforming to FS HH-I-530, Type II; or cellular glass conforming to ASTM C 552, Type I or IV.

## 2.9 VAPOR BARRIER

Vapor barrier shall be polyethylene sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96.

## 2.10 WATER

Water shall be potable, non-potable water shall not be used. The strength comparison shall be made on mortars, identical except for mixing water, prepared and tested in accordance with ASTM C 109. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

# PART 3 EXECUTION

## 3.1 PREPARATION OF SURFACES

Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Conduit and other similar items shall be in place and clean of any deleterious substance. Reference to plans for limits of specified work to be performed.

### A. Foundations

Earthwork shall be as specified on Drawings. Flowing water shall be diverted without washing over freshly deposited concrete. Rock foundations shall be cleaned by high velocity air-water jets, sandblasting, or other approved methods. Debris and loose, semi-detached or unsound fragments shall be removed. Rock surfaces shall be moist but without free water when concrete is placed. Semi-porous subgrades for foundations and footings shall be damp when concrete is placed. Pervious subgrades shall be sealed by blending impervious material with the top 6 inches of the in-place pervious material or by covering with an impervious membrane.

### B. Perimeter Insulation

Perimeter insulation shall be installed at locations indicated. Adhesive shall be used where insulation is applied to the interior surface of foundation walls.

C. Vapor Barrier

Unless otherwise indicated, subgrades for slabs in buildings shall be covered with a vapor barrier. Vapor barrier edges shall be lapped at least 4 inches and ends shall be lapped not less than 6 inches. Patches and lapped joints shall be sealed with pressure-sensitive adhesive or tape not less than 2 inches wide and compatible with the membrane.

D. Preparation of Previously Placed Concrete

Concrete surfaces to which other concrete is to be bonded shall be roughened in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be moist but without free water when concrete is placed.

3.2 INSTALLATION OF EMBEDDED ITEMS

Embedded items shall be free from oil, loose scale or rust, and paint. Embedded items shall be installed at the locations indicated and required to serve the intended purpose. Voids in sleeves, slots and inserts shall be filled with readily removable material to prevent the entry of concrete.

3.3 BATCHING, MIXING AND TRANSPORTING CONCRETE

Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and non-agitating units shall comply with NRMCA TMMB-100. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA Q3. Site-mixed concrete shall be mixed in accordance with ACI 301. On-site plant shall conform to the NRMCA CPMB-100.

A. Admixtures

Admixtures shall be batched within an accuracy of 3 percent. Where two or more admixtures are used in the same batch, they shall be batched separately and must be compatible. Retarding admixture shall be added within one minute after addition of water is complete or in the first quarter of the required mixing time, whichever is first. Superplasticizing admixtures shall be added as recommended by manufacturer. Concrete that shows evidence of total collapse or segregation caused by the use of admixture shall be removed from the site.

B. Control of Mixing Water

No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch except when on arrival at the jobsite, the slump of the concrete is less than that specified. Water added to bring the slump within the specified range shall not change the total water in the concrete to

a point that the approved water-cement ratio is exceeded. The drum shall be turned an additional 30 revolutions, or more, if necessary, until the added water is uniformly mixed into the concrete. Water shall not be added to the batch at any later time.

C. Mixing of Lightweight Concrete

The mixing cycle shall be as recommended by the aggregate producer for the batching and mixing as required by the absorptivity of the aggregate. Typically, the mixer is charged with approximately 2/3 of the total mixing water and all of the aggregate. Ingredients are mixed for not less than 30 seconds in a stationary mixer nor less than 10 revolutions at mixing speed in a truck mixer. Cement, air entraining admixture, and the rest of the mixing water are added to obtain the required slump and mixing is continued for 30 revolutions at mixing speed.

3.4 SAMPLING AND TESTING

Sampling and Testing is the responsibility of the Contractor and shall be performed by an approved testing agency.

A. Aggregates

Aggregates for normal weight concrete shall be sampled and tested in accordance with ASTM C 33. Gradation tests shall be performed on the first day and every other day thereafter during concrete construction.

B. Sampling of Concrete

Samples of concrete for air, slump, unit weight, and strength tests shall be taken in accordance with ASTM C 172.

1. Air Content

Test for air content shall be performed in accordance with ASTM C 173 or ASTM C 231. A minimum of 1 test per day shall be conducted.

2. Slump

At least 2 slump tests shall be made on randomly selected batches of each mixture of concrete during each day's concrete placement. Tests shall be performed in accordance with ASTM C 143.

C. Evaluation and Acceptance of Concrete

1. Frequency of Testing

Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5000 square feet of surface area for slabs or walls. If this sampling frequency results in less than 5 strength tests for a given class of concrete, tests shall be made from at least 5 randomly selected trucks or from each truck if fewer than 5 truck loads are used. Field cured specimens for determining form removal time or when a structure may be put in service shall be made in numbers directed to check the adequacy of curing and protection of concrete in the structure. The specimens shall be removed from the molds at the age of 24 hours and shall be cured and protected, insofar as practicable, in the same manner as that given to the portion of the structure the samples represent.

## 2. Testing Procedures

Cylinders and beams for acceptance tests shall be molded and cured in accordance with ASTM C 31. Cylinders shall be tested in accordance with ASTM C 39 and beams shall be tested in accordance with ASTM C 78. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another specified test age.

## 3. Evaluation of Results

Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength and no individual strength test result falls below the required strength by more than 500 pounds per square inch. For flexural strength concrete, the strength level of the concrete will be considered satisfactory if the averages of all sets of five consecutive strength test results equal or exceed the required flexural strength.

## D. Investigation of Low-Strength Test Results

When any strength test of standard-cured test cylinder falls below the specified strength requirement by more than 500 pounds per square inch, or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity of the structure is not jeopardized. Non-destructive testing in accordance with ASTM C 597, ASTM C 803 or ASTM C 805 may be permitted by the Engineer to determine the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests, unless properly calibrated and correlated with other test data, shall not be used a basis for acceptance or rejection. When strength of concrete in place is considered potentially deficient,

cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores shall be determined by the Engineer to least impair the strength of the structure. If the concrete in the structure will be dry under service conditions, the cores shall be air-dried (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for seven days before testing and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C 42. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to or at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. If the core tests are inconclusive or impractical to obtain, or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Engineer in accordance with the requirements of ACI 318. Concrete work evaluated by structural analysis or by results of a load test and found deficient shall be corrected in a manner satisfactory to the Engineer. All investigations, testing, load tests, and correction of deficiencies shall be performed, and approved by the Engineer, at the expense of the Contractor.

### 3.5 CONVEYING CONCRETE

Concrete shall be conveyed from mixer to forms as rapidly as possible and within the time interval specified in paragraph "CONCRETE PLACEMENT" by methods which will prevent segregation or loss of ingredients. Final method of placement shall be approved by the Engineer.

#### A. Chutes

When concrete can be placed directly from a truck mixer or other transporting equipment, chutes attached to this equipment may be used. Separate chutes will not be permitted except when specifically approved.

#### B. Buckets

Bucket design shall be such that concrete of the required slump can be readily discharged. Bucket gates shall be essentially grout tight when closed. The bucket shall provide means for positive regulations of the amount and rate of deposit of concrete in each dumping position.

#### C. Belt Conveyors

Belt conveyors may be used when approved. Belt conveyors shall be designed for conveying concrete and shall be operated to assure a uniform flow of concrete to the final place of deposit without segregation or loss of mortar. Conveyors shall be provided with positive means for preventing segregation of the concrete at

transfer points and point of placement.

D. Pumps

Concrete may be conveyed by positive displacement pumps when approved. Pump shall be the piston or squeeze pressure type. Pipeline shall be steel pipe or heavy duty flexible hose. Inside diameter of the pipe shall be at least three times the maximum size of the coarse aggregate. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer. Concrete shall be supplied to the pump continuously. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place. After each use, the equipment shall be thoroughly cleaned. Flushing water shall be wasted outside the forms.

3.6 CONCRETE PLACEMENT

Mixed concrete which is transported in truck mixers or agitators or concrete which is truck mixed, shall be discharged within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. These limitations may be waived by the Engineer if the concrete is of such slump after the 1-1/2 hour time or 300 revolution limit has been reached that it can be placed, without the addition of water to the batch. When the concrete temperature exceeds 85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the truck.

A. Placing Operation

Concrete shall be handled from mixer to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 8 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 12 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to the proper level to avoid excessive shimming or grouting.

B. Consolidation

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs 4 inches or less. The vibrators shall at all times be

adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 8000 vibrations per minute, and the head diameter and amplitude shall be appropriate for the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then withdrawn slowly. The use of form vibrators must be specifically approved. Vibrators shall not be used to transport concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique. Excessive vibration of lightweight concrete resulting in segregation and flotation of coarse aggregate shall be avoided.

C. Cold Weather Requirements

Special protection measures, approved by the Engineer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. The temperature of the concrete when placed shall be not less than 50 degrees F nor more than 75 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the concrete to prevent freezing. Upon written approval, calcium chloride or chemical admixture conforming to ASTM C 494 Type C or E may be used. The amount of calcium chloride shall not exceed 2 percent by weight of the cement, and it shall be batched in solution form. Calcium chloride shall not be used where concrete will be in contact with aluminum or zinc-coated items, or where sulfate resistant or pre-stressed concrete is specified.

D. Warm Weather Requirements

The temperature of the concrete placed during warm weather shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 95 degrees F.

### 3.7 CONSTRUCTION JOINTS

Construction joints shall be located as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type

of construction joint shall be subject to approval of the Engineer. Unless otherwise indicated and except for slabs on grade, reinforcing steel shall extend through construction joints. Construction joints in slabs on grade shall be keyed or doweled as shown. Concrete columns, walls, or piers shall be in place at least 2 hours, or until the concrete is no longer plastic, before placing concrete for beams, girders, or slabs thereon. In walls having door window openings, lifts shall terminate at the top and bottom of the opening. Other lifts shall terminate at such levels as to conform to structural requirements or architectural details. Where horizontal construction joints are required, a strip of 1-inch square-edge lumber, beveled and oiled to facilitate removal, shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 1 inch above the underside of the strip. The strip shall be removed 1 hour after the concrete has been placed, and any irregularities in the joint line shall be leveled off with a wood float, and all laitance shall be removed. Prior to placing additional concrete, horizontal construction joints shall be prepared as specified in paragraph "PREPARATIONS OF SURFACES."

### 3.8 FINISHING CONCRETE

#### A. Formed Surfaces

##### 1. Repair of Surface Defects

Surface defects shall be repaired within 24 hours after the removal of forms. Honeycombed and other defective areas shall be cut back to solid concrete or to a depth of not less than 1 inch, whichever is greater. Edges shall be cut perpendicular to the surface of the concrete. The prepared areas shall be dampened and brush-coated with neat cement grout. The repair shall be made using mortar consisting of not more than 1 part cement to 2-1/2 parts sand. The mixed mortar shall be allowed to stand to stiffen (approximately 45 minutes), during which time the mortar shall be intermittently remixed without the addition of water. After the mortar has attained the stiffest consistency that will permit placing, the patching mix shall be thoroughly tamped into place by means approved by the Engineer and finished slightly higher than the surrounding surface. For Class A and Class B finished surfaces the cement used in the patching mortar shall be a blend of job cement and white cement proportioned to produce a finished repair surface matching, after curing, the color of adjacent surfaces. Holes left after the removal of form ties shall be cleaned and filled with patching mortar. Holes left by the removal of tie rods shall be reamed and filled by dry packing. Repaired surfaces shall be cured as required for adjacent surfaces. The temperature of concrete, mortar patching material, and ambient air shall be above 50 degrees F while making repairs and during the curing period. Concrete with defects which affect the strength of the member or with excessive honeycombs will be rejected, or the defects shall be corrected as directed.



2. Class A Finish

Where a Class A finish is indicated, fins shall be removed. A mortar mix consisting of one part Portland cement and two parts well-graded sand passing a No. 30 sieve, with water added to give the consistency of thick paint, shall be prepared. White cement shall be used to replace part of the job cement. After the surface has been thoroughly wetted and allowed to approach surface dryness, the mortar shall be vigorously applied to the area by clean burlap pads or by cork or wood-floating, to completely fill all surface voids. Excess grout shall be scraped off with a trowel. As soon as it can be accomplished without pulling the mortar from the voids, the area shall be rubbed with burlap pads until all visible grout film is removed. The rubbing pads shall have on their surfaces the same sand-cement mix specified above but without any mixing water. The finish of any area shall be completed in the same day, and the limits of a finished area shall be made at natural breaks in the surface. The surface shall be continuously moist cured for 48 hours. The temperature of the air adjacent to the surface shall be not less than 50 degrees F for 24 hours prior to, and 48 hours after, the application. In hot, dry weather the smooth finish shall be applied in shaded areas.

3. Class B Finish

Where a Class B finish is indicated, fins shall be removed. Concrete surface shall be smooth with a texture at least equal to that obtained through the use of Grade B-B plywood forms.

4. Class C Finish

Where a Class C finish is indicated, fins shall be removed. Concrete surfaces shall be relatively smooth with a texture imparted by the forms used.

5. Class D Finish

Where a Class D finish is indicated, fins exceeding 1/4 inch in height shall be chipped or rubbed off. Concrete surfaces shall be left with the texture imparted by the forms used.

B. Unformed Surfaces

In cold weather, the air temperature in areas where concrete is being finished shall not be less than 50 degrees F. In hot windy weather when the rate of evaporation of surface moisture, as determined by methodology presented in ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour; coverings, windbreaks, or fog sprays shall be provided as necessary to prevent

premature setting and drying of the surface. The dusting of surfaces with dry materials or the addition of water during finishing will not be permitted. Finished surfaces shall be plane, with no deviation greater than 1/4 inch when tested with a 10-foot straightedge. Surfaces shall be pitched to drains.

1. Trowel Finish

- a. Slabs shall be given a trowel finish immediately following floating. Surfaces shall be trowelled to produce smooth, dense slabs free from blemishes including trowel marks. In lieu of hand finishing, an approved power-finishing machine may be used in accordance with the directions of the machine manufacturer. A final hard steel troweling shall be done by hand.
- b. Trowel finish will be specified for most wearing surfaces and where a smooth finish is required.

2. Broom Finish (Concrete Stoops)

After floating, slabs shall be lightly trowelled, and then broomed with a fiber-bristle brush in a direction transverse to that of the main traffic.

### 3.9 CURING AND PROTECTION

A. General

1. All concrete shall be cured by an approved method for the period of time given below:

Concrete with Type III cement	3 days
Concrete with Type I, II, IP or IS cement	7 days
Concrete with Type I or Type II cement blended with pozzolan	7 days

2. Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. Air and forms in contact with concrete shall be maintained at a temperature above 50 degrees F for the first 3 days and at a temperature above 32 degrees F for the remainder of the specified curing period. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. All materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Curing

shall be accomplished by any of the following methods, or combination thereof, as approved.

B. Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. If water or curing materials used stains or discolors concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned. When wooden forms are left in place during curing, they shall be kept wet at all times. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Horizontal surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with waterproof paper, polyethylene sheet, polyethylene-coated burlap or saturated burlap.

C. Membrane Curing

Membrane curing shall not be used on surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete; except a styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring specified. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam. Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. Surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. Compound shall be applied in a one-coat continuous operation by mechanical spraying equipment, at a uniform coverage in accordance with the manufacturer's printed instructions. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be re-sprayed by the method and at the coverage specified. On surfaces permanently exposed to view, the surface shall be shaded from direct rays of the sun for the duration of the curing period. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

### 3.10 SETTING BASE PLATES AND BEARING PLATES

Reference to plans for locations, which apply.

After being properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be set to the proper line and elevation with damp-pack bedding mortar, except where non-shrink grout is indicated. The thickness of the mortar or grout shall be approximately 1/24 the width of the plate, but not less than 3/4 inch. Concrete and metal surfaces in contact with grout shall be clean and free of oil and grease, and concrete surfaces in contact with grout shall be damp and free of laitance when grout is placed.

#### A. Damp-Pack Bedding Mortar

Damp-pack bedding mortar shall consist of 1 part cement and 2-1/2 parts fine aggregate having water content such that a mass of mortar tightly squeezed in the hand will retain its shape but will crumble when disturbed. The space between the top of the concrete and bottom of the bearing plate or base shall be packed with the bedding mortar by tamping or ramming with a bar or rod until it is completely filled.

#### B. Non-shrink Grout

Non-shrink grout shall be mixed and placed in accordance with material manufacturer's written recommendations. Forms of wood or other suitable material shall be used to retain the grout. The grout shall be placed quickly and continuously, completely filling the space without segregation or bleeding of the mix.

#### C. Treatment of Exposed Surfaces

For metal-oxidizing non-shrink grout, exposed surfaces shall be cut back 1 inch and immediately covered with a parget coat of mortar consisting of 1 part Portland cement and 2-1/2 parts fine aggregate by weight, with sufficient water to make a plastic mixture. The parget coat shall have a smooth finish. For other mortars or grouts, exposed surfaces shall be left untreated. Curing shall comply with paragraph "CURING AND PROTECTION."

END OF SECTION

**Section 04200****Concrete Masonry  
Split Face Concrete Masonry Units****PART 1- GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

**1.02 DESCRIPTION OF WORK**

- A. Extent of each type of masonry work is indicated on drawings and schedule.
- B. Types of masonry work required include:
  - 1. Concrete Unit Masonry.
  - 2. Brick Masonry.
  - 3. Architectural units:
    - a. Split Face Unit Masonry.
  - 4. Reinforced Unit Masonry.
  - 5. Insulated Unit Masonry.

**1.03 RELATED WORK**

- A. Install work furnished under other sections, which must be built into unit masonry work, including, but not limited to:
  - 1. Glass Unit Masonry.
  - 2. Anchorage Devices.
  - 3. Flashings.
  - 4. Loose Steel Lintels.

**1.04 QUALITY ASSURANCE**

- A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies, equivalent thickness, whose fire endurance has been determined by testing in compliance with ASTM E 119 by means acceptable to authorities having jurisdiction.
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Field constructed Mock-Ups: Prior to installation of masonry work, erect representative sample wall panels to further verify selections made for color and texture characteristics, under sample submittals of masonry units and mortar, and to establish a standard for completed masonry work for qualities of appearance, materials, construction and workmanship.
- E. Build mock-ups for the following types of masonry in sizes approximately 6' long by 4' high, by full thickness, including face and back-up wythes as well as accessories.
  - 1. Each type of exposed unit masonry work.

2. Typical exterior face brick wall.
3. Typical interior brick wall.

#### 1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory and other manufactured products.
- B. Compliance: Submit certifications that each type complies with specified requirements.
- C. Color selection: For initial selection submit:
  1. Unit masonry samples showing full extent of colors and textures available for each type of exposed masonry unit required.
  2. Colored mortar samples showing full extent of colors available.
- D. Samples: For verifications purposes submit:
  1. Unit masonry samples for each type of exposed masonry unit, include full range of color and texture to be expected in completed work.
  2. For selection of brick, submit products of all manufacturers that the manufacturers or their agents consider to be their closest match. Re-submit until match meets approval of Architect.
  3. Colored masonry mortar samples for each color required showing the full range of color which can be used in the finished work. Label samples to indicate type and amount of colorant used.

#### 1.06 REFERENCED STANDARDS

- A. Comply with the current applicable provisions of all codes, standards and specifications referenced in this section, except as modified by the requirements of these Contract Documents, including, but not limited to, the following:
  - ACI531- Building Code Requirements for Masonry Structures.
  - ACI5318R-Coimmentary on Building Code Requirements for Masonry Structures.
  - ACI 530.1- Specification for Masonry Construction.
  - ASTM C-90- Load Bearing Masonry Units.
  - ASTM C-129- Non- load Bearing Masonry Units.
  - ASTM C-140- Testing Concrete Masonry Units.
  - ASTM C-744-Specification for Pre-Faced Concrete and Calcium Silicate Masonry Units.
  - ASTM E-119- Fire Tests with Building Construction and Materials.
  - Technical Notes on Brick Construction.
  - NCMA-TEK Bulletins.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry material to project in undamaged condition. Store and handle materials to prevent their deterioration or damage due to moisture, temperature, changes, contaminants, and corrosion or other causes.
- B. Limit moisture absorption of concrete masonry units during delivery and until time of installation.
- C. Store cemenitious materials off the ground, under cover and in a dry location.
- D. Store and protect aggregates where grading and other required characteristics can be maintained.
- E. Store and protect masonry accessories including metal items to prevent deterioration by corrosion and accumulation dirt.

## 1.08 PROJECT CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
  - 1. Extend cover a minimum of 24" down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
- C. Staining: Prevent ground, mortar or soil from staining the face of masonry to be left exposed or painted. Remove grout or mortar in contact with such masonry immediately.
- D. Do not apply concentrated loads for at least 3 days after building masonry wall or columns.
- E. Protect base of walls from rain – splashed mud and/or mortar splatter by means of coverings spread on ground and over wall surfaces.
- F. Protect sills, ledges, and projections from droppings of mortar.
- G. Cold Weather Protection:
  - 1. Do not lay masonry units that are wet or frozen.
  - 2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
  - 3. Remove masonry damaged by freezing conditions.
  - 4. For clay masonry units with initial rates of absorption which require them to be wetted before laying, comply with the following:
    - a. For units with surface temperature above 32 Degrees F, wet with water heated to above 70 Degrees F.
    - b. For units with surface temperature below 32 Degrees F, wet with water heated to above 130 Degrees F.
- H. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperature existing at time of installation, except for grout.
  - 1. For Grout: Temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10 Degrees F.
  - 2. 40 Degrees F to 32 Degrees F:
    - a. Mortar: Heat mixing water to produce mortar temperature between 40 Degrees F and 120 Degrees F.
    - b. Grout: Follow normal masonry procedures.
  - 3. 32 Degrees F to 25 Degrees F:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40 Degrees F and 120 Degrees F. Maintain temperature of mortar on boards above freezing.
    - b. Grout: Heat grout materials to 90 Degrees F to produce in-place grout temperature of 70 Degree F at end of work day.
  - 4. 25 Degrees F to 20 Degrees F:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40 degree F and 120 Degrees F. Maintain temperature of mortar on boards above freezing.
    - b. Grout: Heat grout materials to 90 Degrees F to produce in-place grout temperature of 70 Degrees F at end of work day.
    - c. Heat both sides of walls under construction using salamanders or other heat sources.
    - d. Use windbreaks or enclosures when wind is in excess of 15 mph.
  - 5. 20 Degrees F and Below:
    - a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40 Degrees F and 120 Degrees F.

- b. Grout: Heat grout materials to 90 Degrees F to produce in-place grout temperature of 70 Degrees F at end of work day.
  - c. Masonry Units: Heat masonry units so that they are above 20 Degrees F at time of laying.
  - d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40 Degrees F for 24 hours after laying units.
  - e. Do not heat mixing water for mortar and grout to above 160 Degrees F.
- I. Protect completed masonry and masonry not being worked on in the following manner: (Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry; if for grouted masonry, temperature ranges apply to anticipated minimum night temperatures.)
- 1. 40 Degrees F to 32 Degrees F:
    - a. Protect masonry from rain or snow for at least 24 hours by covering with weather-resistant membrane.
  - 2. 32 degrees F to 25 Degrees F:
    - a. Completely cover masonry with weather-resistant membrane for at least 24 hours.
  - 3. 25 Degrees F to 20 Degrees F:
    - a. Completely cover masonry with weather-resistant insulating blankets or similar protection for at least 24 hours: 48 hours for grouted masonry.
  - 4. 20 Degrees F and Below:
    - a. Except as otherwise indicated, maintain masonry temperature above 32 Degrees F for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40 Degrees F for 48 hours.

## **PART 2-PRODUCTS**

### 2.01 MASONRY UNITS, GENERAL

- A. Manufacturer: All concrete masonry units shall be manufactured by BUILDING PRODUCTS CORP. 950 Freeburg Ave., Belleville, IL 62220, 800-233-1996.
- B. Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

### 2.02 CONCRETE MASONRY UNITS

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
- B. Provide special shapes where required for lintels, jambs, corners, sash, control joints, headers bonding and other special conditions.
- C. Concrete Block: Provide units complying with characteristics indicated below for Face Size, Exposed Face, and under each form of block included for weight classification.
  - 1. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15 5/8" X 7 5/8" actual) x thickness indicated.
- D. Hollow Load-Bearing Block ASTM C-90, normal weight (125 lbs. per cubic foot dry weight).
- E. Solid Load-Bearing Block: ASTM C-90n normal weight (125 lbs. per cubic foot dry weight).

### 2.03 SPLIT FACE CONCRETE MASONRY UNITS

- A. Manufacturer: BUILDING PRODUCTS CORP., 950 Freeburg Ave., Belleville, IL 62221, 800-233-1996.



1. Face design shall be split face as manufactured by Building Products Corp.
- B. All units will conform to STM C-90.
  1. Weight Classification: Normal Weight.
  2. Minimum Net Compressive Strength 1900 PSI.
- C. Sizes: Manufacturers Standard Nominal Sizes.
- D. Color: Shall be as manufactured by BUILDING PRODUCTS CORP., 950 Freeburg Ave., Belleville, Illinois, 62221, 800-233-1996, and selected from BUILDING PRODUCTS CORP. SPLIT FACE BLOCK SERIES.
- E. Provide integral water repellant in BUILDING PRODUCTS CORP. SPLIT FACE BLOCK SERIES as manufactured by BUILDING PRODUCTS CORP., 950 Freeburg Ave., Belleville, IL 62221 800-233-1996. Basis of Design: Rheopel Admix by B.A.S.F.
- F. All BUILDING PRODUCTS CORP. ARCHITECTURAL SPLIT FACE BLOCK shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or impair the strength or performance of construction.
- G. Cleaning: No muriatic acid or acid-based solutions shall be used in the cleaning of BUILDING PRODUCTS CORP. SPLIT FACE BLOCK. Products and Procedures shall be as outlined in "Architectural CMU Cleaning Recommendations," Section 3.14, Cleaning

#### 2.04 SPLIT RIBBED CONCRETE MASONRY UNITS

- A. Manufacturer: BUILDING PRODUCTS CORP. 950 Freeburg Ave. Belleville, IL 62221, 800-233-1996.
- B. All units will conform to ASTM C-90.
  1. Weight Classification: Normal Weight.
  2. Minimum Net Compressive Strength 1900 PSI.
- C. Sizes: Manufacturers Standard Nominal Sizes.
- D. Color: Shall be as manufactured by BUILDING PRODUCTS CORP., 950 Freeburg Ave. Belleville, IL 62221, 800-233-1996.
- E. Provide an integral water repellant in BUILDING PRODUCTS CORP. ARCHITECTURAL SPLIT RIBBED BLOCK. Basis of Design Rheopel by B.A.S.F.
- F. All BUILDING PRODUCTS CORP. ARCHITECTURAL SPLIT RIBBED BLOCK shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or impair the strength or performance of construction.
- G. Cleaning: No muriatic acid or acid-based solutions shall be used in the cleaning of BUILDING PRODUCTS CORP. ARCHITECTURAL SPLIT FADCE BLOCK. Products and Procedures shall be as outlined in Building Products Corp. "Architectural CMU Cleaning Recommendations."

#### 2.05 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C-150, Type I, except use Type III for construction below 40 Degrees F. Provide natural color or white cement as required to produce required mortar color.
- B. Hydrated Lime: ASTM C-207, Type S.
- C. Aggregate for Mortar: ASTM C-144, except for joints less that 1/4 inch use aggregate graded with 100% passing the No. 16 sieve.
  1. White Aggregates: Natural white sand or ground white stone.
- D. Aggregate for Grout: ASTM C-404.
- E. Water: Clean and potable.
- F. Accelerators: Subject to compliance with requirements, non- chloride admixtures may be used in cold weather construction.
- G. Integral Water Repellant Admixture: Rheopel Admix by BASF.

## 2.06 MORTAR AND GROUT MIXES

- A. General: Use only the specified additives to mortar and grout mixes.
  - 1. Do not use calcium chloride in mortar or grout.
- B. Mixing: Combine and thoroughly mix cementitious materials, water, aggregates and admixtures in a mechanical batch mixer. Comply with applicable ASTM standards and material manufacturer's recommendations for mixing time and water content. Measure and batch materials by volume so that required proportions can be accurately controlled and maintained.
- C. Mortar for Unit Masonry: Comply with ASTM C-270, Proportion Specifications, Cement-Lime Mortar, for types of mortar required, unless otherwise indicated.
  - 1. Use Type N mortar for interior non-load bearing walls.
    - a. Air Content: 8-14% Maximum.
- D. Colored Aggregate Mortar: Produce mortar of color required by use of colored aggregates in combination with selected cementitious materials.
  - 1. Color: To be selected by Architect.
- E. Limit Cementitious materials in mortar to Portland cement-lime.
- F. Grout for Unit Masonry: Comply with ASTM C-476. Use grout of consistency which at time of placement will completely fill all spaces intended to receive grout
  - 1. Mix: Portland cement, sand, gravel and water, proportioned as required to provide a 28-day minimum compressive strength of 3000 PSI.
  - 2. Use for reinforced masonry lintels or bond beams, reinforced masonry piers, and wherever grouting full is indicated or specified.

## 2.07 JOINT REINFORCEMENT, TIES AND ANCHORS

- A. Materials: comply with requirements indicated below for basic materials, as well as requirements for each form of joint reinforcement, tie and anchor for size and other characteristics.
- B. Hot -Dip Galvanized Steel Wire: ASTM A-82 for uncoated wire and with ASTM A-153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after pre-fabrication into units.
- C. Joint Reinforcement: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10'-0", with prefabricated corner and tee units.
  - 1. Width: approximately 2" less than nominal width of walls and partitions, to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
  - 2. Wire Size for Side Rods: 9 gauge.
  - 3. Wire Size for Cross Rods: 9 gauge.
  - 4. Wire Size for Two-Part Reinforcing: 3/16" diameter in exterior walls.
  - 5. Configuration:
    - a. Single-Wythe Masonry: Truss design with continuous diagonal cross rods spaced not more than 16" o.c.
    - b. Multi-Wythe Masonry: For cavity or composite masonry walls, provide adjustable wall tie pintle section fitting into eye section of rectangular box-type cross ties spaced not more than 16" o.c. Truss type units with side rods spaced for embedment within each face shell of back-up wythe and ties extended to within 1" of exterior face of facing wythe.
- D. Flexible Anchors: Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall.

1. Anchorage to Steel Framework: Provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel framework and triangular-shaped wire tie section sized to extend within 1" of exterior face of facing wythe.
- E. Unit Type Masonry Insets in Concrete: furnish cast iron or malleable iron inserts of type and size indicated.
- F. Dovetail Slots: Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336" (22 gauge) sheet metal.
- G. Anchor Bolts: Provide steel bolts with hex nuts and flat washers complying with ASTM A-307, Grade A, hot-dip galvanized to comply with ASTM C-153, Class C, in sizes and configuration indicated.
- H. Pencil Rods at Construction Joints: As shown, dowels dipped in tar for half of length.
- I. Reinforcing Bars: Deformed steel, ASTM A-615, Grade 60 for Bars No. 3- No. 18.
- J. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which maybe incorporated in the work include, but are not limited to, the following.
  1. AA Wire Products Co.
  2. Dur-O-Wal, Inc.

## 2.08 MISCELLANEOUS MASONRY ACCESSORIES

- A. Non- Metallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D-1056, Grade RE41E1, capable of compression up to 35%, of width and thickness indicated on drawings.
- B. Weepholes: Provide the following for weepholes:
  1. Plastic Tubing: Medium density polyethylene, outside diameter and lengths indicated:
    - a. 1/4" X 4"

## 2.09 INSULATION

See Section 3.11

## PART 3- EXECUTION

### 3.01. INSPECTION

- A. Verification: Prior to the start of masonry construction the Contractor shall verify:
  1. Foundations are constructed with tolerances conforming to ACI 117.
  2. Reinforcing dowels are positioned in accordance with Project Drawings.
  3. Verify items provided by other Sections of the Work are properly sized and located.
- B. Notification: If conditions are not met notify the Architect/Owners Representative.

### 3.02. PREPARATION

- A. Establish Lines, Levels, and Coursing:
  1. Protect lines from disturbance.
  2. Use non-corrosive material in contact with masonry.
- B. Surface Preparation: Prior to placing Ultra-Brick remove laitance, loose aggregate or other material that would prevent mortar from bonding to the foundation.

### 3.03 COURSING

- A. Placement: Place Split Face to lines and levels indicated.

- B. Uniformity: Maintain masonry courses to uniform width. Make vertical and horizontal joints equal and of uniform thickness.
- C. Bond Patterns: Place Split Face in 1/2 running bond unless otherwise noted.
- D. Course Height: Course one Split Face and one mortar joint equal to 4 inches.

### 3.04 PLACING AND BONDING

#### A. Bed and Head Joints:

1. Joint Thickness:
  - a. Construct 3/8 inch bed and head joints unless otherwise indicated.
  - b. Construct bed joint at starting course on foundation not less than 1/4 inch and not more than 3/4 inch.
2. Fill holes not specified in exposed and below grade masonry with mortar.
3. Tool head and bed joints concave unless below grade or above ceiling height and to be concealed.
  - a. Use tool with large enough radius that joint is not raked free of mortar.
4. Remove masonry protrusions extending 1/2 inch or more into cells and cavities to be grouted.

#### B. Unit Placement

1. Split Face- Lay units with bed and head joints filled from the faces of the units to a distance in not less than the thickness of the face shell.
  - a. Webs are fully mortared in all courses of piers, columns, pilasters, starting course on footings or foundations, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout.
  - b. Spread out full mortar bed including areas under cells, for starting course on footings where cells are not to be grouted.
  - c. Vertical cells to be grouted are aligned and unobstructed openings for grout are provided in accordance with drawings.
2. Keep cavity airspace and weep holes clean or mortar, clean out promptly if mortar falls into cavity airspace or plugs weep holes.
3. In-Progress Cleaning:
  - a. Remove excess mortar.
  - b. Dry brush exposed masonry prior to the end of each workday.
  - c. Protect wall from mud splatter and mortar droppings.
    - i. Set scaffolds and scaffold boars so that mortar is not deflected onto masonry.
    - ii. At end of each workday turn scaffold boards so that rainwater is not deflected onto masonry.
  - d. Place Split Face such that mortar does not run down the face of the wall or smear the masonry face.
4. Adjustments:
  - a. Do not shift or tap Split Face after mortar has taken initial set.
  - b. Remove unit and mortar and replace.
5. After joints are tooled, cut off mortar tailings with trowel and dry brush excess mortar burrs and dust from the face of the masonry
6. Fully bond external and internal corners and properly anchor intersecting wall.
7. Termination of Wall Height:
  - a. For the fire-rated walls, construct walls to finish against bottom of roof or floor deck and fill voids in fire stopping.
  - b. For other than fire-rated walls, cut units to match the slope of the roof deck and finish construction to within 2-inches of a parallel to roof deck.

8. Isolate masonry partitions from vertical structural framing members with the control joint.

### 3.05 TOLERANCES: Erect masonry within the following tolerances from specified dimensions:

#### A. Dimensions of Elements:

1. In cross-section or elevation: -1/4 inch, +1/2 inch.
2. Mortar joint thickness:
  - a. Bed: Plus or minus 1/8 inch or plus 1/8 inch.
  - b. Head: plus 3/8 inch or minus 1/4 inch.
  - c. Collar: plus 3/8 inch or minus 1/4 inch.
3. Grout space or cavity airspace except where passing framed construction: plus 3/8 inch or minus 1/4 inch.

#### B. Elements:

1. Variation from level:
  - a. Bed joints: plus or minus 1/4 inch in 10 feet; plus or minus 1/2 inch maximum.
  - b. Top of bearing walls: plus or minus 1/4 inch in 10 feet; plus or minus 1/2 inch maximum.
2. Variation from plumb: plus or minus 1/4 inch in 10 feet, plus or minus 3/8 inch in 20 feet, plus or minus 1/2 inch maximum.
3. True to line: plus or minus 1/4 inch in 10 feet; plus or minus 3/8 inch in 20 feet; plus or minus 1/2 inch maximum.
4. Alignment of columns and walls (bottom versus top):
  - a. Bearing: plus or minus 1/2 inch.
  - b. Non-bearing: Plus or minus 3/4 inch.

#### C. Location of Elements:

1. Indicated in plan: plus or minus 1/2 inch in 20 feet; plus or minus 3/4 inch maximum.
2. Indicated in elevation: plus or minus 1/4 inch in story height; plus or minus 3/4 inch maximum.

- D. Notification: If the above conditions cannot be met due to previous construction notify Architect/Owner's Representative.

### 3.06. CUTTING AND FITTING

- A. Coordination: Cut and fit for bearing plates, chases, pipes, and conduits, sleeves and grounds. Coordinate with other Sections of Work to provide correct size and shape.
- B. Notification: Prior to cutting and fitting any area not indicated or where appearance or strength of masonry work may be impaired, obtain approval from Architect/ Owner's Representative.
- C. Cutting Method: Perform jobsite cutting with proper tools to provide straight unchipped edges and take care to prevent raking masonry unit corners or edges.

### 3.07. REINFORCEMENT AND ANCHORAGES

#### A. Basin Requirements:

1. Place reinforcement and anchorages in accordance with the sizes, types, and locations indicated on the Drawings, and as specified.
2. Do not place dissimilar metals in contact with each other.

#### B. Details of Reinforcement:

1. Completely embed reinforcement in grout in accordance with Article 3.08.
2. Maintain clear distance between reinforcing bars and any face of masonry unit or formed surface:

- a. Not less than 1/4 inch for fine grout.
- b. Not less than 1/2 for coarse grout.
- 1. Splice only where indicated on Drawings, unless otherwise specified.
- 2. Do not bend reinforcing bars after embedded in grout.
- 3. Place vertical reinforcing bars supported and secured against displacement by means of bar positioners.
- 4. Support bars other than vertical bars and tie to prevent displacement.
- 5. Placement tolerances:
  - a. Tolerances for the placement of reinforcing bars:
    - i. 1/2 inch when the distance from the centerline of the reinforcing bar to the opposite outside face of the masonry, d, is 8 inches or less.
    - ii. 1 inch when the distance from the centerline of the reinforcing bar to the opposite outside face of the masonry, d, is 24 inches or less but more than 8 inches.
    - iii. 1-1/4 inch when the distance from the centerline of the reinforcing bar to the opposite outside face of the masonry is more than 24 inches.
  - b. Place vertical reinforcing bars within 2 inches of required location along the length of the wall.
  - c. If it is necessary to move bars more than one bar diameter of a distance exceeding the tolerances provided in Section 3.06.C.7.a. to avoid interference with other reinforcing bars, conduit, or embedded items, notify the Architect/Owner's Representative for the acceptance of the resulting arrangement of bars.

#### C. Joint Reinforcement:

- 1. Placement:
  - a. Install joint reinforcement at 16 inches on center vertically, except space at 8 inches on center in parapet walls and below finished floor unless otherwise indicated on Drawings.
  - b. Place joint reinforcement continuous in first bed joints below top of masonry wall and bed joint 8 inches below first bed joint below top of wall.
  - c. Place joint reinforcement so that longitudinal wire are embedded in mortar:
    - i. Minimum cover of 1/2 inch when not exposed to weather.
    - ii. Minimum cover of 5/8 inch when exposed to weather or earth.
  - d. Lap joint reinforcement ends minimum 6 inches.
  - e. Do not extend joint reinforcement through control joints.

#### D. Wall Ties:

- 1. Embed ends of wall ties in mortar joints at least 1/2 inch into outer face shell of hollow masonry construction.
- 2. Unless otherwise required, install adjustable wall ties in accordance with the following:
  - a. One tie for 1.77 sq. ft. of wall area.
  - b. Do not exceed 16 in. on center horizontally or vertically.
- 3. Install wire ties perpendicular to vertical line on the face of the wythe from which they protrude.
- 4. Unless otherwise provided, install additional unit ties around all openings larger than 16 inches in either dimension. Space ties around the opening at a maximum of 3 feet on center and place ties within 12 inches of the opening.

### 3.08. BUILT-IN AND EMBEDDED ITEMS AND ACCESSORIES

- A. Incorporation: As work progresses build in metal doorframes, fabricated metal frames, window frames, anchor bolts, diaphragm anchors, embedded plates, and other items in the work supplied in other Sections.
- B. Metal Door and Glazed Frames:
  - 1. Embed anchors in mortar joints.
  - 2. Fill frame void solid with grout.
  - 3. Fill masonry cores with grout minimum 12 inches from framed openings.
- C. Chases: Construct chases as masonry units are laid.
- D. Pipes and Conduits: When required, place pipes and conduits passing horizontally through masonry beams or walls in steel sleeves or cored holes.
  - 1. Place pipes and conduits passing horizontally through non-load-bearing partitions piers, pilasters, or columns.
  - 2. When required, place horizontal pipes and conduits in and parallel to the plane of the masonry wall.
- E. Accessories: Install and secure connectors, flashing, weep holes, mailing blocks, reglets and other accessories.
  - 1. Install reglet level and parallel to building lines. Set reglet as indicated on Drawings to coordinate with sloped roof surface.
- F. Organic Materials: Do not build in organic materials subject to deterioration.

### 3.09. GROUT PLACEMENT

- A. Placement:
  - 1. Place grout within 1-1/2 hours of introducing of mixing water and prior to initial set.
  - 2. Prevent grout from flowing onto or otherwise staining faces of CMU intended to be exposed.
- B. Confinement: Confine grout to the area indicated on the Drawings.
- C. Grout Pour Height: Use fine or coarse grout in accordance with requirements in Section 04070.
- D. Grout Life Height: Place grout in lifts not to exceed 5 feet.
- E. Consolidation: Consolidate grout at the time of placement.
  - 1. Consolidate grout pours 12 inches or less in height by mechanical vibration or puddling.
  - 2. Consolidate grout pours exceeding 12 inches in height by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.

### 3.10. BRACING

- A. Design and Installation: Design, provide and install bracing for walls, lintels and other masonry work that will assure stability of masonry during construction.
- B. Duration: Maintain bracing in place until roof or other structural elements are complete and provide permanent support.

### 3.11. MASONRY FILL INSULATION

- A. Install insulation in masonry unit cells of exterior walls.
- B. ICON
- C. Kor-Fil Foam
- D. Granular Fill Insulation:
  - 1. Verify that holes and openings have been sealed to prevent escape of insulation.
  - 2. Place masonry fill insulation in accordance with manufacturer's instruction.

3. Ensure spaces are free of mortar to allow free flow of insulation.
4. Place as masonry is erected, completely filling space. Place in lifts and rod to eliminate air pockets. Place prior to covering cores with bond beams or lintels.
5. Place temporary signs on face of insulated walls warning workers to use caution to prevent loss of insulation if cutting into walls.

### 3.12. LINTELS

#### A. Steel Lintels:

1. Install loose steel lintels as scheduled.
2. Provide 9 gage Z- ties at each vertical joint of soap units covering steel lintels. Weld Z- ties to web of steel lintel.

#### B. Concrete Masonry Lintels:

1. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled.
2. Construct lintels using grout fill and reinforcing.
  - a. Maintain minimum 8 inch bearing on each side of opening unless otherwise noted on Drawings.
  - b. Use reinforcing bars on one-piece lengths only.
  - c. Place and consolidate grout without disturbing reinforcing.
3. Allow lintels to reach strength before removing temporary supports.

### 3.13. MOVEMENT JOINTS

#### A. Control Joints:

1. Do not continue bond beams or joint reinforcing across control joints.
2. Install preformed control joint filler at locations indicated on Drawings.
3. Use proper size material to create sealant joint space.
4. Backer rod and sealant installed in accordance with Section 07900.

#### B. Expansion Joints:

1. Install expansion joint filler material on centerline of wall at locations indicated on Drawings.
2. Backer rod and sealant installed in accordance with Section 07900.

#### C. Seismic Joints:

1. Provide seal and cover at both faces of joint, as indicated on Drawings.
2. Secure seal to face of wall.
3. Provide un-faced batt insulation in cavity between exterior and interior seal.
4. Provide fire barrier blanket in cavity between exterior and interior seals of fire rated separation wall.

### 3.14 CLEANING

#### A. In-Progress Cleaning: clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints as described in Article 3.04.B.3.

#### B. Final Cleaning:

1. After mortar has set, reached initial curing; within 7 days of completion of work for custom masonry units, clean exposed masonry as follows:
2. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
3. Cut out any defective mortar joints and holes and re-point with mortar.
4. Protect non-masonry surfaces from contact with cleaning solution by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.



5. Clean Split Face units with proprietary masonry cleaner.
  - a. Materials:
    - i. Sure Klean Concrete Brick Cleaner by Prosoco, Kansas City, Missouri (800) 255-4255, diluted one part cleaning solution to at least 3 parts water.
    - b. Thoroughly wet surface of masonry.
    - c. Scrub using non-metallic brushes:
    - d. Immediately rinse with water.
    - e. Do small sections at a time.
    - f. Work from top to bottom.
6. Do not use high pressure cleaning methods.
  - a. Do not exceed nozzle pressure of 500 PSI.
  - b. Use water flow of at least 4 gallons per minutes.
  - c. Use at least 40 Degrees fan nozzle.
  - d. Keep nozzle at least 18 inches from face of Ultra Brick.
7. Cleaned surface shall appear as represented by mockup wall panel.

### 3.15. SEALING

1. Seal Split Face units with proprietary masonry cleaner.
  - a. Materials
    - i. Customer Masonry Sealer, by Prosoco, Kansas City, Missouri (800) 255-4255, follow manufacturer's recommendations for applying.

### 3.16. PROTECTIONS

- A. External Corners: Maintain protective boards at exposed external corners that may be damaged by construction activities.
  1. Provide protection without damaging work.
- B. Base of Walls: Protect the base of walls from rain-splashed mud and mortar droppings.

END OF SECTION



## SECTION 05500

## MISCELLANEOUS METAL

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Aluminum Finishes
- B. Shop Painting
- C. Miscellaneous
- D. Steel Door Frames
- E. Handrails
- F. Grating
- G. Access Stair

## 1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

## ALUMINUM ASSOCIATION (AA)

AA DAF-45 (Sep 1980, 7th Ed) Designation System  
for Aluminum Finishes

AA SAA-46 (Oct 1978, 5th Ed) Standards for  
Anodized Architectural Aluminum

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36 (1988c) Structural Steel

ASTM A 446 (1987) Steel Sheet, Zinc-Coated (Galvanized)  
by the Hot-Dip Process, Structural  
(Physical) Quality

ASTM A 475 (1978, R 1989) Zinc-Coated Steel Wire Strand

ASTM A 525 (1987) Steel Sheet, Zinc-Coated (Galvanized)

by the Hot-Dip Process

ASTM B 429

(1988) Aluminum-Alloy Extruded Structural  
Pipe and Tube

#### AMERICAN WELDING SOCIETY (AWS)

AWS D1.1

(1988) Structural Welding Code – Steel

#### NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM-01

(1988) Metal Finishes Manual for Architectural  
and Metal Products

### 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

### 1.4 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

### 1.5 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of Tnemec Series 46-465.

### 1.6 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true

alignment. Work shall be accurately set to establish lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

## 1.7 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

## PART 2 - PRODUCTS

### 2.1 ALUMINUM FINISHES

Unless otherwise specified, aluminum items shall have standard mill finish. The thickness of the coating shall be not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF-45. Items to be anodized shall receive a polished-satin-finish pretreatment and a clear-lacquer overcoating.

### 2.2 SHOP PAINTING

Surfaces of ferrous metal, except galvanized surfaces, shall be cleaned and shop coated with the standard protective coating Tnemec Series 37H77 Chem Prime. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to these Specifications.

### 2.3 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

### 2.4 STEEL DOOR FRAMES

Steel doorframes shall be neatly mitered and securely welded at the corners with all welds ground smooth. Jambs shall be provided with 2- by 1/4-by 12-inch bent metal anchors spaced not over 2 feet 6 inches on centers. Provision shall be made to stiffen the top member for all spans over 3 feet. Continuous doorstops shall be made of 1-1/2 by 5/8-inch bars.

### 2.5 HANDRAILS

Handrails shall conform to basic criteria as set forth in ADA, OSHA and Kentucky

## Building Code.

Top rail shall be as noted on plans Set 42" above finished walking surface. Kick plate shall be as noted. Vertical post along with intermediate rails use to be as noted on plans.

### 2.6 ALUMINUM GRATING (NOT USED)

Grating shall be aluminum of thickness noted on plans – Material shall be designed to withstand a load of 125 PSF with an impact load of 300 PSF. Securing shall be clips. Acceptable manufacturer is Ohio Grating Model 19-SGF-4/19 SGF 2.

### 2.7 ACCESS STAIR

Aluminum stair and handrail assembly shall be by "LAPEYRE" Stair Inc. New Orleans, LA 70150. Phone 1-800-535-7631.

Stair shall have an inclined angle of 68° with a floor to platform distance of 10 feet.

Compliance of stair to follow the codes –

A. Federal OSHA – 29 CFR part 1910, Vol. 55, No. 69 (April 10, 1990).

### 2.8 ALUMINUM HANDRAIL (NOT USED)

A. Handrail shall be the product of a company normally engaged in the sole manufacture of pipe railing. Railing shall be shop assembled in lengths not to exceed 24 feet for field erection.

B. Handrails shall be designed to withstand a 200 lb. concentrated load applied in any direction at any point on the top rail. Railing shall also be designed to withstand a load of 50 lbs. per foot applied horizontally to the top rail. The 200-lbs. load will not be applied simultaneously with the 50 lbs. per foot load. In addition, the rails shall be designed to withstand a load of 100 lbs. per foot applied vertically (right angles) downward to top rail and simultaneously with the 50 lbs. per foot horizontal load.

C. The manufacturer shall submit shop drawings and calculations to the Engineer for approval.

D. Vertical post spacing shall not exceed a maximum of 6 feet. All posts and railings shall be 1 1/2 inches Schedule 40 aluminum pipe alloy 6105-T5, ASTM-B-429 or ASTM-B-221. Spacing of horizontal railing shall comply with Kentucky Building code Section 1021.3, exception No. 2.

E. Handrail shall be made of pipes joined together with component fittings. Samples of all components, bases, toe plate and pipe shall be submitted for approval. One

sample of each shall be retained by the Engineer whereas the additional sample shall be returned to the fabricator. Components that are either glued or pop riveted at joints or connectors are not acceptable. All components shall be mechanically fastened with stainless steel hardware.

- F. Posts shall not interrupt the continuation of the top rail at any point along the length of the railing including corners and end termination (OSHA 1910.23). The top surface of the top railing shall be smooth and shall not be interrupted by projecting fittings.
- G. The midrail at corner returns shall be able to withstand a 200-lbs. load without coming undone. The manufacturer is to determine this dimension of its system and provide tests results from a testing laboratory to confirm compliance.
- H. Expansion bolts shall be spaced 10d apart and 5d edge distance for no reduction in pullout strength. A safety factor of 4 shall be used on expansion bolt pullout values published by the manufacturer. Expansion bolts shall be stainless steel type 303 wedge bolts and shall be furnished by the handrail manufacturer.
- I. Toe plates shall conform to OSHA and Kentucky Building Code Standards. Toe plate shall be a minimum of 4 inches high and shall be an extrusion that attaches to the posts with clamps which will allow for expansion and contraction between posts. Toe plates shall be set 1/4 inch above the walking surface. Toe plates shall be provided on handrails as required by Code and/or as shown on documents. Toe plates shall be shipped loose in stock lengths with pre-manufactured corners for field installation.
- J. Openings in the railing shall be guarded by a self-closing gate (OSHA 1910.23). Safety chairs shall be only used for temporary closure of openings where workmen are moving material or items onto or off platform. Once complete safety chain to be unhooked and gate placed back in service.
- K. Finish shall be Aluminum Association M10-C22-A41 (215-R1). The pipe shall be plastic wrapped and remain in place until all work has been completed.
- L. Aluminum surfaces in contact with concrete, grout, concrete masonry units or dissimilar metals shall be protected with mylar isolators, rubber gaskets or other approved material. Use of bituminous paint is strictly prohibited. Material selected must be resistant to chlorine.
- M. Acceptable manufacturer of aluminum railings is Thompson Fabricating Company, Birmingham, Alabama. Contact person Spencer Turner, 1-800-824-6182, Fax - (205) 841-0822 or approved equal.

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Item listed below requires additional procedures as specified.

### 3.2 DOOR FRAMES

Doorframes shall be secured to the floor slab by means of angle clips and expansion bolts. Continuous door stops shall be welded to the frame or tap-screwed with countersunk screws at no more than 18-inch centers, assuring in either case full contact with the frame. Any necessary reinforcements shall be made and the frames shall be drilled and tapped as required for hardware.

### 3.3 ACCESS STAIR

- A. Install aluminum stair per manufacturer's criteria.
- B. Where dissimilar metals or concrete come in contact with aluminum surfaces the aluminum shall be protected with mylar isolators, rubber gaskets or other approved material. Material selected must be resistant to chlorine. Use of bituminous paint is strictly prohibited.

### 3.4 ALUMINUM HANDRAIL

- A. Install aluminum handrail per manufacturer's specification. Steel walkway channel shall be field drilled to receive side-mounting bracket. After holes punched and drilled the exposed metal shall be given a heavy brush coat of paint same as already applied to metal. Allow paint too completely dry before assembly of handrail.

END OF SECTION



## SECTION 07210

## BUILDING INSULATION

## PART 1 - GENERAL

## 1.1 SECTION INCLUDES

- A. Wall Insulation.
- B. Ceiling Insulation.

## 1.2 RELATED SECTIONS

- A. Section 06100 – Rough Carpentry
- B. Section 13120 – Metal Building

## 1.3 REFERENCES

- A. ASTM-C 518 (1991) Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM-C 578 (1995) Rigid, Cellular Polystyrene Thermal Insulation.
- C. ASTM-C 665 (1994) Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM-E 84 (1996a) Surface Burning Characteristics of Building Materials.
- E. ASTM-E 96 (1995) Water Vapor Transmission of Material.

## 1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 – Submittals: Procedures for submittals.
- B. Include manufacturer's product brochures; component specifications of reinforced polyethylene vapor barrier fabric including a sample of a typical seam; specific drawings for the project showing purlin spacings,

support strap spacings, liner fabric sizes and locations; insulation thickness', sizes and locations; installation instructions.

#### 1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 – Submittals: Procedures for submittal.
- B. Manufacturer's Instruction: Indicate method of securing insulation in place.

#### 1.6 WORK INCLUDED:

- A. Interior liner fabric of the color specified, support strapping of the appropriate color, fasteners of the appropriate type and color, sealants, thermal break materials and thermal insulation of the appropriate type to insulate the roof and wall areas to the full designed R-value of the building as specified.
- B. Warranty: Submit manufacturer's standard warranty for product.

#### 1.7 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 – Project Closeout.
- B. Warranty: Submit manufacturer's standard warrant for product.

#### 1.8 QUALITY CONTROL

- A. Provide the materials in original manufacturer packages together with detailed instructions and shop drawings typical of the installation. Materials shall be inspected for damage, proper sizes, and quantities upon delivery and then stored in a dry, secure manner. Installation shall proceed with care to assure proper sealing of the liner fabric. Insulation shall be placed on (ceiling) or behind (walls) the liner fabric in the full-specified thickness without voids or compression. Notify Thermal Design Inc. immediately of any damages, improper sizes or shortages. No changes or substitutions will be allowed unless submitted at least 10 days prior to bid date. Substitutions of systems that do not have a continuous vapor barrier on the inside plane of the purlins or girts will not be allowed. Purlins, girts and insulation must be completely isolated from the inside conditioned air with the vapor barrier. Taping or stapling of vapor barrier lap joints in not acceptable. Sealing field joints with permanent vapor barrier lap sealant is required. All field seams shall be at a structural member.
- B. All exposed parts of the system shall have flame spread of 25 or less and smoke developed value of 50 or less based on ASTM E-84 standards. Vapor barrier fabric shall be opaque white or colored woven reinforced polyethylene with extrusion welded seams fabricated in one piece, to fit not less than the full by length by the width of the building. Buildings more than 100' wide may have

field seams on the bottom of a ridge purlin or no less than 50' apart. All field seams must be sealed with vapor barrier lap sealant. Wall bay minimum fabric size shall be not less than one entire wall bay or end wall column space from ceiling to floor. Perimeter edges of the vapor barrier fabric shall be trimmed and sealed to the adjoining steel or fabric with vapor barrier lap sealant. All edges of liner fabric shall be mechanically fastened with steel retaining straps the full perimeter unless noted otherwise in the installation instructions.

- C. Applicator of insulation system shall be experienced in the installation of the "Simple-Saver" Insulation system. Unqualified applicators will not be acceptable. Company specializing in the application of this system for a minimum of five (5) years is a basic requirement.

## 1.9 QUALITY ASSURANCE

- A. Manufacturing company listed as Thermal Design, Inc., Madison, Wisconsin. Phone: 1-800-255-0776. Suppliers of Insulation system "Simple Saver System".
- B. Other systems of exactly same type of system but not equal shall be considered.

## 1.10 DELIVERY, STORAGE AND PROTECTION

- A. Section 01600 – Material and Accessories: Transport, handle, store and protect products.
- B. Store material inside, off ground and out of weather.

## 1.11 WARRANTY

- A. Provide standard one-year warranty on products after final acceptance of job.

## PART 2 - PRODUCTS

### 2.1 INSULATION - GENERAL

- A. Acceptable systems shall be the Simple Saver insulation system manufactured by Termal Design Inc. with a roof insulation R-value of 25 and a n installed thickness of 8 inches. Roof system shall be a double layer system. A thermal break shall be applied OR a thermal block shall be applied where there is no existing thermal break. The Thermal break shall be 1" Snap-R™ thermal block. Minimum "in-place" insulation R-value of wall insulation shall be R-25 and an installed thickness of 8 inches. System Components shall meet the following minimum specifications:
  1. STEEL TRAP: 316 SS painted the specified color on the exposed side. Minimum size shall be 0.015 x ¾" x continuous length. The strap color

shall be: (selection by owner) white, sky blue, mauve, beige, pale yellow, mint green, silver aspen. Black, bronze, royal blue, and other colors are available in plain painted steel (not galvanized). NOTE: Stainless steel and woven polyester plastic strapping are available for special uses.

2. FASTENERS: #12 x ¾” plated Tek 2 screws painted to match the specified color for light gauge steel (up to 12 GA purlins). #12 x 1-1/4” plated Tek 4 screws, painted to match the specified color for heavier gauge steel (up to 3/8” purlins/bar joist). All fasteners shall be 3/6 SS.
3. SIMPLE SAVER LINER FABRIC: Shall be woven reinforced high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film. The fabric grade for the ceiling shall be: (Simple Saver Plus White. The fabric shall have a flame spread index of 25 or less and smoke density index of 50 or less based on ASTM E-84 test standards. Pieces shall be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on job site. Fabric shall be folded to allow for rapid pullout on the strap support system. Color for ceiling fabric shall be selected by Owner. Color for wall fabric shall be selected by Owner. Liner fabric perm rating shall be 0.025 grains/hr. sq. feet (based on ASTM E-96, procedure B, “non-inverted water method”).
4. SEALANTS: Shall be extruded fast-tack solvent-based vapor barrier sealant, synthetic rubber adhesive for sealing vapor barrier laps and/or pressure sensitive ¾” wide by 1/32” thick extruded vapor barrier sealant by Insulation System supplier.
5. INSULATION: Shall be fiberglass blanket or batt insulation meeting Federal specifications HH-1-588B, Form B, Type 1.
6. INSULATION HANGERS: Shall be by system supplier for supporting insulation between wall girts and roof purlins if roof pitch is over 4:12.
7. THERMAL BREAK (BLOCK): Thermal break shall be: 1” polystyrene Snap-R thermal block. The selection shall be provided as thermal break where there is no existing thermal break.

## PART 3 - EXECUTION

### 3.1 INSTALLATION - GENERAL

- A. SIMPLE SAVER ROOF SYSTEMS: Cut to length and install painted steel straps in the pattern and spacings as shown on the project shop drawings. The straps are installed in tension and span immediately below the bottom plane of the purlins. Position the pre-folded vapor barrier fabric on the strap platform along one eave

purlin. Clamp the two bottom corners at the eave and also centered on the bay. Pull the other end of the pleat folded fabric across the building width on the strap platform but below the purlins, pausing only at the ridge to fasten the straps and fabric in position where the plane of the roof changes and to release temporary fasteners on the opposite ridge purlin. Once positioned, the fasteners are installed from the bottom side at each strap-purlin intersection and the edges are trimmed and sealed along the rafters. A similar method can be used starting at the ridge purlin space and pulling the fabric to each eave.

- B. **SIMPLE SAVER WALL SYSTEMS:** Sheet the building with just the thermal break (if specified) applied to the exterior of the girts. Insulation is cut to required lengths to fit vertically between the first and installed in the girt spaces by FAST-R hangers or other suitable means. Pre-cut insulation shall be neatly positioned in place and firmly pressed onto the FAST-R hangers. Fluff the insulation to exceed the specified thickness making sure there are no gaps or voids. Insulate the wall section and apply the wall vapor barrier fabric by clamping it in position over an eave strap. Once in position, the fasteners are installed through the wall strap, eave strap and onto each roof strap, permanently clamping the wall fabric between them. Seal the wall fabric to the roof fabric, to the base angle or cee and up the columns. Additional vertical straps are installed along each column and fastened at each girt to retain the system permanently in place.
- C. A complete set of installation instructions are to be kept at job site.

END OF SECTION



SECTION 08110

STEEL DOORS AND FRAMES

1 PART 1 GENERAL

1.1 WORK INCLUDED

- A. General Requirements for Doors and Frames
- B. Thermal Insulated Doors

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

- ASTM E 84 (2000) Surface Burning Characteristics of Building Materials
- ASTM E 283 (1991) Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors

**DOOR AND HARDWARE INSTITUTE (DHI)**

- DHI-A115.1G (1994) Installation Guide for Doors and Hardware

**NATIONAL ASSN OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)**

- NAAMM HMMA 840 (1999) Hollow Metal Manual, Section: Installation and Storage of Hollow Metal Doors and Frames.

**STEEL DOOR INSTITUTE (SDOI)**

- SDOI 100 (1991) Standard Steel Doors and Frames
- SDOI 106 (1999) Recommended Door Type Nomenclature
- SDOI 107 (1997) Hardware on Steel Doors

1.3 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01300 SUBMITTALS:

1. Detail Drawings

Detail drawings shall be submitted. Detail drawings shall use standard door type nomenclature in accordance with SDOI 106 and shall indicate the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of struts and anchors for frames, and thickness of metal. Detail drawings shall include catalog cuts or descriptive data for the weather-stripping.

2. Certificates of Compliance

Certification of Sound and Thermal Insulating Rating: Certification or test report for sound rated and thermal insulated doors shall be submitted to show compliance with the specified requirements. The certification, or test report, shall list the parameters and the type of hardware and perimeter seals used to achieve the rating.

#### 1.4 DELIVERY AND STORAGE

- A. To provide protection during shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting good air circulation. Doors and assembled frames shall be stored in an upright position. Whenever damage becomes evident, abraded, scarred, or rusty areas shall be cleaned and touched up with the paint used for the shop painting.

## 2 PART 2 PRODUCTS

### 2.1 GENERAL REQUIREMENTS FOR DOORS AND FRAMES

- A. Doors and frames shall be factory fabricated conforming to SDOI 100 and the additional requirements specified herein. Door grade shall be standard heavy duty 18 gage unless otherwise indicated. Frames shall be extra heavy duty 16 gage. Exterior doors and frames shall be galvanized. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under this Section. Rubber silencers shall be installed into factory pre-drilled holes in doorframes; adhesively applied silencers are not acceptable. Where frames are installed in masonry walls, plaster guards shall be provided on doorframes at hinges and strikes. The Contractor shall coordinate between the hardware and door suppliers to assure that reinforcing of door assemblies for



closers and other required hardware shall conform to SDOI 100 and the conditions of listing when applicable. Exterior doors shall have top edges closed flush and sealed against water penetration.

1. Weatherstripping

Unless otherwise noted, weather-stripping shall be as specified below. Weatherstripping for head and jamb protection shall be an elastomeric type of synthetic rubber, vinyl, or neoprene standard the manufacturer of the doorframe. The weatherstripping shall be installed at the factory or on the jobsite in accordance with the doorframe manufacturer's recommendations. Weatherstripping for bottom of doors shall be of the mounted sweep type consisting of 1/8-inch thick neoprene or spring tension type of bronze or corrosion resisting steel on an extruded aluminum or bronze bar. Spring bronze shall be not less than 0.008-inch thick and corrosion-resisting steel not less than 0.005-inch thick.

2.2 THERMAL INSULATED DOORS

- A. Interior of thermal insulated doors shall be completely filled with rigid foamed-in-place polyurethane or precured polystyrene foamed board, permanently bonded to each face panel. The U-value through the door shall not exceed .24. The door assembly, consisting of door frame, and perimeter seals, shall have an air infiltration rate not greater than 0.20 cubic feet per minute per foot of crack length when tested in accordance with ASTM E 283. Doors with cellular plastic cores shall have a flame spread rating of not more than 75 and a smoke development factor of not more than 150 when tested in accordance with ASTM E 84.

2.3 HARDWARE

- A. Hinges for exterior doors; full mortise 4½" x 4¼" template steel butts; ball bearings; 1-1/2 pair, manufacturer's standard product.
- B. Cylinder locksets for exterior doors; provided by Contractor. (Latch bolt operated by knobs each side. Dead bolt operated by key from outside and turn knob from inside) to be provided by Contractor.
- C. Coordinate keying with Owner. Contractor shall furnish (3) three sets of keys for all doors.
- D. Door closures shall be surface mounted, liquid checking, rack and pinion type; cast iron or non-ferrous case; non-gumming, non-evaporative liquid unaffected by extreme temperatures; without hold-open feature; manufacturer's standard product suitable for use on a doors as indicated on Plans.

- E. Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Stops to match existing where possible.

### 2.3 HARDWARE MOUNTING HEIGHTS

- A. Mount hardware units at heights recommended in "Recommended Locations for Builders' Hardware" by NBHA, except as may be otherwise directed by the Engineer.
- B. Installation: Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware into or onto surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes reinstall each item. Do not install surface mounted items until finishes have been completed on the substrate. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite-type if not other recommended). Replace units which cannot be readjusted and lubricated to operate freely and smoothly as intended for the application made.

### 2.4 MANUFACTURER

Numbers given in schedule are of the following manufacturers:

<u>Mfg. Product</u>	<u>Specified</u>	<u>Acceptable Substitutes</u>
Hinges	Hager	McKinney; Stanley
Locks	Yale	
Mortise Bolts	Trimco	Baldwin; Ives
Closers	LCN	Norton
Thresholds	National Guard	Reese, Rixon, Zero
Weather-stripping	National Guard	Reese, Stanley
Door Stops	Glynn Johnson	Ives, Trimco

### 2.5 HARDWARE SCHEDULE

Set 1:

3 ea.	Hinge	BB1191NRP 4.5 x 4.5 26D
1 ea.	Lockset	CA 5407 x US26D
1 ea.	Closer	4114 - 1
1 ea.	Door Stop	GJFB 19
1 ea.	Threshold	883 x 36" x WS & PS
1 ea.	Weather-strip	PF181 x 17'

### 3 PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Installation shall conform to DHI-A115.1G, The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builders Hardware. Steel doors and frames shall be reinforced, drilled, and tapped to receive mortised hinges, locks, latches, flush bolts, and closers as required. Preparation for hardware shall be in accordance with SDOI 107. Weatherstripping shall be installed at exterior door openings to provide a weather-tight installation.

#### 3.2 THERMAL INSULATED DOORS

- A. Hardware and perimeter seals shall be adjusted for proper operation.

END OF SECTION



## SECTION 08700

## HARDWARE; BUILDERS' (GENERAL PURPOSE)

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

Locks and Latches

Architectural Door Trim

Exit Devices and Exit Device Accessories

Door Controls - Overhead Holders

Auxiliary Hardware

Hinges

Miscellaneous

Finishes

Fastenings

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## BUILDERS HARDWARE MANUFACTURERS ASSN (BHMA)

BHMA-01	(Effective through Jun 1989) Directory of Certified Locks & Latches
BHMA-02	(Effective through Jul 1988) Directory of Certified Door Closers
BHMA A156.1	(1988) Butts and Hinges
BHMA A156.2	(1983) Bored and Preassembled Locks and Latches
BHMA A156.3	(1984) Exit Devices
BHMA A156.4	(1986) Door Controls - Closers

BHMA A156.5	(1984) Auxiliary Locks & Associated Products
BHMA A156.6	(1986) Architectural Door Trim
BHMA A156.7	(1988) Template Hinge Dimensions
BHMA A156.8	(1988) Door Controls - Overhead Holders
BHMA A156.13	(1987) Mortise Locks & Latches
BHMA A156.15	(1986) Closer Holder Release Devices
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.17	(1987) Self-Closing Hinges and Pivots
BHMA A156.18	(1987) Materials and Finishes

#### DOOR AND HARDWARE INSTITUTE (DHI)

DHI 115.1	(1982) Standard Steel Door and Steel Frame Preparation for Mortise Locks for 1-3/8" and 1-3/4" Doors
DHI 115.2	(1980) Door and Frame Preparation for Bored Locks
DHI-02	(1986) Installation Guide for Doors and Hardware
DHI-03	(1978) Keying - Procedures, Systems and Nomenclature
DHI-04	(1976) Recommended Locations for Builders' Hardware for Custom Steel Door and Frames
DHI-05	(1975) Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames

#### FEDERAL SPECIFICATIONS (FS)

FS FF-P-110	Padlocks
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#### NATIONAL FIRE PROTECTION ASSN (NFPA)

NFPA 80	(1986) Fire Doors and Windows
NFPA 101	(1988) Code for Safety to Life from Fire in Buildings and Structures

NFPA 105 (1989; Int Am 89-1) Installation of Smoke - and Draft-Control Door Assemblies

### 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01300 SUBMITTALS:

**\*SD-55, Layout Schedules\***

A. Hardware schedule listing all items to be furnished shall be submitted for approval. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; sizes; detail information or catalog cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

B. Keying schedule shall be developed in accordance with DHI-03 and shall be submitted for approval.

**\*SD-76, Certificates of Compliance\***

Certificates of compliance attesting that hardware items conform to the standards under which the items are specified shall be submitted. A statement that the proposed hardware items appear in BHMA-01 and BHMA-02 directories of certified products may be submitted in lieu of certificates. A separate certificate of compliance attesting that hardware items conform to "The Buy American Act" shall be submitted.

**\*SD-80, Operation and Maintenance Manuals\***

The Contractor shall furnish to the Owner six complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions for electronic locking devices and electro-magnetic closer holder release devices shall include simplified diagrams as installed.

**\*SD-92, Spare Parts Data\***

After approval of the detail drawings, and not later than 3 month(s) prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for locksets, exit devices, closers, electronic locking devices, and electro-magnetic closer holder release devices. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

### 1.4 GENERAL

Hardware shall conform to the requirements specified herein and the HARDWARE

SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

#### 1.5 PACKAGING, MARKING, AND LABELING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule.

#### 1.6 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

#### 1.7 KEYING

Locks shall be keyed in sets or subsets as scheduled. Locks shall be furnished with the manufacturer's standard construction key system. Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks:	2 change keys each lock.
Blank keys:	10 total

The keys shall be furnished to the Owner arranged in a container in sets or subsets as scheduled.

#### 1.8 SPECIAL TOOLS

Special tools shall be provided, such as spanner and socket wrenches and dogging keys, required to adjust hardware items.

### PART 2 - PRODUCTS

#### 2.1 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks shall be the products of a single manufacturer. Lock fronts for double-acting doors shall be rounded. Lock and latch set trim, knobs, handles, roses and escutcheons shall be of a simple design in accordance with manufacturers standard practice. Knob diameter shall be 2-1/8 to 2-1/4 inches.



A. Mortise Locks and Latchsets

Mortise lock and latchsets shall be series 1000 and shall conform to BHMA A156.13, Grade 1. Strikes for all mortise locks and latches, including deadlocks, shall conform to DHI 115.1. Mortise-type locks and latches for doors 1-3/4 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door. Mortise locks shall have armored fronts.

B. Bored Lock and Latchsets

Bored lock and latchsets shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Strikes for bored locks and latches shall conform to DHI 115.2. Bored-type locks and latches for doors 1-3/8 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

C. Auxiliary Locks and Associated Products

Bored and mortise deadlocks and latchsets, narrow style locks, rim locks, electric strikes and exit alarms and/or locks shall conform to BHMA A156.5. Strike boxes shall be furnished with dead bolt and latch strikes for Grade 1.

D. Lock Cylinders (Mortise, Rim and Bored)

Lock cylinders shall comply with BHMA A156.5. Lock cylinder shall have not less than six pins. Disassembly of knob or lockset shall not be required to remove core from lockset.

E. Padlocks

Padlocks shall conform to FS FF-P-110.

F. Lock Trim

Lock trim shall be cast, forged, or heavy wrought construction of commercial plain design. In addition to meeting the test requirements of BHMA A156.2 or BHMA A156.13, knobs, roses, and escutcheons shall be 0.050 inch thick if unreinforced. If reinforced, the outer shell shall be 0.035 inch thick and the combined thickness shall be 0.070 inch, except that knob shanks shall be 0.060 inch thick.

2.2 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

A. Armor Plates

Armor plates shall be category J100, stainless steel, 36 inches in height, and 2 inches less in width than the width of the door for single doors and 1 inch less for pairs of doors.

B. Combination Push-Pull Plates

Combination push-pull plates shall be Category J300, 1/8 inch minimum stainless steel beveled four edges.

C. Kick Plates

Kick plates shall be Category J100, stainless steel. Width of plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Height shall be 10 inches except where the bottom rail is less than 10 inches, the plate shall extend to within 1/2 inch of the panel mold or glass bead.

2.3 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3

A. Exit Devices and Auxiliary Items

Trim shall be of wrought construction and commercial plain design with straight, beveled, or smoothly rounded sides, corners, and edges. Adjustable strikes shall be provided for rim type and vertical rod devices. Open back strikes shall be provided for pairs of doors with mortise and vertical rod devices; except open back strikes shall be used on labeled doors only where specifically provided for in the published listings. Touch bars shall be provided in lieu of conventional crossbars and arms. Escutcheons shall be provided not less than 7 by 2-1/4 inches. Escutcheons will be cut to suit cylinders and operating trim.

2.4 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7.

A. Hinges for Reverse Bevel Doors with Locks

Hinges for reverse bevel doors with locks shall have pins that are made non-removable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

B. Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

C. Pivot Hinges

Pivot hinges shall conform to BHMA A156.4.

2.5 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified.

A. Surface Type Closers

Surface type closures shall be Series C01000 with options PT-4C and PT-4D. Except as otherwise specified, sizes of the door closures furnished shall conform to the manufacturer's published recommendations. Closers for out swinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.

2.6 MISCELLANEOUS

A. Metal Thresholds

Thresholds for exterior doors shall be extruded aluminum of the type as indicated and shall provide proper clearance and an effective seal with specified weather stripping.

B. Rain Drips

Extruded aluminum, not less than 0.07 inch thick, [mill finished] [clear anodized] [bronze anodized] [painted]. Door sill rain drips shall be 1-1/2 inches to 1-3/4 inches high by 5/8-inch projection. Overhead rain drips shall be approximately 1-1/2 inches high by 2-1/2 inches projection and shall extend 2 inches on either side of the door opening width.

C. Aluminum Housed Type Weatherseals

Weatherseals of the type as indicated shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane or vinyl brush inserts. Aluminum shall be [clear (natural)] [bronze] anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions.

2.7 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18.

Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

## 2.8 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be one-way or other approved tamperproof type.

## PART 3 - EXECUTION

### 3.1 APPLICATION

Hardware shall be located in accordance with DHI-04 and DHI-05. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI-02. Door control devices for exterior doors such as closures and holders, shall normally attach to doors with through bolts such as sex bolts and nuts.

#### A. Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

#### B. Kick Plates

Kick plates shall be installed on the push side of single-acting doors

#### C. Thresholds

Exterior thresholds shall be installed in a bed of sealant with stainless steel screws and expansion shields. Minimum screw size shall be No. 10, length dependent on job conditions.

#### D. Rain Drips

Door sill rain drips shall align with the bottom edge of the door. Overhead rain drips shall align with bottom edge of door frame rabbit. Drips shall be set in sealant and fastened with stainless steel screws.

E. Weatherseals

Weatherseals shall be located as indicated snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

END OF SECTION



## SECTION 09900

PROTECTIVE COATINGS AND PAINTING  
PUMP STATIONS AND VALVE VAULTS

## PART 1 - GENERAL

- A. The Contractor shall furnish all labor and materials to complete preparation of surfaces, protective coating application, painting and complete clean up of all new materials. Included in this work are concrete, masonry, metal and wood as specified herein.

## PART 2 - PRODUCTS

## 2.01 MATERIALS AND APPLICATION

- A. The paint and paint products shall be Tnemec. Substitutions are not allowed. Should there be questions about coating application by the Project Engineer or his representatives the Engineer shall request the Contractor to conduct tests to determine the final film thickness. Cost of tests to be by Contractor.
- B. If thinning is necessary or desired for any application, the coating applied shall be built up to the same thickness specified with undiluted material. When thinning is desired, approval and inspection by the Project Engineer is required. When thinning is approved, only those products of the manufacturer supplying coating, for the particular thinning purpose shall be permitted. Thinning shall be done strictly in accordance with the manufacturer's instruction.
- C. Paint and coating shall be applied to substances with ambient and substrate temperature no less than five (5)°F above those temperatures recommended by the paint manufacturer. Paint and coatings shall not be applied if relative humidity exceeds 85%.
- D. ALL SURFACES SHALL BE PREPARED SO THEY ARE SMOOTH, CLEAN AND DRY. PAINT SHALL NOT BE APPLIED UNTIL THE PREPARED SURFACES ARE APPROVED BY THE PROJECT ENGINEER.

Surface preparation methods in the field shall include one or more of the following:

Sand Blasting (dry) SSPC-10	Solvent Cleaning
Brush Blasting	Power Tool Cleaning
Wet Sand Blasting	
Detergent Cleaning	
Galvanized Metal - Trisodium phosphate with water	

Approval of the surface preparation method shall be as directed by the Project Engineer subsequent to inspection of such substrate.

- E. All ferrous metal to be primed in the shop shall have all rust, dust and scale, as well as all other foreign substances, removed by sandblasting. Cleaned metal shall be primed immediately after cleaning to prevent new rusting. All ferrous metals not primed in the shop shall be sandblasted in the field prior to the application of the primer, pre-treatment or paint. Ferrous metal portions of stored equipment shall have all rust, dust and scale, as well as all other foreign substances removed by sandblasting. The aforementioned sandblasting shall be SSPC- 10 specification. All metals, whether to be shop or field primed, shall be wiped with a tack rag as required by the Project Engineer, prior to the application of the pre-treatment and/or primer.
- F. All concrete surfaces shall be cleaned of all dust, form oil, curing compounds and materials added while rubbing and other foreign matter. Concrete block masonry shall have all efflorescence, dirt, rust, oil and grease removed. Prior to applying the first coat, any nails, wire or other exposed metal shall be cleaned and spot primed.
- G. Wood surfaces shall be thoroughly cleaned and free of all foreign matter with cracks, nail holes and other defects properly filled with putty, colored to match the approved finish and smoothed. Knots and pitch streaks shall be sealed before applying primer. Sanding with the grain of the wood shall be done to effect a finish and then wiped clean with tack rags and thinner.
- H. Drying time between coats shall be in strict accordance with the paint manufacturer's detailed instructions.
- I. One (1) gallon of coating as originally furnished by the manufacturer, must not cover a greater square foot area than instructed by the manufacturer's label, no matter what method of application is chosen. Deficiencies in film thickness shall be corrected by the application of an additional coat(s) of paint. On masonry, application rates will vary according to the surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the contractor's responsibility to achieve a protection and decorative finish either by decreasing the coverage rate or by applying additional coats of paint. When non-ferrous substrates are coated, the contractor shall inform the Project Engineer in writing and twenty-four (24) hours in advance to assure the quantity of coating applied to a given substrate.
- J. The Contractor shall paint all new equipment and piping with a finish coat.
- K. All existing structures, equipment, and piping which is to remain on-site will be prepared as stated previously and repainted with new structures, equipment, and piping. Existing paint and rust is to be removed and the surfaces inspected by the Project Engineer before new primer and paint is applied.



## L. COATING SYSTEMS FOR POROUS CONCRETE MASONRY UNITS

1. Exterior Exposed:
  - a. System Type: Acrylate.
  - b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
  - c. Primer: Series 156 Enviro-Crete. Spreading rate 80 to 100 sq. ft/gal.
  - d. Finish Coat: Series 156 Enviro-Crete. Spreading rate 125 sq. ft/gal.
  
2. Interior Exposed:
  - a. System Type: Cementious Acrylic/epoxy.
  - b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
  - c. Primer: Series 130 Masonry Filler. Spreading rate 80 to 100 sq. ft/gal.
  - d. Intermediate Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
  - e. Finish Coat: Series N69 Hi-Build Epoxoline II. DFT 2.0 to 3.0 mils.
  - f. Total DFT: 4.0 to 6.0 mils plus filler.
  
3. H2S Gas Exposed:
  - a. System Type: Perma-Shield H2S/Perma-Glaze.
  - b. Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
  - c. Primer: Series 130 Masonry Filler. Spreading rate 80 to 100 sq. ft/gal.
  - d. First Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
  - e. Finish Coat: Series 435 Perma-Glaze. DFT 15.0 to 20.0 mils.
  - f. Total DFT: 30.0 to 40.0 mils plus filler.

## PART 3 - EXECUTION

### 3.01 PROTECTION AND CLEANING

- A. Before painting is started in an area, finish carpentry including corrections and adjustments, shall have been completed, the building cleaned of all debris, thoroughly broom cleaned and dusted out.
  
- B. Door knobs and escutcheons, before painting is begun, shall be protected either by covering them with cloth or by removal from the doors. Electrical switch plates, receptacle covers and thermostat covers shall be removed prior to the application of paint. These covers shall not be replaced until the final coat of paint is thoroughly dry and inspected. All paint spills and splatters shall be removed, and care must be exercised to avoid paint splatters on adjoining work and materials. At the completion of the painting, all unpainted work must be left free from paint marks of any kind and any markings or scratches on painted work shall be retouched.
  
- C. All abutting joints of dissimilar materials, door frames, metal and plastic attached to and installed in concrete, as well as other seams and joints selected by the Project Engineer, shall be caulked as per Project Engineer.

### 3.02 WORKMANSHIP

- A. Before commencing work on surfaces of any type, the Contractor shall carefully inspect same and satisfy that they are dry and in all other respects suitable to receive the specified treatment. If the condition of any surface is such that it cannot be made, the Contractor shall not undertake surface preparation until corrections have been made which will provide acceptable surface.
- B. Application of any coating to a surface will constitute acceptance of the surface by the Contractor. If, after treatment, the completed finish (or any portion thereof) blisters, cracks, peels or otherwise shows indication of dampness or other irregular conditions or surface, the Contractor shall, at his own expense, remove the applied treatment and refinish the part affected, to the satisfaction of the Project Engineer. The Contractor shall determine dryness of all moisture-holding materials by use of a reliable electronic moisture meter. Moisture test results shall be forwarded to the Project Engineer in writing.
- C. Each coat of material applied must be inspected and approved by the Project Engineer before the application of the succeeding specified coat; otherwise, no credit for the concealed coat will be given, and the Contractor shall assume the responsibility to re-coat the work in question.
- D. All work shall be done by skilled painters and all workmanship shall be of the highest quality, developing to the fullest the possibility of the materials and the process specified.
- E. Materials shall be thoroughly stirred and evenly spread without runs, skips, sags, streaks, brush marks or other defects. Paint shall be cut sharply to lines. Care shall be exercised to avoid lapping of paint over hardware.
- G. Tops and bottoms of all metal doors shall have at least three (3) finish coats.
- H. All materials which have been shop-primed shall be properly prepared and spot primed in the field where necessary, before the field prime coat is applied.
- I. All equipment which arrives with a damaged finish coat will be spot primed and then patched, if homogeneity can be achieved, or it must be repainted completely. Any like equipment shall also be re-painted to match the newly repainted equipment, as determined by the Project Engineer. The color shall be similar to the original color, as determined by the Project Engineer. Field painting must match the original paint system.

### 3.03 CONCRETE SEALING

After proper surface preparation, concrete work not painted shall be given one (1) coat of water

sealing material. This material shall be Tnemec Prime A Pell 200 or equal.

#### 3.04 SURFACE PREPARATION OF POROUS MASONARY UNITS

- A. The CONTRACTOR shall prepare porous concrete masonry unit surfaces in accordance with manufacturer's instructions and SSPC-SP 13/NACE 6.
- B. The CONTRACTOR shall ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
- C. The CONTRACTOR shall allow mortar to cure for a minimum of 28 days before coating.
- D. The CONTRACTOR shall level protrusions and mortar spatter.

#### 3.05 FERROUS METAL PRIMERS

- A. Pipe, valves and appurtenances not buried in the ground shall be shop-primed with Tnemec 37H-77 Chem Prime or equal at a minimum rate of 2.0 - 3.0 mils dry film thickness. Field prime coating shall be Tnemec high build epoxy 66 or equal applied at 2.0 - 3.0 mils dry film thickness. No coating shall be applied until proper surface preparation is completed.
- B. Buried pipes, valves and appurtenances shall be shop-primed with Tnemec 37H-77 Chem Prime or equal, 2.0 - 3.0 mils dry film thickness. No coating shall be applied until proper surface preparation is completed.

#### 3.06 FERROUS METAL FINISH COATING

In addition to the above primers, the Contractor shall complete the following:

- A. Pipe, valves and appurtenances not buried in the ground and not exposed to direct (outdoors) sunlight shall be given a field finish coat of Tnemec high build epoxy 66 or equal system at 3 mils dry film thickness. No coating shall be applied until proper preparation is completed. Pipes, valves and appurtenances installed outdoors shall be finished as outlined for non-submerged ferrous material.
- B. Buried pipes, valves and appurtenances shall be given two (2) field finish coats of Tnemec 46H-413 coal tar epoxy or equal at the rate of 8.0 mils dry thickness per coat. No coating shall be applied until proper surface preparation is completed.

#### 3.07 PIPING MARKERS AND SAFETY SIGNS

- A. The piping markers shall be formed from laminated plastic capable of withstanding normal washing to remove grease, oil, chemicals, etc. without discoloration, loss of

gloss, staining, or other damage. All printing shall be sealed with butyrate plastic film. For pipe smaller than 3/4-inch in diameter, provide brass tags 1-1/2 inches in diameter with depressed 1/4-inch black-filled letters above 1/2-inch high black filled letters. Markers for pipe 3/4-inch to 6 inches in diameter, inclusive, shall be pre-formed to completely wrap around the pipe requiring no adhesives. Markers for pipe larger than 6 inches in diameter shall be pre-formed to the contour of the pipe and held in place with stainless steel spring fasteners. The size of lettering on each marker shall conform to ANSI A13.1. Each marker shall contain a descriptive legend as shown in the Pipe and Sign Color Schedule and a flow direction arrow.

- B. The markers shall be located adjacent to each valve and "tee", at each branch and riser takeoff, at each wall, floor and ceiling penetration, and at 25-foot intervals of horizontal piping. Manufacturers shall be the W.H. Brady Company, Seton Name Plate Corporation, or approved equal.

### 3.08 PAINTING SCHEDULE

- A. The following table lists the type of surface, generic coating, type of coating and the minimum coats of paint. The Owner will select colors to be used on this project relating to pump house structure. All piping colors are established by ANSI.

#### B. PAINT SCHEDULE AT PUMP HOUSE

TYPE OF SURFACE	GENERIC TYPE	NO. OF COATS	MIN. DRY, MILS. THICK PER COAT REFERENCE	TNEMEC PAINT NO.	TNEMEC PRIMER NO.
Block- Interior	Waterborne acrylic	1	80-100 sq. ft./gal.		Series 130 Envirofil
Block-Exterior	Waterborne Elastomeric	1	60-80 sq. ft./gal.		Series 156 Elatoshield
Block-Interior	Waterborne acrylic epoxy	2	4 per coat	Series 113 Tenemec Tufcoat	
Block-Exterior	Waterborne Elastomeric	2	150 sq. ft./ gal.		156 Elatoshield
Plywood & other interior wood surfaces	Primer.	1	2		Series 51 undercoat
	Finish.	2	2 per coat	Series 113 Tenemec Tufcoat	
Ferrous Metal Door Frames & HM Doors	Primer	1	2	Series 73, 74	Series 66
	Finish	2	2 per coat	or 75 Endura Shield	

## PIPE AND SIGN COLOR SCHEDULE

PIPE AND  
DESCRIPTIVE

<u>LEGEND</u>	<u>COLOR</u>	<u>LETTERING COLOR</u>	<u>BACKGROUND COLOR</u>
Potable Water	Blue SC06	Black	Green
Conduit	To Match Wall or Ceiling	N/A	N/A

## 3.09 COATING PROCEDURES

- A. All coating work shall meet the requirements of the coating manufacturer.
- B. All surfaces to be coated shall be in the proper condition to receive the specified coatings before any coatings are applied. Round off all sharp edges and rough welds. Remove all burrs and weld spatter. Remove oil, grease and heavy deposits of surface contaminants by solvent or detergent cleaning. All surfaces shall be clean, dry and free of any dirt, dust, grease, oils, salts, and other deleterious substances before coatings are applied.
- C. Whatever metal is cleaned during a working day shall be coated with primer on the same working day.
- D. Coat all interior and exterior weld seams surfaces by the brush method on field prime coat and field intermediate coats.
- E. Coatings shall be applied in such a manner to produce as uniform a thickness of coat and as complete a coverage as possible, free of lap marks.
- F. Each coat shall have air drying period of at least 24 hours.
- G. The dry film thickness specified shall be obtained. Additional coats shall be applied at the Contractor's expense, if required to achieve the specified dry film thickness.
- H. Only good, clean brushed and equipment shall be used. Clean all brushed, rollers, buckets and spray equipment at the end of each coating period.

END OF SECTION



## SECTION 11010

### BOOSTER PUMPING STATIONS WITH VFD

#### Part I – GENERAL

##### 1.1 SCOPE OF WORK – Quarry Branch & Fuller Ridge

The contractor shall furnish and install two (2) separate - factory built, factory delivered, above-ground water booster pump stations, in a modular unit mounted on a structural base with all necessary internal piping, valves, fittings, supports, meters, control valves, pumps, motors, one (1) variable speed drivers, controls and other necessary appurtenances as shown on the plans and specified herein.

The stations shall be complete when delivered and will not require internal contractor construction except to install the power service through the service conduit provided for that purpose and to connect the main water service to the required points and other work as may be listed in the Section for CONTRACTORS INSTALLATION REQUIREMENTS.

The manufacturer of this equipment shall be one recognized and established in the design and production of water booster pumping stations. The booster station manufacturer shall maintain regular production facilities at their place of business. These facilities shall be open for inspection by a representative of the Owner at any time during construction and testing of this equipment. The station shall bear the UL QCZJ listing for package pump stations.

#### CONTRACTOR INSTALLATION REQUIREMENTS

The contractor shall be required to set the station on the foundation designed by the engineer shown in the plan set. The foundation shall be built by the contractor and as directed by the engineer. Following setting of the station, the contractor will be required to anchor the station to the foundation. The contractor shall supply the anchor bolts.

##### 1.2 REFERENCE STANDARDS

The work in this section is subject to the requirements of applicable portions of the following standards:

- A. Hydraulic Institute
- B. ANSI – American National Standards Institute
- C. ASTM – American Society for Testing and Materials
- D. IEEE – Institute of Electrical and Electronics Engineers
- E. NEMA – National Electrical Manufacturers Association
- F. NEC – National Electrical Code
- G. ISO – International Standards Organization
- H. UL – Underwriters Laboratories, Inc.

#### Part 2 – PRODUCTS

##### 2.1 VARIABLE SPEED PACKAGED PUMPING SYSTEM

- A. The pumping systems shall be a pre-fabricated and tested variable speed packaged pumping system to maintain constant water delivery pressure.

- B. The packaged pump system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed, built, and tested by the same manufacturer.
- C. The complete packaged water booster pump system shall be certified and listed by UL (Category QCZJ – Packaged Pumping Systems) for conformance to U.S. and Canadian Standards.
- D. The complete packaged pumping system shall be NSF61 Annex G listed for drinking water and low lead requirements.

## 2.2 PUMPS

- A. All pumps shall be ANSI/NSF 61 Annex G listed for drinking water and low lead requirements.

### B. Quarry Branch:

The pumps shall be of the in-line vertical multi-stage design. The pumps shall be capable of pumping 150 GPM @ 300' TDH and shall be Grundfos **or approved equal** CR32-5, 20 HP, 230/460 volt, 3 phase with TEFC motor. The incoming power shall be 230 volt, 3 phase. The VFD will need sized accordingly for a 3 Phase, 20 HP motor. **Sample Pump Curve at rear of this specification.**

### Fuller Ridge :

The pumps shall be of the in-line vertical multi-stage design. The pumps shall be capable of pumping 60 GPM @ 160' TDH and shall be Grundfos **or approved equal** CR15-4, 7-1/2 HP, 230/460 volt, 3 phase with TEFC motor. The incoming power shall be 230 volt, 3 phase. The VFD will need to be sized accordingly to run the 3 phase, 7-1/2 HP motor. **Sample Pump Curve at rear of this specification.**

- C. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.
- D. Small Vertical In-Line Multi-Stage Pumps (Nominal flow from 3 to 125 gallons per minute) shall have the following features:

1. The pump impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement.
2. The suction/discharge base shall have ANSI Class 250 flange or internal pipe thread (NPT) connections as determined by the pump station manufacturer.
3. Pump Construction.
 

a. Suction/discharge base, pump head, motor stool:	Cast iron (Class 30)
b. Impellers, diffuser chambers, outer sleeve:	304 Stainless Steel
c. Shaft	316 or 431 Stainless Steel
d. Impeller wear rings:	304 Stainless Steel
e. Shaft journals and chamber bearings:	Silicon Carbide
f. O-rings:	EPDM

Shaft couplings for motor flange sizes 184TC and smaller shall be made of cast iron or sintered steel. Shaft couplings for motor flange sizes larger than 184TC shall be made of ductile iron (ASTM 60-40-18).

Optional materials for the suction/discharge base and pump head shall be cast 316 stainless steel (ASTM CF-8M) resulting in all wetted parts of stainless steel.

4. The shaft seal shall be a balanced o-ring cartridge type with the following features:



a. Collar, Drivers, Spring:	316 Stainless Steel
b. Shaft Sleeve, Gland Plate:	316 Stainless Steel
c. Stationary Ring:	Silicon Carbide
d. Rotating Ring:	Silicon Carbide
e. O-rings:	EPDM

The Silicon Carbide shall be imbedded with graphite.

5. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, shaft coupling and motor. The entire cartridge shaft seal shall be removable as a one piece component. Pumps with motors equal to or larger than 15 hp (fifteen horsepower) shall have adequate space within the motor stool so that shaft seal replacement is possible without motor removal.
- E. Large In-line Vertical Multi-Stage Pumps (Nominal flows from 130 to 500 gallons per minute) shall have the following features:
1. The pump impellers shall be secured directly to the smooth pump shaft by means of a split cone and nut design.
  2. The suction/discharge base shall have ANSI Class 125 or Class 250 flange connections in a slip ring (rotating flange) design as indicated in the drawings or pump schedule.
  3. Pump Construction.
 

a. Suction/discharge base, pump head	Ductile Iron (ASTM 65-45-12)
b. Shaft couplings, flange rings:	Ductile Iron (ASTM 65-45-12)
b. Shaft	431 Stainless Steel
c. Motor Stool	Cast Iron (ASTM Class 30)
d. Impellers, diffuser chambers, outer sleeve:	304 Stainless Steel
e. Impeller wear rings:	304 Stainless Steel
f. Intermediate Bearing Journals:	Tungsten Carbide
g. Intermediate Chamber Bearings:	Leadless Tin Bronze
h. Chamber Bushings:	Graphite Filled PTFE
I. O-rings:	EPDM
  4. The shaft seal shall be a single balanced metal bellows cartridge with the following construction:
 

a. Bellows:	904L Stainless Steel
b. Shaft Sleeve, Gland Plate, Drive Collar:	316 Stainless Steel
c. Stationary Ring:	Carbon
d. Rotating Ring:	Tungsten Carbide
e. O-rings:	EPDM
  5. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, motor couplings, motor and seal cover. The entire cartridge shaft seal shall be removable as a one piece component. Pumps with motors equal to or larger than 15 hp (fifteen horsepower) shall have adequate space within the motor stool so that shaft seal replacement is possible without motor removal.

### 2.3 VARIABLE FREQUENCY DRIVES (Panel Mount)

- A. The VFD shall convert incoming fixed frequency single-phase or three-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC induction motors. The VFD shall be a six-pulse input design, and the input voltage rectifier shall employ a full wave diode bridge; VFD's utilizing controlled SCR rectifiers shall not be acceptable. The output waveform shall closely approximate a sine wave. The VFD shall be of a PWM output design

utilizing current IGBT inverter technology and voltage vector control of the output PWM waveform.

- B. The VFD shall include a full-wave diode bridge rectifier and maintain a displacement power factor of near unity regardless of speed and load.
- C. The VFD shall produce an output waveform capable of handling maximum motor cable distances of up to 1,000 ft. (unshielded) without tripping or derating.
- D. The VFD shall utilize an output voltage-vector switching algorithm, or equivalent, in both variable and constant torque modes. VFD's that utilize Sine-Coded PWM or Look-up tables shall not be acceptable.
- E. VFD shall automatically boost power factor at lower speeds.
- F. The VFD shall be able to provide its full rated output current continuously at 110% of rated current for 60 seconds.
- G. An empty pipe fill mode shall be available to fill an empty pipe in a short period of time, and then revert to the PID controller for stable operation.
- H. Switching of the input power to the VFD shall be possible without interlocks or damage to the VFD at a minimum interval of 2 minutes.
- I. Switching of power on the output side between the VFD and the motor shall be possible with no limitation or damage to the VFD and shall require no additional interlocks.
- J. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life.
- K. VFD shall provide full torque to the motor given input voltage fluctuations of up to +10% to -15% of the rated input voltage.
- L. The VFD shall provide internal DC link reactors to minimize power line harmonics and to provide near unity power factor. VFD's without a DC link reactor shall provide a 5% impedance line side reactor.
- M. VFD to be provided with the following protective features:
  - 1. VFD shall have input surge protection utilizing MOV's, spark gaps, and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msec.
  - 2. VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD.
  - 3. VFD shall include current sensors on all three-output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.
  - 4. VFD shall auto-derate the output voltage and frequency to the motor in the presence of sustained ambient temperatures higher than the normal operating range, so as not to trip on an inverter temperature fault. The use of this feature shall be user-selectable and a warning will be exported during the event. Function shall reduce switching frequency before reducing motor speed.
  - 5. VFD shall auto-derate the output frequency by limiting the output current before allowing the VFD to trip on overload. Speed can be reduced, but not stopped.

6. The VFD shall have the option of an integral RFI filter. VFD enclosures shall be made of metal to minimize RFI and provide immunity.

N. VFD to be provided with the following interface features:

1. VFD shall provide an alphanumeric backlit display keypad, which may be remotely mounted using standard 9-pin cable. VFD may be operated with keypad disconnected or removed entirely. Keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD.
2. VFD shall display all faults in plain text; VFD's, which can display only fault codes, are not acceptable.
3. All VFD's shall be of the same series, and shall utilize a common control card and LCP (keypad/display unit) throughout the rating range. The control cards and keypads shall be interchangeable through the entire range of drives used on the project.
4. VFD keypad shall be capable of storing drive parameter values in non-volatile RAM uploaded to it from the VFD, and shall be capable of downloading stored values to the VFD to facilitate programming of multiple drives in similar applications, or as a means of backing up the programmed parameters.
5. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the VFD when the keypad is removed.
6. A start guide menu with factory preset typical parameters shall be provided on the VFD to facilitate commissioning.
7. VFD shall provide full galvanic isolation with suitable potential separation from the power sources (control, signal, and power circuitry within the drive) to ensure compliance with PELV requirements and to protect PLC's and other connected equipment from power surges and spikes.
8. All inputs and outputs shall be optically isolated. Isolation boards between the VFD and external control devices shall not be required.
9. There shall be three programmable digital inputs for interfacing with the systems external control and safety interlock circuitry. An additional digital input is preprogrammed for start/stop.
10. The VFD shall have two analog signal inputs. One dedicated for sensor input and one for external set point input.
11. One programmable analog output shall be provided for indication of a drive status.
12. The VFD shall provide two user programmable relays with selectable functions. Two form 'C' 230VAC/2A rated dry contact relay outputs shall be provided.
13. The VFD shall store in memory the last 5 faults with time stamp and recorded data.
14. The VFD shall be equipped with a standard RS-485 serial communications port for communication to the multi-pump controller. The bus communication protocol for the VFD shall be the same as the controller protocol.

O. VFD service conditions:

1. Ambient temperature operating range, -10 to 45°C (14 to 113°F).
2. 0 to 95% relative humidity, non-condensing.
3. Elevation to 1000 meters (3,300 feet) without derating.

4. VFD's shall be rated for line voltage of 525 to 690VAC, 380 to 480VAC, or 200 to 240VAC; with +10% to -15% variations. Line frequency variation of  $\pm 2\%$  shall be acceptable.
5. No side clearance shall be required for cooling of the units.

## 2.4 FIXED SPEED MOTORS

- A. Fixed Speed Motors are to be provided with the following basic features:
  1. Designed for continuous duty operation, NEMA design B with a 1.15 service factor.
  2. Totally Enclosed Fan Cooled with Class F insulation.
  3. Nameplate shall have, as a minimum, all information as described in NEMA Standard MG 1-20.40.1.
  4. Motors shall have a NEMA C-Flange for vertical mounting.
  5. Drive end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump.

## 2.5 PUMP SYSTEM CONTROLLER

- A. The pump system controller shall be a standard product developed and supported by the pump manufacturer.
- B. The controller shall be microprocessor based capable of having software changes and updates via personal computer (notebook). The controller user interface shall have a color display with a minimum screen size of 3-1/2" x 4-5/8" for easy viewing of system status parameters and for field programming. The display shall have a back light with contrast adjustment. Password protection of system settings shall be standard.
- C. The controller shall provide internal galvanic isolation to all digital and analog inputs as well as all fieldbus connections.
- D. The controller shall have the ability to be connected to a battery to maintain power on controller during periods of loss of supply power.
- E. The controller shall have built in data logging capability. Logged values shall be graphically displayed on the controller and able to be exported to computer via standard connection. A minimum of 3600 samples per logged value with the following parameters available for logging:
  - Estimated flow-rate
  - Speed of pumps
  - Inlet pressure
  - Discharge pressure
  - Power consumption
  - Controlling parameter (process value)
- F. The controller shall display the following as status readings from a single display on the controller (this display shall be the default):
  - Current value of the control parameter, (typically discharge pressure)
  - Most recent existing alarm (if any)

- System status with current operating mode
  - Status of each pump with current operating mode and rotational speed as a percentage (%)
  - Estimated flow-rate, (not requiring flow meter connection)
- G. The controller shall have as a minimum the following hardware inputs and outputs:
- Three analog inputs (4-20mA or 0-10VDC)
  - Three digital inputs
  - Two digital outputs
  - Ethernet connection
  - Field Service connection to PC for advanced programming and data logging
- H. Pump system programming (field adjustable) shall include as a minimum the following:
- Water shortage protection (analog or digital)
  - Transducer Settings (Suction and Discharge Analog supply/range)
  - PI Controller (Proportional gain and Integral time) settings
  - High system pressure indication and shut-down
  - Low system pressure indication and shut-down
  - Low suction pressure/level shutdown (via digital contact)
  - Low suction pressure/level warning (via analog signal)
  - Low suction pressure/level shutdown (via analog signal)
  - Flow meter settings (if used, analog signal)
- I. The system controller shall be able to accept up to seven programmable set-points via a digital input, (additional input/output module may be required).
- J. The controller shall have advanced water shortage protection. When analog sensors (level or pressure) are used for water shortage protection, there shall be two indication levels. One level is for warning indication only (indication that the water level/pressure is getting lower than expected levels) and the other level is for complete system shut-down (water or level is so low that pump damage can occur). System restart after shut-down shall be manual or automatic (user selectable).
- K. The system pressure set-point shall be capable of being automatically adjusted by using an external set-point influence. The set-point influence function enables the user to adjust the control parameter (typically pressure) by measuring an additional parameter. (Example: Lower the system pressure set-point based on a flow measurement to compensate for lower friction losses at lower flow rates).
- L. The controller shall be capable of receiving a remote analog set-point (4-20mA or 0-10 VDC) as well as a remote system on/off (digital) signal.
- M. The controller shall be able to adjust the ramp time of a change in set point on both an increase or decrease change in set point.
- N. The pump system controller shall store up to 24 warning and alarms in memory. The time, date and duration of each alarm shall be recorded. A potential-free relay shall be provided for alarm notification to the building management system. The controller shall display the following alarm conditions:
- |  |                                 |
|--|---------------------------------|
| High System Pressure                     | Low system pressure             |
| Low suction pressure (warning and alarm) | Individual pump failure         |
| VFD trip/failure                         | Loss of sensor signal (4-20 mA) |
| Loss of remote set-point signal (4-20mA) | System power loss               |
- O. The pump system controller shall be mounted in a UL Type 12 rated enclosure. A self-certified NEMA enclosure rating shall not be considered equal. The entire control panel shall be UL 508

listed as an assembly. The control panel shall include a main disconnect, circuit breakers for each pump and the control circuit and control relays for alarm functions.

Control panel options shall include, but not be limited to:

Pump Run Lights	System Fault Light
Audible Alarm (80 db[A])	Surge Arrestor
Emergency/Normal Operation Switches	Service Disconnect Switches
Qty (9) Configurable Digital Outputs available for monitoring	

- P. The controller shall be capable of receiving a redundant sensor input to function as a backup to the primary sensor (typically discharge pressure).
- Q. The controller shall have a pump "Test Run" feature such that pumps are switched on during periods of inactivity (system is switched to the "off" position but with electricity supply still connected). The inoperative pumps shall be switched on for a period of two to three (3-4) seconds every 24 hours, 48 hours or once per week and at specific time of day (user selectable).
- R. The controller shall be capable of changing the number of pumps available to operate or have the ability limit the maximum power consumption by activation of a digital input for purposes of limited generator supplied power.
- S. The controller shall be capable of displaying instantaneous power consumption (Watts or kilowatts) and cumulative energy consumption (kilowatt-hours).
- T. The controller shall be capable of displaying instantaneous specific energy use (kw/gpm), (optional flow meter must be connected).
- U. The actual pump performance curves (5<sup>th</sup> order polynomial) shall be loaded (software) into the pump system controller or be able to input manually into controller based on three points on pump curve of pumps controlled.
- V. The controller shall be capable of displaying an estimated flow-rate on the default status screen.
- W. The controller shall have the ability to compensate for pipe friction loss by decreasing pressure set-point at lower flow-rates and increasing pressure set-point at higher flow-rates without the requirement of a flow meter.
- X. The controller shall have the ability to communicate common field-bus protocols, (BACnet, Modbus, Profibus, and LON), via optional communication expansion card installed inside controller.
- Y. The controller shall have a built in Ethernet connection allowing controller to connected to network and access of controller via web browser and internet any where around the world where internet communication is available.
- Z. The controller shall have a programmable Service Contact Field that can be populated with service contact information including: contact name, address, phone number(s) and website.

## 2.6 SEQUENCE OF OPERATION

- A. The system controller shall operate equal capacity variable speed pumps to maintain a constant discharge pressure (system set-point). The system controller shall receive an analog signal [4-20mA] from the factory installed pressure transducer on the discharge manifold, indicating the actual system pressure. As flow demand increases the pump speed shall be increased to maintain the system set-point pressure. When the operating pump(s) reach 96% of full speed (adjustable), an additional pump will be started and will increase speed until the system set-point is achieved. When the system pressure is equal to the system set-point all pumps in operation

shall reach equal operating speeds. As flow demand decreases the pump speed shall be reduced while system set-point pressure is maintained. When all pumps in operation are running at low speed the system controller shall switch off pumps when fewer pumps are able to maintain system demand.

- B. The system controller shall be capable of switching pumps on and off to satisfy system demand without the use of flow switches, motor current monitors or temperature measuring devices.
- C. All pumps in the system shall alternate automatically based on demand, time and fault. If flow demand is continuous (no flow shut-down does not occur), the system controller shall have the capability to alternate the pumps every 24 hours, every 48 hours or once per week. The interval and actual time of the pump change-over shall be field adjustable.
- D. The system controller shall be able to control a pressure maintenance pump, (jockey pump), in the system. The set point of the pressure maintenance pump shall be able to be any value above or below the pump system's set point. The pressure maintenance pump shall be able to be staged on as back-up pump when capacity of pump system is exceeded.

## 2.7 LOW FLOW STOP FUNCTION

The system controller shall be capable of stopping pumps during periods of low-flow or zero-flow without wasting water or adding unwanted heat to the liquid. Temperature based no flow shut-down methods that have the potential to waste water and add unwanted temperature rise to the pumping fluid are not acceptable.

### Standard Low Flow Stop and Energy Saving Mode

If a low or no flow shut-down is required (periods of low or zero demand) a bladder type diaphragm tank shall be installed with a pre-charge pressure of 70% of system set-point. The tank shall be piped to the discharge manifold or system piping downstream of the pump system. When only one pump is in operation the system controller shall be capable of detecting low flow (less than 10% of pump nominal flow) without the use of additional flow sensing devices. When a low flow is detected, the system controller shall increase pump speed until the discharge pressure reaches the stop pressure (system set-point plus 50% of programmed on/off band). The pump shall remain off until the discharge pressure reaches the start pressure (system set-point minus 50% of programmed on/off band). Upon low flow shut-down a pump shall be restarted in one of the following two ways:

- A. Low Flow Restart: If the drop in pressure is slow when the start pressure is reached (indicating the flow is still low), the pump shall start and the speed shall again be increased until the stop pressure is reached and the pump shall again be switched off.
- B. Normal Flow Restart: If the drop in pressure is fast (indicating the flow is greater than 10% of pump nominal flow) the pump shall start and the speed shall be increased until the system pressure reaches the system set-point.

### [OPTIONAL] Low Flow Stop and Energy Saving Mode

The pump system controller shall be capable receiving a digital signal from a flow switch or an analog signal from a flow meter to indicate a low flow condition. A bladder type diaphragm tank shall be installed with a pre-charge pressure of 70% of system set-point. The tank shall be piped to the discharge manifold or system piping downstream of the pump system. When low flow is detected (signal from flow switch or meter), the system controller shall increase pump speed until the discharge pressure reaches the stop pressure (system set-point plus 50% of programmed on/off band). The pump shall remain off until the discharge pressure reaches the start pressure (system set-point minus 50% of programmed on/off band). The pump shall remain in the energy saving on/off mode during low flow indication. When low flow is no longer present (low flow indication ceases), the pump(s) shall resume constant pressure operation.

It shall be possible to change from the standard low flow stop to the optional low flow stop (and vice-versa) via the user interface.

## 2.8 SYSTEM CONSTRUCTION

- A. Suction and discharge manifold construction shall be in way that ensures minimal pressure drops, minimize potential for corrosion, and prevents bacteria growth at intersection of piping into the manifold. Manifold construction that includes sharp edge transitions or interconnecting piping protruding into manifold is not acceptable. Manifold construction shall be such that water stagnation can not exist in manifold during operation to prevent bacteria growth inside manifold.
- B. The suction and discharge manifolds shall be constructed of 316 stainless steel. Manifold connection sizes shall be as follows:
- |                        |                                 |
|------------------------|---------------------------------|
| 3 inch and smaller:    | Male NPT threaded               |
| 4 inch through 8 inch: | ANSI Class 150 rotating flanges |
| 10 inch and larger:    | ANSI Class 150 flanges          |
- C. Pump Isolation valves shall be provided on the suction and discharge of each pump. Isolation valve sizes 2 inch and smaller shall be nickel plated brass full port ball valves. Isolation valve sizes 3 inch and larger shall be a full lug style butterfly valve. The valve disk shall be of stainless steel. The valve seat material shall be EPDM and the body shall be cast iron, coated internally and externally with fusion-bonded epoxy.
- D. A spring-loaded non-slam type check valve shall be installed on the discharge of each pump. The valve shall be a wafer style type fitted between two flanges. The head loss through the check valve shall not exceed 5 psi at the pump design capacity. Check valves 1-1/2" and smaller shall have a POM composite body and poppet, a stainless steel spring with EPDM or NBR seats. Check valves 2" and larger shall have a body material of stainless steel or epoxy coated iron (fusion bonded) with an EPDM or NBR resilient seat. Spring material shall be stainless steel. Disk shall be of stainless steel or leadless bronze.
- E. For systems that require a diaphragm tank, a connection of no smaller than 3/4" shall be provided on the discharge manifold.
- F. A pressure transducer shall be factory installed on the discharge manifold (or field installed as specified on plans). Systems with positive inlet gauge pressure shall have a factory installed pressure transducer on the suction manifold for water shortage protection. Pressure transducers shall be made of 316 stainless steel. Transducer accuracy shall be +/- 1.0% full scale with hysteresis and repeatability of no greater than 0.1% full scale. The output signal shall be 4-20 mA with a supply voltage range of 9-32 VDC.
- G. A bourdon tube pressure gauge, 2.5 inch diameter, shall be placed on the suction and discharge manifolds. The gauge shall be liquid filled and have copper alloy internal parts in a stainless steel case. Gauge accuracy shall be 2/1/2 %. The gauge shall be capable of a pressure of 30% above its maximum span without requiring recalibration.
- H. Systems with a flooded suction inlet or suction lift configuration shall have a factory installed water shortage protection device on the suction manifold.
- I. The base frame shall be constructed of corrosion resistant 304 stainless steel. Rubber vibration dampers shall be fitted between each pumps and baseframe to minimize vibration.
- J. Depending on the system size and configuration, the control panel shall be mounted in one of the following ways:
- On a 304 stainless steel fabricated skid, separate from the main system skid
  - On its own base (floor mounted with plinth)



**2.9 TESTING**

- A. The entire pump station shall be factory tested for functionality. Functionality testing shall include the following parameters: Dry Run Protection, Minimum Pressure and Maximum Pressure alarms (where applicable), Setpoint Operation, and Motor Rotation.
- B. The system shall undergo a factory hydrostatic test at the end of the production cycle. The system shall be filled with water and pressurized to 1.5 times the nameplate maximum pressure. Systems with 150# flange connections shall be tested at 350 psig, and systems with 300# flange connections shall be tested at 450 psig. The pressure shall be maintained for a minimum of 15 minutes with no leakage (slight leakage around pump(s) mechanical seal is acceptable) prior to shipment.

**2.10 WARRANTY**

- A. The warranty period shall be a non-prorated period of 24 months from date of installation, not to exceed 30 months from date of manufacture.

END OF SECTION



## SECTION 13400

## TURBINE FLOW METER

## PART 1 – GENERAL

## 1.01 THE REQUIREMENT

- A. The Contractor shall furnish, test, install and place in satisfactory operation the turbine flow meter, with all spare parts, accessories, and appurtenances as herein specified and as shown on the Drawings.

## PART 2 – PRODUCTS

## 2.01 TURBINE FLOW METER SYSTEM

1. The master meter shall include a 6" turbine-type water meter at the location in the station as shown on the plans and specified herein. These specifications set forth the minimum acceptable design criteria and performance requirements for Turbine-type cold water meters including the following potential service applications and general considerations:
  - Intended where a moderately wide flow range is anticipated
  - Measurement of water usage for typical billing applications
  - Measurement intended for typical commercial and industrial applications
  - Measurement of constant medium to extended high flow usage
2. The meter package shall meet or exceed all requirements of ANSI/AWWA Standard C701 for Class II turbine meter assemblies. Each meter assembly shall be performance tested to ensure compliance.
3. The meter maincase shall be of epoxy coated ductile iron composition. The epoxy coating shall be provided as standard fusion-bonded and adhere to NSF for non-lead regulation compliance.
4. The meter assembly shall have performance capability of continuous operation up to the rated maximum flows as listed below without affecting long-term accuracy or causing any undue component wear. The meter assembly shall also provide a 25% flow capacity in excess of the maximum flows listed for intermittent flow demands. Maximum headloss through the meter / strainer assembly shall not exceed those listed in the following table per meter size.

## Operating Characteristics

Meter Size	6"
Low Flow (95% Min.)	2.5 gpm

Operating Range (98.5 - 101.5%)	4.0 – 2000 gpm
Intermittent Flows (98.5 - 101.5%)	2500 gpm
Pressure Loss (Not to Exceed)	8.2 psi @ 2000 gpm

5. The measuring chamber shall consist of a measuring element, removable housing, and all-electronic register. The measuring element shall be mounted on a horizontal, stationary stainless steel shaft with sleeve bearings and be essentially weightless in water. The measuring element comes integrated with the advanced Floating Ball Technology design. The measuring chamber shall be capable of operating within the above listed accuracy limits without calibration when transferred from one maincase to another of the same size. The measuring shall be so configured to capture all flows as specified above.
6. The direct magnetic drive shall occur between the motion of the measuring element blade position and the electronic register. The meter shall contain a direct drive system with Floating Ball Technology, designed to extend service life, enhance low flow sensitivity and provide extended flow capacity and overall accuracy of the meter assembly. Any and all additional intermediate, magnetic or mechanical, drive couplings are not acceptable.
7. The meter's register shall be all-electronic and not contain any mechanical gearing to display flow and accurate totalization.  
The electronic register will include the following partial list of features:
- AMR resolution units fully programmable
  - Pulse output frequency fully programmable
  - Integral data logging capability
  - Integral resettable accuracy testing feature
  - Large, easy-to-read LCD display
  - 10-year battery life guarantee
8. The meter assembly shall operate properly without leakage, damage, or malfunction up to a maximum working pressure of 200 pounds per square inch (psig).
9. The meter strainer shall be integral and cast as part of the meter's maincase. The strainer's screen shall have a minimum net open area of at least two (2) times the pipe opening and be a V-shaped configuration for the purpose of maintaining a full unobstructed flow pattern. The strainer body shall be a coated ductile iron fusion-bonded epoxy identical to that of the meter's maincase. All fasteners shall be stainless steel capable of maintaining the following static pressure ratings and physical dimensions:

Meter Size	Maximum Operating Pressure	Centerline to Strainer Base	Overall Length (not to exceed)
6"	200 psig	5-3/4 inches	27 inches

10. A straightening vane assembly is mandatory and shall be positioned directly

upstream of the measuring element. The straightening vane assembly shall be an integral component of the measuring chamber.

11. Flanges for the 1-1/2" and 2" size meter assemblies shall be of the 2-bolt oval flange configuration. The 6" size meter assemblies shall have flanges of the Class 125 round type, flat faced and shall conform to ANSI B16.1 for specified diameter, drilling and thickness.
12. All sizes of meter packages shall display the sizes, model, manufacturer name, and direction of flow. Such display shall be cast on the side of the meter maincase.
13. Meters shall be guaranteed against defects in material and workmanship for a period of one (1) year from date of shipment. In addition, the meter supplier shall submit nationally published literature clearly outlining its factory maintenance program and current price schedule covering complete measuring chamber exchange.
14. The meter shall be a Sensus Omni Model T2 meter or equal.

## PART 3 – EXECUTION

### 3.01 REQUIREMENTS

- A. The meter shall be installed as shown on the Plans.
- B. Refer to the manufacturer's specifications for further requirements.

END OF SECTION



## SECTION 15010

## BASIC MECHANICAL REQUIREMENTS

## PART 1 - GENERAL

## 1.1 SECTION INCLUDES

- A. General Requirements specifically applicable to Division 15.

## 1.2 CONTRACT DOCUMENTS

- A. The Instructions to Bidders, General and Special Conditions and all other Contract Documents shall apply to the mechanical contractor's work as well as to each of his subcontractor's work. Each contractor is directed to familiarize himself in detail with all documents pertinent to this Contract.

## 1.3 WORK SEQUENCE

- A. Construct work in sequence under provisions of this Specification.
- B. Schedule outages of all utilities with Owner's representative.

## 1.4 COORDINATION

- A. Coordinate the work specified in this Division under provisions of this Specification.
- B. This Contract in all instances requires a complete and operating system be delivered to the Owner. Contractor shall coordinate among the various trades to ensure that the products and services offered by each trade cover in aggregate all required elements.
- C. Equipment, electrical systems and equipment, and controls: The work shall include all required disconnects, starters, controls, interlocks, and other such components required for operation. Unless specified otherwise, it is generally preferred that starters and disconnects be provided with the equipment. However, unless specified otherwise it is Contractor's option for the components and systems to be provided with the individual equipment, or instead provided for field-installation by the vending trade or another trade.
- D. Prepare drawings showing proposed rearrangement of work to meet job conditions, including changes to work specified under other Sections, and interconnections to work of other trades. Obtain permission of the Engineer before proceeding.

## 1.5 REFERENCES

- A. ANSI/IEEE C2 - National Electrical Safety Code.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. Kentucky Building Code.
- D. Kentucky Plumbing Code
- E. International Mechanical Code.

## 1.6 REGULATORY REQUIREMENTS

- A. Conform to all requirements incorporated in the Kentucky Building Code.
- B. Obtain all permits, and inspections from authority having jurisdiction.

## 1.8 QUALITY CONTROL

### A. INCLUDES

- 1. Quality assurance and control of installation.
- 2. References.
- 3. Field samples.
- 4. Mock-up.
- 5. Inspection and testing laboratory services.
- 6. Manufacturers' field services and reports.

### B. QUALITY ASSURANCE/CONTROL OF INSTALLATION

- 1. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- 2. Comply fully with manufacturers' instructions, including each step in sequence.
- 3. Should manufacturers' instructions conflict with the Contract Documents, request clarification from the Engineer before proceeding.
- 4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.
- 5. Perform work by persons qualified to produce workmanship of specified quality.



6. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

C. REFERENCES

1. Conform to reference standard by the date of issue current on date of Contract Documents.
2. Obtain copies of the standards when required by the Contract Documents.
3. Should specified reference standards conflict with the Contract Documents, request clarification from the Engineer before proceeding.
4. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

D. FIELD SAMPLES

1. Install field samples at the site as required by the individual Specifications Sections for review.
2. Acceptable samples represent a quality level for the Work.
3. Where field sample is specified in the individual Sections to be removed, clear area after field sample has been accepted by the Engineer.

E. INSPECTION AND TESTING LABORATORY SERVICES

1. The Contractor will appoint, employ, and pay for services of an independent firm to perform inspection and testing.

F. MANUFACTURERS' FIELD SERVICES AND REPORTS

1. When the individual Specification Sections require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
2. Individuals are to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
3. Submit report in duplicate within 30 days of observation to the Engineer for review.

## 1.9 MATERIAL AND EQUIPMENT

### A. INCLUDES

1. Products.
2. Transportation and handling.
3. Storage and protection.
4. Product options.
5. Substitutions (after bidding).

### B. PRODUCTS

1. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.
2. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
3. Provide interchangeable components of the same manufacturer, for similar components.

### C. TRANSPORTATION AND HANDLING

1. Transport and handle products in accordance with manufacturer's instructions.
2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

### D. STORAGE AND PROTECTION

1. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
2. For exterior storage of fabricated products, place on sloped supports, above ground.
3. Provide off-site storage and protection when site does not permit on-site storage or protection.

4. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
5. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
6. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
7. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
8. Store applicable plumbing products per the requirements of the Kentucky Plumbing Code.
9. Items which are dirty, damaged, rain soaked, and otherwise unacceptable for use in the project shall be removed from the site.

#### E. PRODUCT OPTIONS

1. Products specified by reference standards or by description only: Any product meeting those standards or description. Some products have been listed as only one acceptable.
2. Products specified by naming one or more manufacturers: products of manufacturers named and meeting Specifications; other equal products which in the judgment of the Engineer meet the intended standards. Prior approval is required.
3. Limited or sole source items - (products specified by naming one or more manufacturers and limited to only those manufacturers with a phrase such as "no substitutions allowed" or "prior approval required".): products of manufacturers named and meeting Specifications; other products which in the judgment of the Engineer meet the intended standards. Prior approval is required.

Note: This project is procured with the intent for full and open competition. Wherever practical in the opinion of the Engineer, options - and - above have been made available to the bidders.

#### F. SUBSTITUTIONS (AFTER BIDDING)

1. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
2. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

3. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
4. Substitution Submittal Procedure:
  - a. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - b. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
  - c. The Engineer will notify Contractor, in writing, of decision to accept or reject request.
  - d. This procedure can not be used as part of shop drawing submittal.

## PART 2 - PRODUCTS

### 2.1 UTILITY SERVICE MARKERS

- A. The Contractor shall furnish and install markers for all underground utility services. Locations shown on the Drawings, if any, are typical only. Markers are to be provided as specified below, and follow the actual as built route.
- B. Markers shall consist of bronze plates, ground and polished, and marked to identify the service, depth buried, the owner of the service, and the owner of the marker. Markers shall also be stamped with arrows indicating the directions the service extends.
- C. Markers locating services at the building shall be installed in masonry or concrete walls two feet (2') above grade. Markers locating services elsewhere on the site shall be installed in concrete walks or curbs, or in 6" x 6" steel reinforced concrete posts.
- D. Markers are required for all utility services.
- E. At the entrance of each service to the building. Wall markers are preferred at this location.
- F. At each direction change of the service, along its length, including tees, wyes, or other divided flow fitting.
- G. Every 200 feet along its length. Where the route is clearly marked by manholes or other items extending to the surface, these may be waived.

### 2.2 CONSUMABLES

- A. At least three (3) sets or quantities of consumables shall be provided for project systems, including:
  - 1. One or more sets used during construction, testing, and system commissioning.
  - 2. A new set installed when systems are accepted.
  - 3. A spare set, not installed, for Owner to use.
- B. The term "Consumables" includes, but is not limited to:
  - 1. Air filter media.
  - 2. Non-rechargeable batteries.
  - 3. Other similar items as called for in the Specifications or required.

### PART 3 - EXECUTION

#### 3.1 EQUIPMENT ACCESS

- A. Provide adequate access space to service and maintain equipment. The Contractor may be required to demonstrate accessibility of the equipment and systems installed.
- B. Contractor shall take 35mm pictures of permanently concealed items above hard ceilings, in inaccessible chases, in ground, embedded in structure, and the like, and shall turn over both photographs and negatives to Owner at final completion of the project. Photographs shall clearly identify location and type of utility.

#### 3.2 TRENCHES AND EXCAVATION

- A. Perform the work in accordance with the requirements of Section 02221. To preserve site access and minimize inconvenience to others, keep trenches open the minimum period of time necessary to promptly do the work. If necessary, segment the work, completing each section before starting the next section.

#### 3.3 CUTTING AND PATCHING

- A. Primary products: Those required for original installation.
- B. Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching.
- C. After uncovering existing work, assess conditions affecting performance of work.
- D. Beginning of cutting or patching means acceptance of existing conditions.
- E. Provide temporary supports to ensure structural integrity of the work. Provide devices and methods to protect other portions of project from damage.

- F. Provide protection from elements for areas which may be exposed by uncovering work.
- G. Maintain excavations free of water.
- H. CUTTING
  1. Execute cutting and fitting to complete the work.
  2. Uncover work to install improperly sequenced work.
  3. Remove and replace defective or non-conforming work.
  4. Remove samples of installed work for testing when requested.
  5. Provide openings in the work for penetration of mechanical and electrical work.
  6. Employ original or skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
  7. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- I. PATCHING
  1. Execute patching to complement adjacent work.
  2. Fit products together to integrate with other work.
  3. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing.
  4. Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
  5. Restore work with new products in accordance with requirements of Contract Documents.
  6. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Seal penetrations with caulking or fire stopping material as applicable.
  7. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
  8. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

### 3.4 SAFETY

- A. Contractor shall provide inherently safe installations of all project materials, systems and equipment.
- B. All safety, safety precautions and safety programs in conjunction with the performance of Contract work are the responsibility of the Contractor.

END OF SECTION





## SECTION 15020

## GATE VALVES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Gate valves for buried pipelines shall be iron body, bronze mounted, resilient-seated gate valves with non-rising stems having either parallel or inclined seats in accordance with AWWA C509, "Resilient-Seated Gate Valves for Water Service."
- B. Mechanical joint bell ends will be used in buried pipelines of mechanical joint and rubber seal type joint cast iron. Bell and flange ends will be used in exposed cast iron piping at the locations shown on the construction drawings.

## 1.2 SUBMITTALS

- A. Manufacturer's Data:
  - 1. Material and component data.
  - 2. Performance data.
  - 3. Product warranties.
- B. Submit in accordance with Section 01300.

## 1.03 RELATED SECTIONS

- A. 01300 - Submittals
- B. 01600 - Materials and Equipment.
- C. 01610 - Transportation and Handling

## PART 2 -PRODUCTS

## 2.1 OPERATING NUTS

Gate valves for buried pipelines shall be furnished with two (2) inch square wrench nuts. Nuts shall have a flanged base upon which shall be cast an arrow two (2) inches long showing the direction of opening, and the word "OPEN" in one-half (1/2) inch or larger letters, shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve.

## 2.2 HANDWHEELS

Hand-wheels may be specified for operating valves in exposed piping on the construction drawings. The hand-wheels shall have an arrow and the word "OPEN", cast thereon, to clearly indicate the direction the hand-wheel is to be turned to open the valve. The diameter of the hand-wheel shall conform to the following dimensions for the various size gate valves.

Size of Valve	Diameter of Hand-wheel
4"	10"
6"	12"
8"	14"
10" and 12"	18"
16" and 18"	22"
24" and 30"	30"

## 2.3 HORIZONTAL MOUNTING

Gate valves in size sixteen (16) inches and larger may be installed in the horizontal position. Bronze tracks, rollers, and scrapers will be provided for valves to be installed in the horizontal position. Horizontal valves for pressure lines shall be furnished with beveled gear operators. The gear cases for buried service shall be totally enclosed, and the gear cases for exposed piping in a vault shall be of the extended type.

## 2.4 BYPASS VALVES

Bypasses shall be furnished on valves when so specified on the proposal sheets or shown on the construction drawings. The bypass valve shall be furnished of the same type as the main line valve to which it is fitted. The size requirements of the bypass shall be as follows:

Valve Diameter - Inches	Bypass Diameter - Inches
16-20	3
24-30	4
26-42	6
48	8

## 2.5 RISING STEM VALVES

Outside screw and yoke rising stem valves shall conform to all of the requirements of AWWA C509 except for the rising stem mechanism. The OS and Y valves shall have

a rugged cast iron yoke machined to provide accurate stem alignment. The OS and Y valves shall be furnished with hand-wheels. OS and Y valves shall only be installed where shown on the drawings.

## 2.6 UNDERWRITERS VALVES

Gate valves for fire protection systems shall be manufactured in conformance to the requirements of the Underwriters Laboratories, Inc., and the Associated Factory Mutuals Laboratories. Gate valves which support an indicator post shall contain a flange of the indicator post base. Such valves are specified on the construction drawings and shall bear the inspection label of the Underwriters Laboratories, Inc. Gate valves shall be M&H, Mueller or approved equal.

## PART 3 - EXECUTION

### 3.1 SPECIAL DETAILS

The details of other valve requirements and valve appurtenances such as special ends and materials, position indicators, floor stands, cylinders, chain operators, and extension stems and guides are described on the construction drawings.

### 3.2 SETTING GATE VALVES

Gate valves shall be installed of the size and the location as shown on the construction drawings. Vertical valves shall be set plumb and horizontal valves installed so that the valve body is level. The valves shall be set to the new pipe in the manner specified for cleaning, laying, and jointing pipe. Mechanical joint, rubber compression seal, or bell and spigot shall be used for buried pipelines. Other types of joints for pipelines within structures will be shown on the construction drawings.

### 3.3 SPARE PARTS

The Contractor shall furnish the Owner one (1) valve rebuild/maintenance kit for each size and type of valve. Each Contractor shall also furnish the Owner one (1) 'T' type valve wrench.

END OF SECTION



SECTION 15030  
MECHANICAL CHECK VALVES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Manufacturer's Data:
  - 1. Material and component data.
  - 2. Performance data.
  - 3. Product warranties.
- B. Submit in accordance with Section 01300.

1.2 RELATED SECTIONS

- A. 01300 – Submittals
- B. 01600 - Materials and Equipment
- C. 01610 - Transportation and Handling

PART 2 PRODUCTS

2.1 SWING CHECK TYPE

Swing check valves shall be constructed with heavy cast iron or cast steel body with a bronze or stainless steel seat ring, and a non-corrosive shaft for attachment of weighted lever that shall be keyed to the shaft. The seat ring must be renewable and shall be securely held in place by a threaded joint.

The valve shall be full ported with the disc unseated 25° to ensure quiet closing. The valve disc shall be constructed of cast iron or cast steel and shall be suspended from a non-corrosive shaft which will pass through a stuffing box and be connected to a weighted lever. O-ring seals will not be acceptable.

The swing check valves shall have flanged ends, be suitable for a working pressure not less than 175 PSIG, and shall be G. A. Industries, Mueller Model A-2600-6-01, or equal as approved by the Engineer.

## 2.2 SILENT CHECK TYPE

The silent check valve shall be a globe type, non-slam check valve. The body of the check valve shall be semi-steel. The plug, seat and guide bushings shall be bronze and conform to ASTM Designation B-143. The valve spring and seat retainers shall be stainless steel and conform to ASTM Designation A-276. The valve plug shall be guided at both ends by a center shaft integral with the valve plug. Alignment of the center shaft shall be provided through the usage of guide bushings. The check valve shall be designed to prevent water hammer by returning the valve plug to the seat before reversal of flow occurs. The check valves shall be designed so as to be easily repaired in the field.

The valve supplied shall be flanged and drilled to conform to 125 lb. ANSI standards and sized as shown on the drawings.

The valve shall be G. A. Industries, Val-Matic 1800 series, or equal.

## 2.3 TILTED DISC CHECK TYPE

The check valve shall be of the tilted disc, full body flange type.

The valve housing shall consist of two body sections bolted together at a central diagonal flange, which shall be inclined at an angle of 55 degrees. The inlet body section shall contain a seat ring positioned and captured by the diagonal flange. The outlet body section shall accept two, eccentrically located, in-line pivot trunnions about which a disc shall rotate.

The eccentric pivot trunnions must be so located as to divide the disc into approximately a one-third/two-third proportion, and also must allow the seating surface of the disc to rotate away from the seating surface of the seat ring cleanly, without contact. A small amount of clearance must exist between the pivot pin and bushing when the disc is seated to prevent binding and to insure a drop tight seal. To demonstrate the capability of the valve to maintain excellent seating and sealing characteristics over an extended service life, a 250,000 cycle test shall be conducted and witnessed by an independent consulting firm. The results of the test must indicate a leakage rate not to exceed 75 percent of the allowable rate for new valves as called for by A.W.W.A. and M.S.S. check valve specifications.

The disc shall travel no more than 40 degrees from the closed to the fully open position. The design contours of the disc, and its position during flow, must prevent disc flutter at a minimum flow velocity of four (4) F.P.S.

The flow area, through the valve body inlet and outlet, shall be equal to pipe size, and gradually increase to an area 40 percent greater than pipe size through the valve seat.

Inspection ports shall be provided upstream and downstream of the valve disc. An indicator must be supplied and visually show the disc position at all times.

Materials of construction: body sections to be cast iron ASTM A126, Class B, disc to be cast iron ASTM A126, Class B, seat ring to be centrifugally cast aluminum bronze ASTM B271, copper alloy #954. Disc ring to be centrifugally cast aluminum bronze ASTM B271, copper alloy #955. Pivot pins to be aluminum bronze ASTM B505, copper alloy #954. Pivot pin bushings to be aluminum bronze ASTM B505, copper alloy #954.

The tilted disc check valve shall be series 9000 as manufactured by Val-Matic Valve and Manufacturing Corporation, Elmhurst, Illinois, or approved equal.

PART 3 EXECUTION

NOT USED

END OF SECTION





SECTION 15035  
ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

DESCRIPTION OF WORK:

This section specifies the basic requirements for electrical components which are an integral part of packaged mechanical equipment. These components include, but are not limited to factory installed motors, starters, and disconnect switches furnished as an integral part of packaged mechanical equipment. NOTE: Refer to other sections of the specifications for additional or superseding requirements for motors and/or starters.

SUBMITTALS:

Product Data: Submit manufacturers data on motor starters.

Shop Drawings: Submit dimensioned drawings on motor starters showing accurately scaled equipment layouts and spatial relationship to associated motors, and connections to electrical power panels and feeders.

MOTORS:

Provide motors and starting equipment where not furnished with the equipment package. Motors shall have copper windings, class B insulation, and standard squirrel cage with starting torque characteristics suitable for the equipment served. All motors for air handling equipment shall be selected for quiet operation. Each motor shall be checked for proper rotation after electrical connection has been completed.

Motors shall have dripproof enclosure for locations protected from weather and not in air stream of fan; and totally enclosed fan cooled enclosure for motors exposed to weather.

Motors shall be manufactured by Century, General Electric, Westinghouse, Louis Allis, or approved equal.

Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads.

Motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range.

Temperature Rating: Rated for 40 deg. C environment with maximum 50 deg. C temperature rise for continuous duty at full load (Class A Insulation).

Service Factor: 1.15 for poly-phase motors and 1.35 for single phase motors.

Overload protection: build-in thermal overload protection and, where indicated, internal sensing device suitable for signaling and stopping motor at starter.

Noise rating: "Quiet" rating on motors located in occupied spaces of building.

Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

END OF SECTION



SECTION 15040  
BUTTERFLY VALVES

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Butterfly valves shall be one piece iron body with integral cast iron hub sections.
- B. Valves shall be designed, manufactured and tested in accordance with AWWA C504. Valve seats shall be retained in a groove in the body of the valve. Valve disc edge shall be 304 S.S. permanently welded to the disc. Valves shall be rated and tested for absolute zero leakage at rated pressure when closed. The valve shall be of wafer or flanged design with short face to face dimensions.
- C. Lug wafer will not be allowed.

1.02 SUBMITTALS

- A. Manufacturer's Data:
  - 1. Material and component data.
  - 2. Performance data.
  - 3. Product warranties.
- B. Submit in accordance with Section 01300.

1.03 RELATED SECTIONS

- A. 01300 – Submittals
- B. 01600 – Special Provisions for Materials and Equipment
- C. 01610 - Transportation and Handling

PART 2 – PRODUCTS

2.01 GENERAL

- A. The valve body and workings shall be rated for a minimum working pressure of 150 psi.
- B. The valve disc shall be constructed of bronze materials meeting ASTM B584 standards or of cast iron meeting requirements of ASTM A48.
- C. The disc seat shall be of rubber material and shall seal against the disc edge. The valve shaft shall be constructed of stainless steel material which meets the standards of ASTM A582. Stainless steel materials shall also be used for shaft wedge keys and retaining nuts.

- D. Shaft bearings shall be self lubricating type with a nylon or woven Teflon backed sleeve for bearing surfaces. The bearings shall be press fitted to the valve body to inhibit rust formation between the body and bearings.
- E. Valve packing shall be "O" ring, self adjusting type contained in a removable corrosion resistant recess. Unless otherwise indicated on the Plans, valves 6 inches and smaller shall be operated by hand lever.
- F. Valves 8 inches and larger shall have a traveling nut hand-wheel operator assembly.
- G. Valves shall be Henry Pratt or equal. Valve shall be able to sit in any position with-out movement and the assist of locking device.

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 15060  
AIR RELEASE VALVES  
(WATER)

PART 1 GENERAL

1.01 SUMMARY

A. Description of Work:

1. Provide air release valves as specified in this section and shown on Drawings.

1.02 SUBMITTALS

A. Manufacturer's Data:

1. Material and component data.
2. Performance data.
3. Product warranties.

B. Submit in accordance with Section 01300

1.03 RELATED SECTIONS

A. 01300 - Submittals

B. 01600 - Materials and Equipment

C. 01610 - Transportation and Handling

1.04 QUALITY ASSURANCE

A. Experience

1. Supplier shall have been manufacturing air release valves for a period of at least five (5) years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. GA Industries: Figure 910, Val-Matic Model 15 or approved equal.

2.02 AIR RELEASE VALVE

- A. ASTM A126 Class B cast iron body with screwed inlet and outlet

1. Valve shall be designed to withstand minimum 150 PSI pressure.
- C. Provide a stainless steel orifice of a diameter suitable for use at a maximum working pressure of 150 PSI.
- D. Stainless steel linkage and float
- E. Replaceable Buna-N seat
- F. The air release valve shall be mounted on a 1" Brass Corporation Stop.

### 2.03 VALVE OPERATION

- A. The valve shall function to prevent the collection of air in pipelines by automatically releasing accumulated air while the system is pressurized.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install valve in accordance with manufacturer's written instructions and approved submittals.
- B. The valve shall be connected to the pumps' discharge piping as shown on the Plans.

END OF SECTION

SECTION 15140  
SUPPORTS AND ANCHORS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe and equipment hangers and supports.
- B. Sleeves and seals.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Placement of roof curbs.

1.3 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Supply of roofing, pipe, duct and equipment supports for placement by this Section.

1.4 RELATED SECTIONS

- A. Section 09900 - Painting.
- B. Section 15410 - Piping.
- C. Section 15430 – Piping Specialties.

1.5 REFERENCES

- A. ASME B31.9 - Building Services Piping
- B. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- C. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- D. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
- E. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

## 1.6 SUBMITTALS

- A. Submit under provisions of Section - Submittals.
- B. Shop Drawings: Indicate system layout with location and detail of special hangers.
- C. Product Data: Provide manufacturers catalog data including load capacity.
- D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
- E. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

## 1.7 REGULATORY REQUIREMENTS – NOT USED

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Commercially made:
  - 1. Grinnell
  - 2. B-Line
  - 3. PHD Manufacturing

### 2.2 PIPE HANGERS AND SUPPORTS

- A. Piping - Water:
  - 1. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
  - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron or Carbon steel, adjustable swivel, split ring.
  - 3. Wall Support for Pipe Sizes to 3 Inches: As specified on Drawings.
  - 4. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange.

### 2.3 ACCESSORIES

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.



## 2.4 INSERTS

- A. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

## 2.5 FLASHING

- A. Metal Flashing: 26 gage thick aluminum.
- B. Metal Counter-flashing: 22 gage thick aluminum.

## 2.6 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: PVC Schedule 80, one size larger of specified pipe size.
- B. Sleeves for Pipes Through Non-fire Rated Walls, Footings, and Potentially Wet Floors: PVC Schedule 80, one size larger of specified size.
- C. Stuffing Insulation: Glass fiber type, non-combustible.
- D. Caulking.

## 2.7 FABRICATION

- A. Size sleeve large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping, when required.
- B. Hangers to be fabricated for process piping as noted on Plans.
- C. Provide hangers and supports as specified

## 3 PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions or as directed by Engineer.

### 3.2 INSERTS

- A. Provide inserts and sleeves to General Contractor for placement in concrete formwork.
- B. Provide inserts and sleeves for placement in masonry walls.
- C. Where inserts are omitted, install stainless steel anchors similar to Hilt's Quick Bolts. Minimum size one half inch diameter with a minimum of 2 inch embedded in concrete. Use clips of stainless steel for securing anchor. Consult with Engineer on specific applications.

### 3.3 PIPE HANGERS AND SUPPORTS

- A. Manufactured name brand hangers.
  - 1. Support piping as scheduled.
  - 2. Place hangers within 12 inches of each horizontal elbow.
  - 3. Use hangers with 1 ½ inch minimum vertical adjustment.
  - 4. Hangers shall be selected whereby pipe movement will not disengage supported pipe and insulation can run there hanger with appropriate saddle. Do not size for direct hanger contact with pipe.

### 3.4 FLASHING

- A. Provide flexible flashing and metal counter-flashing where piping and ductwork penetrate weather or waterproofed roofs.
- B. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.

### 3.5 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors 1 inch above finished floor level. Calk sleeves.
- D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with stuffing or fire stopping insulation as required and calk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

- E. Install stainless steel escutcheons at finished surfaces.
- F. Where sleeves, pipe, conduit stubs and other penetration are provided in this work for installation of materials in the future, seal all such penetrations with a removable seal. Use intrumescent seal for all penetrations with plastic pipe, plastic material or other plastic mechanical and electrical items.

END OF SECTION



## SECTION 15410

### PIPING

#### 1 PART 1 GENERAL

##### 1.1 WORK INCLUDED

- A. Pipe and pipe fittings.
- B. Valves.

##### 1.2 RELATED WORK

- A. Section 02221 - Excavation, Trenching and Backfilling for Utility Systems.
- B. Section 02701 – Polyvinyl Chloride Pipe (Water mains)
- C. Section 02720 – Pressure Pipelines Installation
- D. Section 02722 – Ductile Iron Pipe
- E. Section 09900 - Painting.
- F. Section 15140 - Supports and Anchors.
- G. Section 15430 - Piping Specialties.

##### 1.3 REFERENCES

- A. ASTM D1785 – (1999) Polyvinyl Chloride (PVC) plastic pipe schedules 40, 80, & 120.
- B. ASTM D2466 – (1999) Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80.
- C. ASTM D2855 – (1996) Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings.
- D. Kentucky State Plumbing Law, Regulations and Code. (If above pipe listings conflict with The Kentucky Plumbing Code, Contractor shall install products listed in the Code.

##### 1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide catalog illustrations of valves, sizes, dimensions, trim, and

material type.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 - Contract Closeout.
- B. Maintenance Data: Include valve replacement parts, trim exploded view and list of suppliers within area including names, phone numbers and addresses.
- C. Warranty: Submit manufacturers warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience. Manufacturer must still be in business.

1.8 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
- B. Accept fixtures on site in factory packaging. Inspect for damage.
- C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.10 WARRANTY

- A. Provide one year manufacturer warranty for electrical operated equipment.

1.11 EXTRA MATERIALS

A. Section 01700 - Contract Closeout.

B. Supply one set of valve trim.

## 2 PART 2 PRODUCTS

### 2.1 WATER PIPING, ABOVE GRADE

A. PVC Pipe: ASTM D1785 Schedule 80, solvent cement ASTM D2855, joints/fittings ASTM D2466. NSF 61-91 rating for piping.

### 2.2 ACCEPTABLE MANUFACTURERS - GATE VALVES

A. Grinnell Fig 2910 \*\* 200# bronze ½"-2", threaded \*\*.

B. Stockham Fig B-105 \*\* 125# bronze ¼"-3" threaded\*\*.

C. Hammond Fig IB617 \*\* 125# bronze ¼"-3", threaded \*\*.

D. Substitutions: Under provisions of Section 15010.

### 2.3 GATE VALVES

A. Up to 2 Inches: Bronze body, non-rising stem and handwheel, inside screw, solid wedge or disc or threaded ends.

### 2.4 ACCEPTABLE MANUFACTURERS - GLOBE VALVES

A. Grinnell Fig 3200 \*\* 1/8"-2" 125# bronze, bronze disc, threaded \*\*.

B. Grinnell Fig 3210 \*\* 1/2"-2" 125# bronze, teflon disc, threaded \*\*.

C. Watts Fig B4000 \*\* 1/8"-3" 125# bronze, bronze disc, threaded \*\*.

D. Hammond 1B412 \*\* 1/4"-2" 300# bronze, bronze disc, threaded \*\*.

E. Substitution: Under provision of Section 15010.

### 2.5 GLOBE VALVES

A. Up to 2 Inches: Bronze body, rising stem and handwheel, inside screw, renewable composition disc, screwed ends, with backseating capacity.

### 2.6 ACCEPTABLE MANUFACTURERS - BALL VALVES

- A. Watts B-6800 \*\* 1/4"-2" brass, brass ball, PTFE seat, threaded, full port \*\*.
- B. Hammond 8301 \*\* 1/4"-2" brass, brass ball, TFE seat, threaded \*\*.
- C. Appollo 70-100 series \*\* 1/4"-3" bronze, brass ball, RTFE seat, threaded \*\*.

## 2.7 BALL VALVES

- A. Up to 3 Inches: Stainless steel body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops threaded ends.

## 2.8 ACCEPTABLE MANUFACTURERS - WATER PRESSURE REDUCING VALVES

- A. Watts                    Model No. 25AUB
- B. Wilkins                Model No. BR4
- C. FEBCO                 Model No. 8254
- D. Substitutions:       None acceptable.

## 2.9 WATER PRESSURE REDUCING VALVES

- A. Up to 2 Inches: Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded double union ends. Set at 30 psi.

## 3 PART 3 EXECUTION

### 3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to pump header discharge.

### 3.2 INSTALLATION

#### A. Domestic Water

1. All piping shall be installed according to Kentucky Plumbing Code, latest edition.
2. Route piping in orderly manner.



3. Install piping with proper slope to nearest open faucet whereby system can be drained leaving no pockets of water in system.
4. Install piping to allow for expansion and contraction.
5. Install pipe hangers per Code. Reference Section 15140.
6. Install valves with stems upright or horizontal, not inverted.

### 3.3 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves.
- C. Install ball valves for shut-off and for bypass as noted on plans.

END OF SECTION



SECTION 15430  
PIPING SPECIALTIES

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Floor Drains. (FD).
- B. Hose Bibs. (HB)
- C. Backflow Preventions (BP)

1.2 RELATED SECTIONS

- A. Section 15140 – Supports and Anchors.
- B. Section 15410 - Piping.

1.3 REFERENCES

- A. ASME A112.21.1M - (1998) Floor Drains.
- B. ASSE 1011 - (1995) Hose Connection Vacuum Breakers.
- C. AWWA C511 - (1997) Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types.

1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Provide catalog illustrations of specified items, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Section 01700 - Contract Closeout.

- B. Maintenance Data: Include fixture trim exploded view and replacement parts lists. Also list closest supplier's name, address, phone number and if wholesaler or retailer.
- C. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

## 1.8 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

## 1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
- B. Accept fixtures on site in factory packaging. Inspect for damage.
- C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

## 1.10 WARRANTY

- A. Provide five-year manufacturer warranty for electrical operated equipment.

## 1.11 EXTRA MATERIALS

- A. Section 01700 - Contract Closeout.
- B. Supply two sets of repair parts for backflow preventor.

## 2 PART 2 PRODUCTS

### 2.1 FLOOR DRAINS

- A. Floor Drain (FD-1): Design based on Zurn Model Z 550 or approved equal.

1. Other Manufacturers:
  - a. J.R. Smith Model: 2110 Y.
  - b. Josam Model: Model 32100
  - c. Substitutions: None Acceptable.
2. ANSI A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

## 2.2 FLAP VALVE

- A. Flap Valve – Design based on Neenah CIR – 5004 with SS. Screen on discharge.
  1. Other Manufacturers:
    - a. J.R. Smith Model 7070
    - b. Zurn Model Z1091
  2. Provide with SS screen on discharger
  3. Substitutions: None Acceptable.

## 2.3 HOSE BIBS

- A. Interior: (for use only when chlorinator room provided.)
  1. In pump room Woodford Model Y26
  2. In chlorinator room Woodford Model 26P
  3. Substitutions: None Acceptable

## 2.4 DOUBLE CHECK VALVE ASSEMBLY

- A. Manufacturers:
  1. Wilkins Model 950XLT (3/4" line)
  2. Watts Model 007
  3. Febco Model 800
  4. Substitutions: None Acceptable.
- B. AWWA C511: Bronze body with corrosion resistant internal parts and S.S. springs; two independently operating check valves with intermediate atmospheric vents.
- C. Provide matching air gap with 1" outlet pipe discharging to floor.

## 2.5 PRESSURE GUAGES

### A. Manufacturer:

1. Omega –  
High side of regulator – 0-300 psi; dial 2-1/2” standard case style 1000.  
Low side of regulator – 0-100 psi; dial 2-1/2” standard case style 1000.

### B. Substitutions: None Acceptable.

## 3 PART 3 EXECUTION

### 3.1 PREPARATION

- A. Coordinate forming of floor construction to receive drains to required invert elevations.

### 3.2 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. All backflow preventors will be installed fully accessible and the drip mechanism will be piped to a floor drain or open receptacle.

END OF SECTION

SECTION 15870  
POWER VENTILATORS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof exhausters.

1.2 RELATED SECTIONS

- A. Section 16180 - Equipment Wiring Systems: Electrical characteristics and wiring connections.
- B. Section containing execution requirements for roof mounting curbs specified by this section.

1.3 REFERENCES

- A. Section containing requirements for references and standards.
- B. AMCA 99 - Standards Handbook.
- C. AMCA 261 - Directory of Products Licensed to Bear the AMCA Certified Ratings Seal.
- D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- E. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
- F. NEMA MG1 - Motors and Generators.
- G. NFPA 70 – National Electric Code.
- H. SMACNA – Low Pressure Duct Construction Standards.

1.4 SUBMITTALS FOR REVIEW

- A. Section Submittals: Procedures for submittals.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.

## 1.5 SUBMITTALS FOR INFORMATION

- A. Section Submittals: Procedures for submittals.
- B. Manufacturer's Instructions: Indicate installation instructions.

## 1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Sections describing Operation and Maintenance Data, Warranties and Procedures for submittals.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

## 1.8 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., or other testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

## 2 PART 2 PRODUCTS

### 2.1 WALL EXHAUST VENTILATORS

- A. Manufacturer: Greenheck Model CW Centrifugal Sidewall for EF-1. Greenheck Model S1 Sidewall Propeller Fan for EF-2.
- B. Other acceptable manufacturers offering equivalent products.
  - 1. Jenn-Fan.
  - 2. Penn.
  - 3. Carnes.
  - 4. Substitutions: None acceptable.
- C. Product Requirements:
  - 1. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
  - 2. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
  - 3. Fabrication: Conform to AMCA 99.



- D. Performance:
  - 1. EF-1: Greenheck Model CW-060-D, 120 CFM @ 1/4" S.P. 1/60HP 115/60/1.
  - 2. EF-2: Greenheck Model S1-16-436-B4, 2000 CFM @1/4"S.P. 1/4HP 115V/60/1.
- E. EF-1 Fan Unit: Direct driven, as indicated, with spun aluminum housing; resilient mounted motor; aluminum wire birdscreen; Wall mounting flange.
- F. EF-2 Fan Unit: Direct driven axial type sidewall fan. Galvanized steel frame and housing, steel propeller, permanently lubricated heavy duty type motor. Provide with flush interior wall housing, 45 degree weather hood, and backdraft dampers.
- G. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor and wall mounted switch.
- H. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings.
- I. Where noted provide all aluminum or non-ferrous non-sparking construction. 120% drive factor.

### 3 PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install per manufacturer's instructions.
- B. Secure exhausters with stainless steel attachments to wall.
- C. Install backdraft dampers on inlet to EF-1 and on outlet of wall housing for EF-2.

END OF SECTION



## SECTION 15890

### DUCTWORK

#### 1 PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Duct cleaning.

##### 1.2 RELATED SECTIONS

- A. Section 09900 - Painting: Weld priming, weather resistant, paint or coating.
- B. Section 15140 - Supports and Anchors: Sleeves.
- C. Section 15940 - Air Inlets and Outlets.

##### 1.3 REFERENCES

- A. ASTM A 167 – (1999) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM B209 – (2000) Aluminum and Aluminum-Alloy Sheet and Plate.
- C. AWS D9.1 - Welding of Sheet Metal.
- D. SMACNA HVAC Duct Construction Studs - (1997) HVAC Duct Construction Standards – Metal and Flexible.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. No variation of duct configuration or sizes permitted except by written permission.

##### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

##### 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years experience.
- B. Installer: Company specializing in performing the work of this section with minimum five years experience.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures during and after installation of duct sealants.

## 2 PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Aluminum Ducts: ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061- T6 or of equivalent strength.
- B. Stainless Steel Ducts: ASTM A167, Type 304.
- C. Fasteners: Rivets, bolts, or sheet metal screws.
- D. Sealant:
  - 1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

### 2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

## 3 PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- C. Duct Sizes are inside clear dimensions.

- D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

### 3.2 CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time.

END OF SECTION



SECTION 15940

AIR OUTLETS AND INLETS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Louvers.

1.2 REFERENCES

A. ADC 1062 - Certification, Rating and Test Manual.

B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.

C. ARI 650 - Air Outlets and Inlets.

D. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

E. BOCA – BOCA National Mechanical Code.

F. NFPA 70 - National Electrical Code.

G. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

H. SMACNA – HVAC Duct Construction Standard - (1997) HVAC Duct Construction Standards – Metal and Flexible.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Record actual locations of air outlets and inlets.

## 1.5 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
- B. Test and rate louver performance in accordance with AMCA 500.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Anemostat.
- B. Tuttle & Bailey.
- C. Carnes.

### 2.2 LOUVER – Storm Proof Design.

- A. Design based on Carnes Model FLDC with gravity damper secured on inside with adjustable S.P. weight.
- B. Frame: Aluminum extensions – 6063-T5 alloy, 4” thick.
- C. Blades: “J” hook shape extrusions, storm proof.
- D. Bird Screen: Standard ½” x ½” 19-gauge S.S. wire.

### 2.3 WALL DAMPER

- A. Adjustable gravity operated damper set in 4” thick extruded aluminum frame.
- B. Damper to have adjustable S.P. weight.
- C. Adjustment damper from 1/8” S.P. to ½” S.P.
- D. Sizes to equal 12” x 16” for Louver L-1; 32”x40” for Louver L-2.



3 PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with features, symmetry, and location.

END OF SECTION



## SECTION 16010

### BASIC MECHANICAL/ELECTRICAL REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1. WORK INCLUDED

- A. General Requirements specifically applicable to Division 16.

##### 1.2. CONTRACT DOCUMENTS

- A. The Instructions to Bidders, General and Special Conditions and all other Contract Documents shall apply to the Electrical Contractor's work as well as to each of his subcontractor's work.
- B. Each Contractor is directed to familiarize himself in detail with all documents pertinent to this Contract. In case of conflict between these General Provisions and the General and/or Special Conditions, the affected Contractor shall contact the Engineer for clarification and final determination.

##### 1.3. WORK SEQUENCE

- A. Construct Work in sequence under provisions of this specification.
- B. Schedule power outages with owners' representative.

##### 1.4. COORDINATION

- A. Coordinate the Work specified in this Division under provisions of this specification.
- B. Prepare drawings showing proposed rearrangement of Work to meet job conditions, including changes to Work specified under other Sections. Obtain permission of Engineer/ Engineer before proceeding.

##### 1.5. REFERENCES

- A. ANSI/IEEE C2 - National Electrical Safety Code.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. NECA - Standard of Installation.

## 1.6. REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 70 as incorporated in the Kentucky Building Code.
- B. Conform to ANSI/IEEE C2.
- C. Conform to Kentucky Building Code.
- D. Conform to 702 KAR 4:070.
- E. Inspections: Contractor is to pay for electrical inspection and is to provide a final certificate of inspection.

## 1.7. SUBMITTALS

- A. Submit inspection and permit certificates under provisions of this specification.
- B. Include certificate of final inspection and acceptance from authority having jurisdiction.
- C. Submit shop drawings as specified herein and under Section 01300.
  - 1. Shop drawings and/or manufacturer's descriptive literature shall have the Engineer project numbers indicated thereon and shall be clearly referenced to the specification section number, schedule, materials, etc., so the Engineer may readily determine the particular item the Contractor or subcontractor proposes to furnish. Each submission shall also contain Date Submitted. If shop drawings and/or other items are transmitted by correspondence, each item of correspondence shall bear the Engineer project number.
  - 2. The Contractor shall submit with such promptness as to cause no delay in his own work or in that of any other Contractor, with a two (2) week allowance for the Engineer's review, six (6) copies plus those required by the Contractor and his suppliers, of all Shop drawings and schedules required for the work of the various trades, and the Engineer shall pass on them with reasonable promptness, making desired corrections relating to the design concept. The Contractor shall make any corrections required by the Engineer, and if the Engineer so requests file with him eight (8) corrected copies and furnish such other copies as may be needed. The Engineer's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called to the Engineer's attention such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules. The term "as specified" will not be acceptable as shop drawings must be submitted on all equipment.

3. The Contractor shall request that shop drawings be prepared by the subcontractors and be submitted to him for approval. The Contractor shall correct the shop drawings in colored pencil, if necessary, return them to the subcontractor for correction, then submit correct shop drawings in their final form to the Engineer for approval. All shop drawings must not only bear the Contractor's stamp of approval, but shall show evidence that he has thoroughly checked each drawing submitted. Any drawings submitted without this evidence and stamp of approval will not be considered and will be returned to the Contractor for proper resubmission.
4. Schedules, brochures or equipment, operating instructions and manuals, material literature, etc. shall be processed by the Contractor and submitted to the Engineer for approval in the same manner as outlined herein for shop drawings.
5. The Contractor shall maintain at least one (1) set of all approved shop drawings and specification documents at the site for reference.

## PART 2 – PRODUCTS

### 2.1. MATERIALS AND EQUIPMENT

- A. Materials and Equipment: Acceptable to the authority jurisdiction as suitable for the use intended.
- B. Unregistered Bidders are required to obtain 10 day prior approval.

## PART 3 - EXECUTION

### 3.1. WORKMANSHIP

- A. Install Work using procedures defined in NECA Standard of Installation.

END OF SECTION



SECTION 16111  
CONDUIT

**PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Rigid metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Thickwall nonmetallic conduit.
- F. Fittings and conduit bodies.

1.2 RELATED SECTIONS

- A. Section 16010 – Basic Mechanical/Electrical Requirements  
Section 16130 - Boxes.
- B. Section 16170 – Grounding and Bonding.
- C. Section 16190 - Supporting Devices.
- D. Section 16195 - Electrical Identification.

1.3 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA “Standard of Installation.”
- F. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, metallic tubing, nonmetallic conduit, fittings, conduit bodies.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01720.
- B. Accurately record actual routing of conduits larger than 2 inches.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 01600.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

#### 1.9 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

### **PART 2 - PRODUCTS**

#### 2.1 CONDUIT REQUIREMENTS

- A. Minimum Size:  $\frac{3}{4}$  inch unless otherwise specified.
- B. Underground Installations:
  - 1. More than Five Feet from Foundation Wall:
  - 2. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
  - 3. Within Five Feet from Foundation Wall:
  - 4. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
- C. In or Under Slab on Grade:
  - 1. Use thickwall nonmetallic conduit with galvanized rigid steel elbows through concrete slab.
  - 2. Minimum Size:  $\frac{3}{4}$  inch.
- D. Outdoor Locations, Above Grade:
  - 1. Use rigid steel and intermediate metal conduit.
- E. Wet and Damp Locations:
  - 1. Use thickwall nonmetallic conduit.
- F. Dry Locations:



1. Concealed: Use electrical metallic tubing.
2. Exposed: Use electrical metallic tubing.

## 2.2 RIGID METAL CONDUIT

- A. Manufacturers:
1. Allied Tube & Conduit.
  2. Wheatland Tube Co.
  3. Triangle PWC, DAC.
- Substitutions: Under provisions of Section 01300.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Intermediate Metal Conduit (IMC): Rigid steel.
- D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

## 2.3 FLEXIBLE METAL CONDUIT

- A. Manufacturers:
1. Alflex Corp.
  2. AFC Co.
  3. Electri-Flex Corp.
- Substitutions: Under provisions of Section 01300.
- B. Description: Interlocked steel construction.
- C. Fittings: ANSI/NEMA FB 1.

## 2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
1. Alflex Corp.
  2. AFC Co.
  3. Electri-Flex Corp.
- Substitutions: Under provisions of Section 01300.
- B. Description: Interlocked aluminum construction with PVC jacket.
- C. Fittings: ANSI/NEMA FB 1.

## 2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
1. Allied Tube & Conduit.
  2. Wheatland Tube Co.
  3. Triangle PWC, DAC.
- Substitutions: Under provisions of Section 01300.
- B. Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, compression type.

## 2.6 THICKWALL NONMETALLIC CONDUIT

- A. Manufacturers:

1. Carlon.
  2. Cantex Industries.
  3. Electri-Flex Corp.
- Substitutions: Under provisions of Section 01300.

- B. Description: NEMA TC 2; Schedule 40 PVC.  
 C. Fittings and Conduit Bodies: NEMA TC 3.

### **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Group related conduits; support using conduit rack. Construct rack using steel channel.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190.
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports
- H. Do not attach conduit to ceiling support wires.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route conduit parallel and perpendicular to walls.
- K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- L. Route conduit in and under slab from point-to-point.
- M. Do not cross conduits in slab.
- N. Provide two coats of asphaltum paint on all underground or underslab metal conduits.
- O. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- P. Cut conduit square using saw or pipecutter; de-burr cut ends.
- Q. Bring conduit to shoulder of fittings; fasten securely.
- R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- S. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.
- T. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender or factory elbows for bends in metal conduit larger than 2 inch size.
- U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- V. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- W. Provide suitable pull string in each empty conduit except sleeves and nipples.
- X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- Y. Ground and bond conduit under provisions of Section 16170.
- Z. Exposed surface mounted conduit feeding device boxes in finished areas shall be mounted securely to wall with one-hole straps and offset at device box connections. Conduit hangers

with exposed bolts used to space the conduit from the wall shall not be acceptable for this type installation.

### 3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION



**SECTION 16120****CONDUCTORS, SPLICING DEVICES AND CONNECTORS****1. GENERAL**

- A. This section of the Specifications covers all of the electrical power, lighting, and control power (line voltage) conductors. It does not include voice/data conductors, but does include all drag wires for empty conduits.
- (1) All conduits installed without conductors shall have a 200 lb. test nylon string installed for future use, tied off securely at each end.
- B. No more than 40% conduit fill is permitted for any conduit system, including video, intercom, data, power or other signal circuits unless specifically indicated otherwise on the Plans.
- C. No more than five conductors shall be installed in conduit except for switch legs and travelers in multi-point switching arrangements.
- D. If more than three phases are installed in a single raceway, an additional equipment grounding conductor and neutral shall be installed as indicated by the number of phase conductors.

**2. MATERIALS****A. CONDUCTORS**

- (1) All conductors shall be 98% conductive annealed copper unless otherwise noted, UL listed and labeled.
- (2) Lighting and receptacle branch circuits shall be not less than No. 12 copper wire or of the sizes shown on the drawings with Type THW, THHN or THWN insulation. All feeder circuits shall be Type THW or THHN of the size as shown on the Contract Drawings.
- (3) Conductors No. 10 and smaller sizes of wire shall be solid. Conductors No. 8 and larger sizes shall be stranded. No. 14 AWG drag wire shall be installed in all empty conduit and stubs for future use, as indicated. Conductors for fire alarm wiring and control wiring shall be stranded.
- (4) All wire on the project shall be new, in good condition, and shall be delivered in standard coils or reels.
- (5) The color of the wire shall be selected to conform with Section 210-5 of the latest edition of the National Electrical Code. Refer also to 16J-4, Color Coding.
- (6) All equipment grounding conductors shall have green color insulation.

- (7) Conductors used for motor connections and connections to vibrating or oscillating equipment shall be extra flexible.
- (8) Conductors for main ground from neutral bus, equipment grounding bus, building steel, grounding grid and main cold water pipe connection shall be bare copper.
- (9) All conductors shall be identified by color code and by means of labels placed on conductors in junction boxes and at terminal points with Brady, Gardner, T & B or approved equivalent labels indicating source, circuit No. or terminal No.

#### B. SPLICING DEVICES & CONNECTORS

- (1) Splicing devices for use on No. 14 to No. 10 AWG conductors shall be pressure type such as T & B "STA-KON", Burndy, Reliable or approved equivalent.
- (2) Terminating pressure applied ring type (or fork with upturned ends) terminations shall be employed on motor and equipment terminals where such terminals are provided on motor and equipment leads.
- (3) The use of split-bolt clamps will be permitted in wireways at service entrance only. Torque to 55 foot-pounds or as recommended by manufacturer.
- (4) Large connectors (lugs) shall be mechanical type, hex-head socket or crimp-on style, installed per the manufacturer's recommendations.
- (5) If aluminum feeder conductors are permitted elsewhere in these Specifications, all aluminum terminations shall be made with mechanical crimp type connectors with steel pins for inserting in lugs, Burndy, or equivalent.
- (6) No aluminum conductors shall be permitted to be used for branch circuitry.
- (7) Exterior underground connections made between bare ground wires or to ground rods shall be exothermically welded, "Cadweld" or equivalent.
- (8) Splices, where necessary shall be made with hydraulically-set "Hy-press" or equivalent crimped connectors. All splices shall be insulated to the full value of the wiring insulation using a cold-shrink kit or the equivalent in built-up materials.

### 3. INSTALLATION

- A. The pulling of all wires and cable on this project shall be performed in strict compliance with applicable sections of the National Electrical Code. No conductor entering or leaving a cabinet or box shall be deflected in such a manner as to cause excess pressure on the conductor insulation and after all insulation and insulating bushings are in place.

- B. The radius of bending of conductors shall be not less than eighteen (18) times the outside diameter of the conductor insulation.
  - C. Conductors installed within environmental air plenums shall be per N.E.C., teflon-type insulation or approved equivalent.
  - D. Conductors that are installed exposed shall not be routed across ceilings or ductwork. They shall be held up against building structure or against permanent support members. They shall be installed in such a manner that they do not interfere with the operation of equipment or removal of ceiling tiles. Nylon tie-wraps shall be installed in such a manner so as to bundle conductors neatly, allowing run-outs of single conductors or groups to drop down to equipment served. Install grommeting where dropping out of trays or into panels or service columns. Install sleeves with bushings where penetrating partitions. Firestop sleeves with approved material. Do not penetrate firewalls if so indicated on plans.
  - E. Maximum permissible pulling tensions, as recommended by the manufacturer for any given type of cable or wire installed shall not be exceeded. Utilize special remote readout equipment as required to ensure compliance.
4. COLOR CODING DISTRIBUTION VOLTAGE CONDUCTORS, 600 VOLT OR LESS
- A. Conductors to be color coded as follows:
    - (1) 480/277 Volt Conductors
      - Phase A – Brown
      - Phase B – Orange
      - Phase C – Yellow
      - Neutral – Gray
    - (2) 120/208 Volt Conductors
      - Phase A - Black
      - Phase B - Blue
      - Phase C - Red
      - Neutral - White
    - (3) Control Wiring - Red, or as indicated.
    - (4) Conductors within enclosures that may be energized when enclosure disconnect is off - yellow, or taped with ½" yellow tape every 6" of length, inside enclosure. Provide lamacoid plate warning sign on front of enclosure where this condition occurs.
    - (5) D.C. Wiring : Positive - Light Blue, Negative - Dark Blue

END OF SECTION





SECTION 16123  
BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 RELATED SECTIONS

- A. Section 16111 - Conduit.
- B. Section 16130 - Boxes.
- C. Section 16195 - Identification.

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide for each cable assembly type.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

## 1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

## 1.8 COORDINATION

- A. Determine required separation between cable and other work.
- B. Determine cable routing to avoid interference with other work.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS - BUILDING WIRE AND CABLE

- A. Capital Wire and Cable.
- B. General Cable.
- C. Carol.
- D. Substitutions: Under provisions of Section 01300.

### 2.2 BUILDING WIRE AND CABLE

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THHN/THWN.

### 2.3 WIRING CONNECTORS

- A. Split Bolt Connectors:
  - 1. Burndy.

2. IlSCO.
  3. Kearney.
  4. Substitutions: Under provisions of Section 01300.
- B. Solderless Pressure Connectors:
1. Buchanan.
  2. Ideal.
  3. Thomas & Betts.
  4. Substitutions: Under provisions of Section 01300.
- C. Spring Wire Connectors:
1. Buchanan.
  2. Ideal.
  3. Thomas & Betts.
  4. Substitutions: Under provisions of Section 01300.
- D. Compression Connectors:
1. Buchanan.
  2. Ideal.
  3. Thomas & Betts.
  4. Substitutions: Under provisions of Section 01300.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.

### 3.2 WIRING METHODS

- A. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- B. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- C. Above Accessible Ceilings: Use only building wire, Type THHN/THWN insulation, in raceway.
- D. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.

- E. Exterior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
- F. Underground Installations: Use only building wire, Type THHN/THWN insulation, in raceway.

### 3.3 INSTALLATION

- A. Install products in accordance with manufacturers instructions.
- B. Use solid conductor for feeders and branch circuits 12 AWG and smaller.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 16 AWG for control circuits.
- F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- I. Protect exposed cable from damage.
- J. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- K. Use suitable cable fittings and connectors.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- M. Clean conductor surfaces before installing lugs and connectors.
- N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- O. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- P. Use solderless pressure connectors with insulating covers for copper conductor

splices and taps, 8 AWG and smaller.

- Q. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- R. Terminate stranded conductors under screws using crimp-on wire terminals. Wrapping stranded wire around screw stem and tightening shall not be permitted.

### 3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 16195.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

### 3.5 FIELD QUALITY CONTROL

- A. Inspect wire and cable for physical damage and proper connection.
- B. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- C. Verify continuity of each branch circuit conductor.

END OF SECTION



## SECTION 16130

### BOXES

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Wall and ceiling device boxes.
- B. Pull and junction boxes.

##### 1.2 RELATED SECTIONS

- A. Section 16141 - Wiring Devices
- B. Section 16160 – Cabinets and Enclosures.

##### 1.3 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

##### 1.4 SUBMITTALS FOR CLOSEOUT

- A. Operation and Maintenance Data: Submittals for Project closeout.
- B. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

##### 1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.

- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

## PART 2 - PRODUCTS

### 2.1 DEVICE BOXES (RECESSED)

- A. Sheet Metal Device Boxes: NEMA OS 1, galvanized steel.
  - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
  - 2. Concrete Ceiling Boxes: Concrete type.
- B. Nonmetallic Device Boxes: NEMA OS 2.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- D. Wall Plates for Finished/Unfinished Areas: As specified in Section 16140.

### 2.2 DEVICE BOXES (SURFACE)

- A. Cast Aluminum Device Boxes: NEMA FB 1, aluminum.
  - 1. Surface mounted device boxes shall be cast aluminum box with threaded conduit openings. Exterior of box shall be smooth with unused conduit openings filled with flush sealing plugs. Exterior of box, surface conduit and hangers shall be painted to match wall finish. Standard wall plates as specified in Section 16140 shall be used. Wall plate size shall be selected to match the exterior dimension of the box as closely as possible to avoid overhanging edge of box. Box shall be mounted using mounting ears in wet locations and mounted through holes in the back of the box in dry locations.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer for wet locations.

### 2.3 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 16160.



## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
- E. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
- F. Maintain headroom and present neat mechanical appearance.
- G. Install boxes to preserve fire resistance rating of partitions and other elements.
- H. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- I. Align adjacent wall mounted device boxes for switches, thermostats, and similar devices.
- J. Use flush mounted device box in finished areas.
- K. Locate flush mounted device box in masonry wall to require cutting wall of masonry unit in block opening only. Coordinate masonry cutting to achieve neat opening.
- L. Do not install flush mounted boxes back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- M. Secure flush mounted boxes to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- N. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

- O. Use adjustable steel channel fasteners for hung ceiling outlet box.
- P. Do not fasten boxes to ceiling support wires.
- Q. Support boxes independently of conduit.
- R. Use gang box where more than one device is mounted together. Do not use sectional box.
- S. Use gang box with plaster ring for single device outlets.
- T. Use cast device box in exterior locations exposed to the weather and other wet locations.
- U. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

### 3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation of device boxes for equipment connected under Section 16180.

### 3.3 ADJUSTING

- A. Section 01650 - Testing, Adjusting, and Balancing: Adjusting installed work.
- B. Adjust flush-mounting devices to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

### 3.4 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 16141  
WIRING DEVICES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Wall switches.
- B. Receptacles.
- C. Device plates and box covers.

1.02 REFERENCES

- A. NEMA WD 1 - General-Purpose Wiring Devices.
- B. NEMA WD 5 - Specific-Purpose Wiring Devices.

1.03 RELATED SECTIONS

- A. 01300 - Submittals.
- B. 01600 - Materials and Equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - WALL SWITCHES.

- A. Hubbell.
- B. Pass & Seymour.
- C. Arrow Hart.
- D. Slater.

2.02 WALL SWITCHES

- A. Wall Switches for Lighting Circuits and Motor Loads Under 1/2 HP: NEMA WD; 1 AC general use snap switch with toggle handle, rated 20 amperes and 120 volts AC. Handle: Ivory plastic.
- B. Pilot Light Type: Lighted handle.

C. Locator Type: Lighted handle.

## 2.03 ACCEPTABLE MANUFACTURERS - RECEPTACLES

- A. Hubbell.
- B. Pass & Seymour.
- C. Arrow Hart.
- D. Slater.

## 2.04 RECEPTACLES

- A. Convenience and Straight-blade Receptacles: NEMA WD 1.
- B. Locking-Blade Receptacles: NEMA WD 5.
- C. Convenience Receptacle Configuration: NEMA WD 1; Type 5-20 R, ivory plastic face.
- D. Specific-use Receptacle Configuration: NEMA WD 1 or WD 5; type as indicated on Drawings, ivory plastic face.
- E. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter.

## 2.05 ACCEPTABLE MANUFACTURERS - WALL PLATES

- A. Hubbell.
- B. Pass & Seymour.
- C. Arrow Hart.
- D. Slater.

## 2.06 WALL PLATES

- A. Cover Plates: Stainless Steel.
- B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device covers.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install wall switches 48 inches above floor, OFF position down.
- B. Install convenience receptacles 18 inches above floor, grounding pole on bottom.
- C. Install specific-use receptacles at heights shown on Contract Drawings.
- D. Install stainless steel plates on outlet boxes and junction boxes in unfinished areas, and on surface-mounted outlets.
- E. Install devices and wall plates flush and level

END OF SECTION



## SECTION 16160

### CABINETS AND ENCLOSURES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Hinged cover enclosures.

##### 1.02 RELATED SECTIONS

- A. Section 16010 - Basic Electrical Requirements.

##### 1.03 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment.
- B. ANSI/NFPA 70 - National Electrical Code.

##### 1.04 SUBMITTALS

- A. Submit under provisions of Section 16010.
- B. Product Data: Provide manufacturer's standard data for enclosures and cabinets.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

##### 1.05 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

##### 1.06 EXTRA MATERIALS

- A. Provide two of each cabinet key.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Westinghouse Electric Corp.
- B. Hoffman Engineering Company
- C. E. M. Wiegmann & Company
- D. Substitutions: Under provisions of Section 16010.

## 2.02 HINGED COVER ENCLOSURES

- A. Boxes construction: NEMA 250, Type 1 Galvanized steel.
- B. Box Size: 24 inches wide by 30 inches high by 6 inches deep.
- C. Backboard: Provide 3/4 inch thick plywood backboard for mounting terminal blocks. Paint matte white.
- D. Fronts: Steel, flush type with front, concealed hinge, and flush lock. Finish with gray baked enamel.
- E. Knockouts: none.
- F. Provide metal barriers to separate compartments containing telephone wiring from data wiring.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify conditions under provisions of Section 16010.
- B. Verify that surfaces are ready to receive Work.

### 3.02 INSTALLATION

- A. Install Products in accordance with manufacturer's instructions.
- B. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner.
- C. Install cabinet fronts plumb.

END OF SECTION



SECTION 16170  
GROUNDING & BONDING

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Requirements of the following Division 16 Sections apply to this Section:
  - 1. Section 16010 "Basic Electrical Requirements."

1.2 SUMMARY

- A. This Section includes solid grounding of electrical systems and equipment. It includes basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other sections of these Specifications.
- B. Related Sections: The following sections contain requirements that relate to this Section:
  - 1. Division 11 Section "Packaged Pump Stations" for station grounding.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for ground rods, connectors and connection materials, and grounding fittings.
- C. Field-testing organization certificate, signed by the Contractor, certifying that the organization performing field tests complies with the requirements specified in Quality Assurance below.
- D. Report of field tests and observations certified by the testing organization.

## 1.4 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled. The terms "listed" and "labeled" shall be defined as they are in the National Electrical Code, Article 100.
  - 1. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code" (NEC).
- C. UL Standard: Comply with UL 467, "Grounding and Bonding Equipment."

## 2 PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- 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. Anixter Bros., Inc.
  - 2. Bashlin Industries, Inc.
  - 3. Buckingham Mfg. Co.
  - 4. A.B. Chance Co.
  - 5. Dossert Corp.
  - 6. Engineered Products Co.
  - 7. Erico Products, Inc.
  - 8. Galvan Industries, Inc.
  - 9. GB Electrical, Inc.
  - 10. General Machine Products Co., Inc.
  - 11. Hastings Fiber Glass Products, Inc.
  - 12. Ideal Industries, Inc.
  - 13. Kearney-National.
  - 14. McGill Mfg.
  - 15. O-Z/Gedney Co.
  - 16. Racor, Inc.
  - 17. Thomas & Betts Corp.
  - 18. W.H. Salisbury & Co.
  - 19. Utilco Co.

### 2.2 GROUNDING AND BONDING PRODUCTS

- A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.
- B. Conductor Materials: Copper.

## 2.3 WIRE AND CABLE CONDUCTORS

- A. General: Comply with Division 16 Section "Wires and Cables." Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
- B. Equipment Grounding Conductor: Green insulated.
- C. Grounding Electrode Conductor: Stranded cable.
- D. Bare Copper Conductors: Conform to the following:
  - 1. Solid Conductors: ASTM B-3.
  - 2. Assembly of Stranded Conductors: ASTM B-8.
  - 3. Tinned Conductors: ASTM B-33.

## 2.4 MISCELLANEOUS CONDUCTORS

- A. Ground Bus: Bare annealed copper bars of rectangular cross section.
- B. Braided Bonding Jumpers: Copper tape, braided No. 30 gage bare copper wire, terminated with copper ferrules.
- C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

## 2.5 CONNECTOR PRODUCTS

- A. General: Listed and labeled as grounding connectors for the materials used.
- B. Pressure Connectors: High-conductivity-plated units.
- C. Bolted Clamps: Heavy-duty units listed for the application.
- D. Exothermic Welded Connections: Provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

## 2.6 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten welded to core.
  - 1. Size: 5/8 inch by 8 feet.
- B. Plate Electrodes: Copper plates, minimum 0.10 inch thick, size as indicated.

### 3 PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. Equipment Grounding Conductor Application: Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.
  - 1. Install separate insulated equipment grounding conductors with circuit conductors for the following in addition to those locations where required by Code:
    - a. Feeders and branch circuits.
  - 2. Busway Circuits: Install separate insulated equipment ground conductor from the ground bus in the switchgear, switchboard, or distribution panel to the equipment ground bar terminal on the busway.
  - 3. Computer Panel Circuits: Install separate insulated equipment ground wire in branch circuits from computer area power panels.
  - 4. Nonmetallic Raceways: Install an insulated equipment ground conductor in nonmetallic raceways unless they are designated for telephone or data cables.
  - 5. Air Duct Equipment Circuits: Install an insulated equipment grounding conductor to duct-mounted electrical devices operating at 120-V and above including air cleaners and heaters. Bond the conductor to each such unit and to the air duct.
- B. Underground Conductors: Bare, stranded copper except as otherwise indicated.
- C. Signal and Communications: For telephone, alarm, and communication systems, provide a #4 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each terminal cabinet or central equipment location.
- D. Separately derived systems required by NEC to be grounded shall be grounded in accordance with NEC paragraph 250-26.

#### 3.2 INSTALLATION

- A. General: Ground electrical systems and equipment in accordance with NEC requirements except where the Drawings or Specifications exceed NEC requirements.
- B. Ground Rods: Locate a minimum of one-rod length from each other and at least the same distance from any other grounding electrode. Interconnect ground rods with bare conductors buried at least 24 inches below grade. Connect bare-cable ground conductors to ground rods by means of exothermic welds except as otherwise indicated. Make these connections without damaging the copper coating or exposing the steel. Use 3/4-inch by 10-ft. ground rods except as otherwise indicated. Drive rods until tops are 6 inches below finished floor or final grade except as otherwise indicated.
- C. Route grounding conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

### 3.3 CONNECTIONS

- A. General: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
1. Use electroplated or hot-tin-coated materials to assure high conductivity and make contact points closer in order of galvanic series.
  2. Make connections with clean bare metal at points of contact.
  3. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps.
  4. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
  5. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.
- B. Exothermic Welded Connections: Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground bus in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors.
- D. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Compression-Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.
- G. Moisture Protection: Where insulated ground conductors are connected to ground rods or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

### 3.4 OVERHEAD LINE GROUNDING

- A. General: Comply with ANSI C2, "National Electrical Safety Code" for "Single-Grounded Systems," using two electrodes in parallel if a single electrode resistance to ground exceeds 25 ohms.
- B. Ground Rod Connections: Use exothermic welds for underground connections and connections to rods.
- C. Secondary Neutral and Tank of Transformer: Interconnect and connect to ground.
- D. Grounding Conductor Protection: Protect grounding conductors running on the surface of wood poles with molding of a type manufactured for this purpose. Extend from grade level up to and through communications and transformer spaces.

### 3.5 FIELD QUALITY CONTROL

- A. Tests: Subject the completed grounding system to a megger test at each location where a maximum ground resistance level is specified, at service disconnect enclosure ground terminal, and at ground test wells. Measure ground resistance without the soil being moistened by any means other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
- B. Ground/resistance maximum values shall be as follows:
  - 1. Equipment rated 500 kVA and less: 10 Ohms
  - 2. Equipment rated 500 kVA to 1000 kVA: 5 Ohms
  - 3. Equipment rated over 1000 kVA: 3 Ohms
  - 4. Unfenced substations and pad-mounted equipment: 5 Ohms
- C. Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values.

END OF SECTION

## SECTION 16180

## EQUIPMENT WIRING

## 1 PART 1 – GENERAL

## 1.1 SECTION INCLUDES

- A. Electrical connections to equipment.

## 1.2 RELATED SECTIONS

- A. Section 16111 - Conduit.
- B. Section 16120 - Conductors, Splicing Devices And Connectors
- C. Section 16130 - Boxes.

## 1.3 REFERENCES

- A. Section 01400 - Quality Control: 01090 - Reference Standards: Requirements for references and standards.
- B. NEMA WD 1 - General Purpose Wiring Devices.
- C. NEMA WD 6 - Wiring Devices - Dimensional Requirements.
- D. NFPA 70 - National Electrical Code.

## 1.4 SUBMITTALS FOR REVIEW

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data (Shop Drawing): Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.

## 1.5 SUBMITTALS FOR INFORMATION

- A. Section 01300 - Submittals: Submittals for information.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

## 1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

## 1.7 COORDINATION

- A. Section 01039 - Coordination.
- B. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- C. Determine connection locations and requirements.

- D. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- E. Sequence electrical connections to coordinate with start-up of equipment.

## 2 PART 2 – PRODUCTS

### 2.1 CORDS AND CAPS

- A. Manufacturers:
  - 1. Hubbell.
  - 2. Pass and Seymour.
  - 3. Carol.
  - 4. Substitutions: Refer to Section 01600 - Material and Equipment.
- B. Attachment Plug Construction: Conform to NEMA WD 1.
- C. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
- D. Cord Construction: NFPA 70, Type SJO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

## 3 PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Section 01039 - Coordination and Meetings: Verification of existing conditions prior to beginning work.
- B. Verify that equipment is ready for electrical connection, wiring, and energization.

### 3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION



SECTION 16190  
SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.2 REFERENCES

- A. Reference Standards under provisions of Section 16010.
- B. NECA Standard of Installation (National Electrical Contractors Association).
- C. NFPA 70 - National Electrical Code.

1.3 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Section 16010 and Section 01300.
- B. Product Data: Provide manufacturer's catalog data for fastening systems.

1.4 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Corrosion resistant.

- B. Select materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit, including weight of wire in conduit.
- C. Anchors and Fasteners:
  - 1. Concrete Structural Elements: Use precast inserts, expansion anchors, powder actuated anchors and preset inserts.
  - 2. Steel Structural Elements: Use beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
  - 3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
  - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
  - 5. Solid Masonry Walls: Use expansion anchors and preset inserts.
  - 6. Sheet Metal: Use sheet metal screws.
  - 7. Wood Elements: Use wood screws.

## 2.2 FORMED STEEL CHANNEL

- A. Manufacturers:
  - 1. Unistrut.
  - 2. B-Line.
  - 3. MP Husky Corp.
- B. Description: Galvanized or Painted steel.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Locate and install anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
  - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
  - 2. Do not use spring steel clips and clamps.
  - 3. Obtain permission from Engineer before using powder-actuated anchors.

4. Obtain permission from Engineer before drilling or cutting structural members.
- B. Fabricate supports from structural steel or formed steel members. Rigidly weld members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- C. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
- E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION



## SECTION 16195

### ELECTRICAL IDENTIFICATION

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. Nameplates.
- B. Wire and cable markers.

##### 1.2 RELATED SECTIONS

- A. Section 16130 - Boxes.

##### 1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

##### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.

##### 1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

#### PART 2 - PRODUCTS

##### 2.1 NAMEPLATES

- A. Nameplates: Engraved three-layer laminated plastic, white letters on black background.
- B. Locations:
  - 1. Each electrical distribution and control equipment enclosure.

2. Communication cabinets.

3. Motor Starters.

C. Letter Size:

1. Use 1/8 inch letters for identifying individual equipment and loads.

2. Use 1/4 inch letters for identifying grouped equipment and loads.

## 2.2 WIRE MARKERS

A. Manufacturers:

1. Panduit.

2. Brady.

3. Thomas & Betts.

4. Substitutions: Under provisions of Section 01300.

B. Description: Tape, split sleeve, or tubing type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings

## 2.3 UNDERGROUND WARNING TAPE

A. Manufacturers:

1. Panduit.

2. Thomas & Betts.

3. Thor Enterprises.

4. Substitutions: Under provisions of Section 01300.

B. Description: 4 inch wide plastic tape, colored red with suitable warning legend describing buried electrical lines.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates.

### 3.2 APPLICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using adhesive.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

END OF SECTION





SECTION 16440  
DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Disconnect switches.
- B. Fuses.
- C. Enclosures.

1.2 REFERENCES

- A. ANSI/UL 198C - High-Intensity Capacity Fuses; Current Limiting Types.
- B. ANSI/UL 198E - Class R Fuses.
- C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).
- D. FS W-S-865 - Switch, Box, (Enclosed), Surface-Mounted.
- E. NEMA KS 1 - Enclosed Switches.

1.3 SUBMITTALS

- A. Submit product data under Section 01300 - Submittals.
- B. Include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

1.4 RELATED SECTION

- A. Section 01600 - Materials and Equipment.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - DISCONNECT SWITCHES

- A. Square D.
- B. General Electric.
- C. Westinghouse.

- D. Substitutions: Approved equal.

## 2.2 DISCONNECT SWITCHES

- A. Fusible Switch Assemblies: NEMA KS 1; FS W-S-865; quick- make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F-870. Designed to accommodate Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1; Type HD; GD; FS W-S-865; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1; Type 1 or 3R.

## 2.3 ACCEPTABLE MANUFACTURERS - FUSES

- A. Buss.
- B. LittellFuse.
- C. Gould.
- D. Substitutions: Approved equal.

## 2.4 FUSES

- A. Fuses 600 Amperes and Less: ANSI/UL 198C, Class J or RK1; current limiting, dual-element, time delay, one-time fuse, 250 and 600 volt.
- B. Interrupting Rating: 200,000 rms amperes.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install disconnect switches where indicated on Drawings.
- B. Install fuses in fusible disconnect switches.

END OF SECTION

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1. WORK INCLUDED

- A. Distribution panelboards.
- B. Branch circuit panelboards.

1.2. RELATED SECTIONS

- A. Section 16190 - Supporting Devices.
- B. Section 16195 - Electrical Identification: Engraved nameplates.

1.3. REFERENCES

- A. NECA (National Electrical Contractors Association) "Standard of Installation."
- B. NEMA AB 1 - Molded Case Circuit Breakers.
- C. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- D. NEMA KS 1 - Enclosed Switches.
- E. NEMA PB 1 - Panelboards.
- F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- G. NFPA 70 - National Electrical Code.

1.4. SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

- C. **Manufacturer's Installation Instructions:** Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

#### 1.5. PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01700.
- B. Record actual locations of Products; indicate actual branch circuit arrangement.

#### 1.6. OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01700.
- B. **Maintenance Data:** Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

#### 1.7. QUALITY ASSURANCE

Perform Work in accordance with NECA Standard of Installation.

#### 1.8. QUALIFICATIONS

**Manufacturer:** Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

#### 1.9. REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

#### 1.10. MAINTENANCE MATERIALS

- A. Provide maintenance materials under provisions of Section 01700.
- B. Provide two of each panelboard key.

### PART 2 - PRODUCTS

#### 2.1. MANUFACTURERS

- A. Square D.
- B. General Electric.
- C. Westinghouse/Cutler Hammer.
- D. Substitutions: Under provisions of Section 01300.

## 2.2. DISTRIBUTION PANELBOARDS

- A. Panelboards: NEMA PB 1, circuit breaker type.
- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: 22,000 amperes rms symmetrical for 240 volt panelboards, or as indicated.
- D. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- E. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1. Provide circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
- F. Controllers: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower, with melting alloy overload relay. Coil operating voltage: 240 volts, 60 Hertz. Size as shown on Drawings. Provide HAND-OFF-AUTO selector, STOP-START pushbutton station, and GREEN indicating light in front cover.
- G. Provide circuit breaker accessory trip units and auxiliary switches as indicated.
- H. Enclosure: As indicated.
- I. Cabinet Front: Surface type, fastened with concealed trim clamps. Provide hinged door with flush lock. Finish in manufacturer's standard gray enamel.

## 2.3. BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1, circuit breaker type.

- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: 22,000 amperes rms symmetrical for 240 volt panelboards, or as indicated.
- D. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
- E. Enclosure: As indicated.
- F. Cabinet Front: Surface cabinet front with concealed trim clamps, concealed hinge, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

## PART 3 – EXECUTION

### 3.1. INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb. Provide supports in accordance with Section 16190.
- C. Height: 6 ft to top of panelboard; install panelboards taller than 6 ft with bottom no more than 4 inches above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 16195.

### 3.2. FIELD QUALITY CONTROL

Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

SECTION 16480  
MOTOR CONTROL

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Magnetic motor starters.
- B. Motor control centers.
- C. Motor starter panel boards.

1.02 RELATED WORK

- A. Section 16190 - Supporting Devices: Housekeeping pads.

1.03 REFERENCES

- A. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- B. ANSI/IEEE 344 - Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations.
- C. ANSI/UL 198C - High-Intensity Capacity Fuses; Current-Limiting Types.
- D. ANSI/UL 198E - Class R Fuses.
- E. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service.
- F. FS W-P-115 - Power Distribution Panel.
- G. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).
- H. FS W-S-865 - Switch, Box, (Enclosed), Surface-Mounted.
- I. NEMA AB 1 - Molded Case Circuit Breakers.
- J. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.
- K. NEMA KS 1 - Enclosed Switches.
- L. NEMA PB 1 - Panel boards.

- M. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panel boards Rated 600 Volts or Less.

#### 1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of this specification.
- B. Indicate on shop drawings, front and side views of motor control center enclosures with overall dimensions. Include conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground; electrical characteristics including voltage, frame size and trip ratings, withstand ratings, and time-current curves of all equipment and components.
- C. Provide product data on motor starters and combination motor starters, relays, pilot devices, and switching and overcurrent protective devices.
- D. Submit manufacturers' instructions under provisions of this specification.

#### 1.05 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of this specification.
- B. Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of this specification.
- B. Deliver in 60-inch maximum width shipping splits, individually wrapped for protection, and mounted on shipping skids.
- C. Store and protect products under provisions of this specification.
- D. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- E. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to motor control center components, enclosure, and finish.



## 1.07 SPARE PARTS

- A. Keys: Furnish 3 each to Owner.

## PART 2 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS - MOTOR STARTERS

- A. Square D.
- B. General Electric.
- C. Westinghouse.
- D. Substitutions: Approved equal.

### 2.02 MAGNETIC MOTOR STARTERS

- A. Magnetic Motor Starters: NEMA ICS 2; AC general-purpose Class A magnetic controller for induction motors rated in horsepower.
- B. Full Voltage Starting: Non-reversing type.
- C. Coil Operating Voltage: 120 volts, 60 Hertz.
- D. Size: NEMA ICS 2; size as shown on Drawings.
- E. Overload Relay: NEMA ICS 2; melting alloy.
- F. Enclosure: NEMA ICS 6; Type 1.
- G. Auxiliary Contacts: NEMA ICS 2; two and normally closed field convertible contacts in addition to seal-in contact.
- H. Pushbuttons: NEMA ICS 2; START/STOP in front cover.
- I. Indicating Lights: NEMA ICS 2; RUN: green in front cover.
- J. Selector Switches: NEMA ICS 2; HAND/OFF/AUTO locking type in front cover.
- K. Relays: NEMA ICS 2.

## 2.04 CONTROLLER OVERCURRENT PROTECTION AND DISCONNECTING MEANS

- A. Molded Case Thermal-Magnetic Circuit Breakers: NEMA AB\1; FS W-C-375; circuit breakers with integral thermal and instantaneous magnetic trip in each pole.
- B. Motor Circuit Protector: NEMA AB 1; FS W-C-375; circuit breakers with integral instantaneous magnetic trip in each pole.
- C. Nonfusible Switch Assemblies: NEMA KS 1; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

## 2.05 ACCEPTABLE MANUFACTURERS - MOTOR CONTROL CENTER

- A. Square D.
- B. General Electric.
- C. Westinghouse.
- D. Substitutions: Approved equal.

## 2.06 MOTOR CONTROL CENTER

- A. Motor Control Centers: NEMA ICS 2; Class I Type A.
- B. Main Overcurrent Protection: As scheduled.
- C. Motor Starters: As scheduled.
- D. Feeder Tap Units: As scheduled.
- E. Voltage Rating: 120/240 volts, three phase, four wire, 60 Hertz.
- F. Horizontal Bussing: Copper with a continuous current rating of 400 amperes. Include copper ground bus entire length of control center.
- G. Vertical Bussing: NEMA ICS 2; copper.
- H. Integrated Equipment Short Circuit Rating: 22K amperes rms symmetrical at 600 volts.
- I. Configuration: Units front mounting only, accessible from the front and rear.

- J. Enclosure: ANSI/NEMA ICS 6; Type 1 or 12.
- K. Finish: Manufacturer's standard gray enamel.
- L. Seismic Requirements: ANSI/IEEE 344; Class I.

#### 2.07 ACCEPTABLE MANUFACTURERS - MOTOR STARTER PANELBOARD

- A. Square D.
- B. General Electric.
- C. Westinghouse.
- D. Substitutions: Approved equal.

#### 2.08 MOTOR STARTER PANELBOARD

- A. Motor Starter Panel boards: NEMA PB 1; circuit breaker type.
- B. Motor Starters: As indicated on Drawings.
- C. Enclosure: NEMA PB 1; Type 1.
- D. Provide surface cabinet front with concealed trim clamps, and hinged door with flush lock. Finish in manufacturer's standard gray enamel.
- E. Provide motor starter panel boards with copper bus, ratings as scheduled on Drawings. Provide copper ground bus in all motor starter panel boards.
- F. Minimum Integrated Short Circuit Rating: 22K amperes rms symmetrical at 240 volts, three phase.

#### 2.09 FUSES

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install motor control equipment in accordance with manufacturer's instructions.
- B. Motor Starter Panel board Installation: In conformance with NEMA PB 1.1.
- C. Install fuses in fusible switches.

- D. Select and install heater elements in motor starters to match installed motor characteristics.
- E. Motor Data: Provide neatly typed label inside each motor starter enclosure door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

END OF SECTION

## SECTION 16515

## LIGHTING FIXTURES (INTERIOR &amp; EXTERIOR)

1. GENERAL

- A. Furnish and install all lighting fixtures, as herein specified, complete with lamps and accessories for safe and effective operation. All fixtures shall be installed and left in an operable condition with no broken or damaged parts.
- B. All items furnished shall comply with the latest standards applicable such as U.L., NEMA, etc., and shall bear labels accordingly. All fixtures shall be the color specified or as selected by the Architect and fixtures shall have all scratches and damage marks finished and painted.
- C. Eight (8) copies of light fixture factory shop drawings and cuts, showing fixture dimensions, photometric data, installation information and, if applicable, air handling data, shall be submitted to the Engineer for written approval 30 days after bid date.
- D. Alternate fixtures may be substituted for types specified by name or catalog number. Proposed substitutions must be submitted to the Engineer ten working days prior to bid date for written approval to bid. This written approval will only be issued in addendum form.
- E. Where emergency battery packs are provided with fixtures (if any), they shall be connected to an unswitched power line and wired in accord with the manufacturer's recommendations.
- F. All reflecting surfaces, glass or plastic lenses, ballast housings, parabolic louvers, downlighting Alzak cones and specular reflectors shall be handled with care during installation or lamping to avoid fingerprints or dirt deposits. It is preferred that louvers be shipped and installed with clear plastic bags to protect louvers. At close of project, and after construction air filters are changed, remove bags. Any louver or cone showing dirt or fingerprints shall be cleaned with solvent recommended by the manufacturer to a like-new condition, or replaced as necessary in order to turn over to the Owner new fixtures at beneficial occupancy.
- G. Refer to architectural details as applicable for recessed soffit fluorescent fixtures or wherever fixture installations depend upon work of other trades. Coordinate all installations with other trades. Verify dimensions of spaces for fixtures, and if necessary, adjust lengths to assure proper fit and illumination of diffuser and/or area below.
- H. Locate pendant, surface mounted or chain-hung industrial fixtures in mechanical rooms and similar spaces to avoid ductwork and piping. Locate around and between equipment to maximize the available light. Request a layout from the Engineer if uncertain about an installation.

## 2. VOLTAGE

- A. All lighting fixtures shall be rated 120 volts, or 208 volts, single phase as noted on the Lighting Fixture Schedule located in the Electrical Plans.

## 3. BALLASTS

### A. Electronic Instant-Start Fluorescent Ballast Specifications

- (1) Fluorescent ballast to be instant-start high performance electronic to operate at a frequency of 20KHz or higher with less than 2% lamp flicker, at an input voltage of 108 to 132 VAC (120 volt line) or 249 to 305 VAC (277 volt line) at an input frequency of 60 Hz, minimum of .88 ballast factor, power factor of .98. Light output to remain constant for line voltage of  $\pm 4\%$ . Ballast to comply with EMI and RFI limits set by FCC (CFR 47 part 18) for normal electrical equipment and have less than 1.4 lamp current crest factor (or less if required by the fluorescent lamp supplier). Verify this prior to submitting shop drawings. Ballast to meet ANSI Standard 82.41 and be UL listed Class P Type I. Ballast shall be non-PCB bearing.
- (2) Ballast to have less than 10% total harmonic distortion with less than 6% third harmonic distortion. Ballast to have "A" sound rating with a power factor greater than .99 and have a twenty year rated life. Ballasts used shall operate 1, 2, 3, or 4 T8 lamps as specified in the fixture specification. Use a 2, 3 or 4-lamp ballast to match number of lamps in fixture, and meet all switching requirements as shown on the drawings. Ballasts shall be unconditionally warrantied by the manufacturer for a period of three years from the date of substantial completion.
- (3) Motorola, Advance, Universal or Valmont are acceptable manufacturers.

**NOTE:** No single 2, 3, or 4 lamp ballast with 2 source input will be allowed for any fixture(s) shown supplied by both normal and emergency power.

- (4) Fluorescent ballasts shall be 120 volts, two or three lamp, electronic, solid state, full light output, U.L. listed, style Class "P", high power factor, sound "A" rated. Conform to FCC regulations Part 15, Subpart J. For electromagnetic interference. Advance Mark III, G.E. or Universal. All exterior fluorescent light fixtures shall be provided with cold temperature ballasts. No PCB filled ballasts shall be used.
- (5) Metal Halide ballasts shall be rated 120 volt, 60 Hertz, high power factor, copper wound, constant-wattage autotransformer for single lamp. U.L. 1029 listed. Manufactured by Jefferson, G.E., or Advance.

## 2. LAMPS

- A. Lamps furnished and installed in indicated fixtures shall be as manufactured by Sylvania, G.E. or Philips. No others shall be acceptable.

- B. All incandescent lamps shall be rated 130 volts with a medium screw type base in wattages less than 300 watts and 130 volts, mogul screw type base in 300 watts and larger.
- C. All fluorescent lamps shall be T8; or as listed in the Lighting Fixture Schedule.

3. LIGHT FIXTURES

- A. See drawings for Lighting Fixture Schedule.
- B. Light fixtures shall be as listed or of equivalent manufacturer. All alternate fixtures must be approved by the Engineer and meet all specifications as listed in the fixture schedule.

4. PHOTO CONTROLS

- A. Photo cell(s) to control exterior lighting shall be equal to Tork, SPST, 1000 watt, 120 volt. Photo cells shall be wired into the exterior lighting control scheme such that the photo cell shall turn on the exterior lighting at sunset and turn off exterior lighting at sunrise. Additionally, a manual bypass switch shall be wired (and labeled as such) into the control scheme so that the timeclock may be turned off or on at night or during cloudy weather.

5. TIME CLOCKS

- A. Time clock shall be rated to control a lighting contactor for exterior lighting control. Unit shall be equal to Paragon and be "Astro-dial" seven-day programmable type for sun tracking and change of season.

6. INSTALLATION

- A. Light fixtures are to be independently hung from the ceiling.
- B. Setting and Securing: Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer's printed instructions and approved shop drawings.
- C. All exterior fixtures shall be adequately and squarely supported and shall be hung plumb in perfect alignment when hung in groups.
- D. All fixtures shall be new and clean with new lamps.

END OF SECTION





## SECTION 16900

### VARIABLE-FREQUENCY DRIVE CONTROLLERS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. The Variable Frequency Drive (VFD) system shall contain all components required to meet the performance, protection, safety and certification criteria of this specification.
- B. The drives shall be wall mounted in the existing booster stations listed below, powered from existing pump circuit breakers:
  - 1. Coalton Booster Pump Station (U.S. 60)
    - Qty – 2 ea.
    - Incoming Power – 230-volt, 3 phase
    - Pump Motor Info – 20 hp, 230-volt, 3 phase, 47 FLA
  - 2. The Point Booster Pump Station
    - Qty – 2 ea.
    - Incoming Power – 230-volt, 1 phase
    - Pump Motor Info – 15 hp, 230-volt, 3 phase, 36 FLA

##### 1.02 RELATED SECTIONS

- A. Section 16010 – Basic Electrical Requirements
- B. Section 01300 – Submittals

##### 1.03 REFERENCES

- A. National Fire Protection Association - NFPA 70 - US National Electrical Code.
- B. National Electrical Manufacturers Association - NEMA 250 - Enclosures for Electrical Equipment.
- C. Underwriters Laboratory Inc. – UL 508.
- D. Canadian Standards Association International – CAN/CSA-C22.2 No. 14-05.
- E. International Electrical Code - IEC 146.
- F. Institute of Electrical and Electronics Engineers, Inc. - IEEE 519 - IEEE Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.

##### 1.04 SUBMITTALS

- A. Submit under provisions of Spec Section 01300 requirements
- B. Shop Drawings - Approval
  - 1. Elevation Drawings: Include dimensional information and conduit routing locations.

2. Unit Descriptions: Include amperage ratings, enclosure ratings, fault ratings, nameplate information, etc. as required for approval.
  3. Wiring Diagrams:
    - a) Power Diagram: Include amperage ratings, circuit breaker frame sizes, circuit breaker continuous amp ratings, etc. as required for approval.
    - b) Control Diagram: Include disconnect devices, pilot devices, etc.
  4. Major components list.
- C. Product Data Sheets
1. VFD and Operator Interface publications.
  2. Data sheets and publications on all major components including but not limited to the following:
    - a) Contactors
    - b) Circuit breaker and fuse (power and control)
    - c) Control power transformers
    - d) Pilot devices
    - e) Relays/Timers
- D. Test procedures shall be per the manufacturer's standards.

## 1.05 CLOSEOUT SUBMITTALS (OPERATION AND MAINTENANCE MANUALS)

- A. Submit under provisions of previous spec section requirements
- B. Shop Drawings – Final as shipped
  1. Elevation Drawings: Include dimensional information and conduit routing locations.
  2. Unit Descriptions: Include amperage ratings, enclosure ratings, fault ratings, nameplate information, etc. as required for approval.
  3. Wiring Diagrams:
    - a) Power Diagram: Include amperage ratings, circuit breaker frame sizes, circuit breaker continuous amp ratings, etc. as required for approval.
    - b) Control Diagram: Include disconnect devices, pilot devices, etc.
  4. Major components list.
- C. Product Data Sheets
  1. VFD and Operator Interface publications.
  2. Data sheets and publications on all major components including but not limited to the following:
    - a) Contactors
    - b) Circuit breaker and fuse (power and control)
    - c) Control power transformers
    - d) Pilot devices
    - e) Relays/Timers

- D. Test procedures shall be per the manufacturer's standards.
- E. Operation and Maintenance Data
  - 1. Service and Contact information
  - 2. VFD and Operator Interface User Manuals
  - 3. Troubleshooting / Service Manuals

## 1.06 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturers:
    - a) The VFD and all associated optional equipment shall be UL listed or recognized.
    - b) The VFD shall contain a UL label attached on the inside of the enclosure cabinet.
  - 2. Suppliers:
    - a) All inspection and testing procedures shall be developed and controlled under the guidelines of the Supplier's quality system and must be registered to ISO 9001 and regularly reviewed and audited by a third party registrar.
    - b) The VFD shall be factory pre-wired, assembled and tested as a complete package.

## 1.07 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall coordinate the shipping of equipment with the manufacturer.
- B. Contractor shall store the equipment in a clean and dry space at an ambient temperature range of -25 °C to 55 °C (-13 °F to 130 °F).
- C. The contractor shall protect the units from dirt, water, construction debris and traffic.

## 1.08 WARRANTY

- A. The manufacturer shall provide their standard parts warranty for eighteen (18) months from the date of shipment or twelve (12) months from the date of being energized, whichever occurs first.
- B. This warranty applies to variable frequency drive systems.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Allen-Bradley – PowerFlex 753 VFD **or engineer approved equal**

## 2.02 VARIABLE FREQUENCY DRIVE UNIT

### A. Features

#### 1. Certifications

- a) Listed to UL508C and CAN/CSA-C22.2 No. 14-05
- b) In conformity with EMC Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC). Standards applied; EN 61800-3:2004, EN 61800-5-1:2007
- c) TÜV Rheinland - standards applied: EN 61800-3:2004, EN 61800-5-1:2007, EN ISO 13849-1:2008, EN ISO 13849-2:2003, EN 61800-5-2:2007, EN 61508 PARTS 1-7:2000, EN 62061:2005, and EN 60204-1:2006
- d) Australian Communications and Media Authority. In conformity with Radiocommunications Act: 1992, Radiocommunications Standard: 2008, and Radiocommunications Labeling Notice: 2008. Standards applied: EN 61800-3:2004
- e) Electric Power Research Institute. Certified compliant with standards SEMI F47 and IEC 61000-4-34
- f) Russian GOST-R Certificate No. POCC US.ME92.H00040
- g) Compliant with the European "Restriction of Hazardous Substances" directive

#### 2. Hardware

- a) Utilize diode bridge or SCR bridge on the input rectifier.
- b) Utilize DC bus inductor on all six-pulse VFDs only.
- c) Utilize switching logic power supply operating from the DC bus.
- d) Incorporate phase to phase and phase to ground MOV protection on the AC input line.
- e) Microprocessor based inverter logic shall be isolated from power circuits.
- f) Utilize latest generation IGBT inverter section.
- g) Battery receptacle for Lithium battery power to the Real Time Clock.
- h) Additional DPI port for handheld and remote HIM options.
- i) Dedicated Digital Input for hardware enable.
- j) Conformal coated printed circuit boards.
- k) Optional onboard 24V DC Auxiliary Control Power Supply.

#### 3. Control Logic

- a) Ability to operate with motor disconnected.
- b) Provide a controlled shut down, when properly protected, with no component failure in the event of an output phase to phase or phase to ground short circuit. Provide annunciation of the fault condition.
- c) Provide multiple programmable stop modes including Ramp, Coast, DC-Brake, Ramp-to-Hold, Fast Braking, and Current Limit Stop.
- d) Provide multiple acceleration and deceleration rates.
- e) Adjustable output frequency up to 650Hz.

#### 4. DeviceLogix Control

- a) Ability to control outputs and manage status information locally within the VFD.

- b) Ability to function stand-alone or complimentary to supervisory control.
  - c) Ability to speed reaction time by processing in the VFD.
  - d) Ability to provide scaling, selector switches, or other data manipulations not already built into the VFD.
  - e) Ability to read inputs/write outputs and exclusively control the VFD.
  - f) Ability to provide an option for decision making if communication is lost with main controller.
  - g) Ability to control other VFDs via a peer-to-peer EtherNet/IP network.
  - h) Ability to write programs off-line.
5. Motor Control Modes
- a) Selectable Sensorless Vector, Flux Vector, V/Hz, and Adjustable Voltage Control modes selectable through programming.
  - b) The drive shall be supplied with a Start-up and Auto-tune mode.
  - c) The V/Hz mode shall be programmable for fan curve or full custom patterns.
  - d) Capable of Open Loop V/Hz.
6. Current limit
- a) Programmable current limit from 20 to 160% of rated output current.
  - b) Current limit shall be active for all drive states: accelerating, constant speed and decelerating.
  - c) The drive shall employ PI regulation with an adjustable gain for smooth transition in and out of current limit.
7. Acceleration / Deceleration
- a) Accel/Decel settings shall provide separate adjustments to allow either setting to be adjusted from 0 to 3600 seconds.
  - b) A second set of remotely selectable accel/decel settings shall be accessible through digital inputs.
8. Speed Profiles
- a) Programming capability shall allow the user to produce speed profiles with linear acceleration/deceleration or "S Curve" profiles that provide changing accel/decel rates.
  - b) S Curve profiles shall be adjustable.
9. Adjustments
- a) A digital interface can be used for all set-up, operation and adjustment settings.
  - b) All adjustments shall be stored in nonvolatile memory (EEPROM).
  - c) No potentiometer adjustments shall be required.
  - d) EEPROM memory for factory default values shall be provided.
  - e) Software must be available for trending and diagnostics, as well as online and offline programming functionality.

#### 10. Process PID Control

- a) The drive shall incorporate an internal process PI regulator with proportional and integral gain adjustments as well as error inversion and output clamping functions.
- b) The feedback shall be configurable for normal or square root functions. If the feedback indicates that the process is moving away from the set-point, the regulator shall adjust the drive output until the feedback equals the reference.
- c) Process control shall be capable of being enabled or disabled with a hardwire input. Transitioning in and out of process control shall be capable of being tuned for faster response by preloading the integrator.
- d) Protection shall be provided for a loss of feedback or reference signal.

#### 11. Skip Frequencies

- a) Three adjustable set points that lock out continuous operation at frequencies which may produce mechanical resonance shall be provided.
- b) The set points shall have a bandwidth adjustable from Maximum Reverse Speed to Maximum Forward Speed.

#### 12. Fault Reset / Run

- a) The drive shall provide up to nine automatic fault reset and restarts following a fault condition before locking out and requiring manual restart.
- b) The automatic mode shall not be applicable to a ground fault, shorted output faults and other internal microprocessor faults.
- c) The time between restarts shall be adjustable from 0.5 seconds to 30 seconds.

#### 13. Run on Power Up

- a) A user programmable restart function shall be provided to allow restart of the equipment after restoration of power after long duration power outages. Restart time dependent on presence of incoming signal.

#### 14. Fault Memory

- a) The last 32 fault codes shall be stored and time stamped in a fault buffer.
- b) Information about the drive's condition at the time of the last fault such as operating frequency, output current, dc bus voltage and twenty-seven other status conditions shall be stored.
- c) A power-up marker shall be provided at each power-up time to aid in analyzing fault data.
- d) The last 32 alarm codes shall be stored and time stamped for additional troubleshooting reference.

#### 15. Overload Protection

- a) The drive shall provide internal class 10 adjustable overload protection.
- b) Overload protection shall be speed sensitive and adjustable.
- c) A viewable parameter shall store the overload usage.

#### 16. Auto Economizer

- a) An auto economizer feature shall be available to automatically reduce the output voltage when the drive is operating in an idle mode (drive output current less than programmed motor FLA). The voltage shall be reduced to minimize flux current in a lightly loaded motor thus reducing kW usage.
- b) When the load increases, the drive shall automatically return to normal operation.

#### 17. Terminal Blocks

- a) Separate terminal blocks shall be provided for control and power wiring.
- b) I/O terminal blocks shall be removable with wiring in place.

#### 18. Flying Start

- a) The drive shall be capable of determining the speed and direction of a spinning motor and adjust its output to "pick-up" the motor at the rotating speed. This feature is disabled by default.

#### 19. Inputs and Outputs

- a) The Input / Output option modules shall consist of both analog and digital I/O.
- b) No jumpers or switches shall be required to configure digital inputs and outputs.
- c) All digital input and output functions shall be fully programmable.
- d) The control terminal blocks shall be rated for 115V AC.
- e) Inputs shall be optically isolated from the drive control logic.
- f) The control interface card shall provide input terminals for access to fixed drive functions that include start, stop, external fault, speed, and enable.
- g) The VFD shall be capable of supporting up to 7 analog inputs, 7 analog outputs, 21 digital inputs, 7 relay outputs, 7 transistor outputs, and 3 positive temperature coefficient (PTC) inputs.
- h) The Input / Output option modules shall have the following features:
  - a) Analog Inputs:
    - a. Quantity two (2) differentially isolated,  $\pm 10V$  (bi-polar), 88k ohm input impedance, 11 bit plus sign.
    - b. Analog inputs shall be user programmable for a variety of uses including frequency command and process loop input. Analog inputs shall be user programmable for function scaling (including invert), offset, signal loss detect and square root.
  - b) Analog Outputs:
    - a. Quantity two (2)  $\pm 10V$  (bi-polar) / 11 bit & sign, 2 k $\Omega$  minimum load, 4-20 mA, 11 bit plus sign, 400  $\Omega$  maximum load.
    - b. The analog output shall be user programmable to be proportional to one of fourteen process parameters including output frequency, output current, encoder feedback, output power.

- c. Programming shall be available to select either absolute or signed values of these parameters.
- c) Digital Inputs:
  - a. Quantity of six (6) digital inputs rated 24V DC/115V AC.
  - b. All inputs shall be individually programmable for multiple functions including: Start, Run, Stop, Auxiliary Fault, Speed Select, Jog and Process PI functions.
- d) Digital Outputs:
  - a. At least one (1) relay output (N.O. or N.C.).
  - b. For 240V AC or 24V DC, N.O. contact output ratings shall be 2 amp max., general purpose (inductive)/resistive. N.C. contact output ratings shall be 2 amp max., resistive only.
  - c. Relays shall be programmable to multiple conditions including: Fault, Alarm, At Speed, Drive Ready and PI Excess Error.
  - d. Timers shall be available for each output to control the amount of time, after the occurring event, that the output relay actually changes state.
  - e. At least one (1) transistor output.
  - f. For 24V DC, transistor output rating shall be 1 amp max, Resistive.

## 20. Reference Signals

- a) The drive shall be capable of using the following input reference signals:
  - a) Analog inputs
  - b) Preset speeds
  - c) Remote potentiometer
  - d) Digital MOP
  - e) Human Interface Module
  - f) Communication modules

## 21. Loss of Reference

- a) The drive shall be capable of sensing reference loss conditions.
- b) In the event of loss of the reference signal, the drive shall be user programmable to the following:
  - a) Fault the drive and coast to stop.
  - b) Issue a minor fault - allows the drive to continue running while some types of faults are present.
  - c) Alarm and maintain last reference.
- c) When using a communications network to control the drive, the communications adapter shall have these configurable responses to network disruptions and controller idle (fault or program) conditions:
  - a) Fault
  - b) Stop
  - c) Zero Data



- d) Hold Last State
- e) Send Fault Configuration

## 22. Metering

- a) At a minimum, the following parameters shall be accessible through the Human Interface Module, if installed:
  - a) Output Current in Amps
  - b) Output Voltage in Volts
  - c) Output Power in kW
  - d) Elapsed MWh
  - e) DC Bus Voltage
  - f) Frequency
  - g) Heatsink Temperature
  - h) Last eight (32) faults
  - i) Elapsed Run Time
  - j) IGBT Temperature

## 23. Faults

- a) At a minimum, the following faults shall be accessible through the Human Interface Module:
  - a) Power Loss
  - b) Undervoltage
  - c) Overvoltage
  - d) Motor Overload
  - e) Heat Sink Over-temperature
  - f) Maximum Retries
  - g) Phase to Phase and Phase to Ground Faults

## 24. Predictive Diagnostics

- a) At a minimum, the following predictive diagnostic features shall be provided:
  - a) Relay Output Life Cycles based on load type and amps.
  - b) Hours of Fan Life based on load and ambient temperature.
  - c) Motor Bearing life based on expected hours of use.
  - d) Motor Lubrication schedule based on hours of use.
  - e) Machine Bearing life based on expected hours of use.

## 25. Real-Time Clock

- a) Shall be capable of providing time stamped events.
- b) Shall have the ability to be set locally or via a remote controller.
- c) Shall provide the ability to be programmable for month, day, year and local time zones in HH:MM:SS.

## 26. Displacement Power Factor

- a) Six-pulse VFD shall be capable of maintaining a minimum true power factor (Displacement P.F. X Distortion P.F.) of 0.95 or better at rated load and nominal line voltage, over the entire speed range.
- b) Eighteen-pulse VFD shall be capable of maintaining a minimum true power factor (Displacement P.F. X Distortion P.F.) of 0.98 or better at rated load and nominal line voltage, over the entire speed range.

## 27. Efficiency

- a) A minimum of 96.5% (+/- 1%) at 100% speed and 100% motor load at nominal line voltage.
- b) Control power supplies, control circuits, and cooling fans shall be included in all loss calculations.
- c) Operating ambient temperature range without derating: 0 °C to 40 °C (32 °F to 104 °F)
- d) Operating relative humidity range shall be 5% to 95% non-condensing.
- e) Operating elevation shall be up to 1000 Meters (3,300 ft) without derating.

## 28. Sizing

- a) Systems rated at Normal Duty loads shall provide 110% overload capability for up to one minute and 150% for up to 3 seconds.
- b) Systems rated at Heavy Duty loads shall provide 150% overload capability for up to one minute and 180% for up to 3 seconds.

## 29. Auto Reset/Run

- a) For faults other than those caused by a loss of power or any other non-critical fault, the drive system shall provide a means to automatically clear the fault and resume operation.

## 30. Ride-Through

- a) The VFD system shall attempt to ride through power dips up to 20% of nominal. The duration of ride-through shall be inversely proportional to load. For outages greater than 20%, the drive shall stop the motor and issue a power loss alarm signal to a process controller, which may be forwarded to an external alarm signaling device.

## 31. Run on Power Up

- a) The VFD system shall provide circuitry to allow for remote restart of equipment after a power outage. Unless indicated in the contact drawings, faults due to power outages shall be remotely resettable. The VFD system shall indicate a loss of power to a process controller, which may be forwarded to an external alarm signaling device. Upon indication of power restoration the process controller will attempt to clear any faults and issue a run command, if desired.

### 32. Communications

- a) VFD shall be capable of communicating on multiple networks.
- b) VFD shall be capable of supporting the following network options:
  - a) DeviceNet
  - b) EtherNet/IP
  - c) ControlNet Coax
  - d) ControlNet Fiber
  - e) Interbus
  - f) CANopen
  - g) Modbus/TCP
  - h) Modbus RTU
  - i) Profibus DP
  - j) RS-485 DF1
  - k) RS-485 HVAC
  - l) Remote I/O

### 33. Enclosure Door Mounted Human Interface Module (HIM)

- a) VFD shall provide a HIM with integral LCD display, operating keys and programming keys.
- b) A VFD-mounted HIM, rated NEMA/UL Type 1, shall be provided and shall be capable of connecting via a separate cable for use as a handheld terminal.
- c) The HIM shall have the following features:
  - a) A seven (7) line by twenty-one (21) character backlit LCD display with graphics capability.
  - b) Shall indicate drive operating conditions, adjustments and fault indications.
  - c) Shall be configured to display in the following three distinct zones:
    - a. The top zone shall display the status of direction, drive condition, fault / alarm conditions and Auto / Manual mode.
    - b. The middle zone shall display drive output frequency.
    - c. The bottom zone shall be configurable as a display for either programming menus / information or as a two-line user display for two additional values utilizing scaled units.
  - d) Shall provide digital speed control.
  - e) The keypad shall include programming keys, drive operating keys (Start, Stop, Direction, Jog and Speed Control), and numeric keys for direct entry.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that location is ready to receive equipment.
- B. Verify that the building environment can be maintained within the service conditions required by the manufacturer of the VFD.

### 3.02 INSTALLATION

- A. Installation shall be in compliance with all manufacturer requirements, instructions and drawings.

### 3.03 START-UP SERVICE

- A. At a minimum, the start-up service shall include:
  - 1. Perform pre-Power Check
  - 2. Megger Motor Resistances: Phase-to-Phase and Phase-to-Ground
  - 3. Verify system grounding per manufacturer's specifications
  - 4. Verify power and signal grounds
  - 5. Check connections
  - 6. Check environment
- B. Drive Power-up and Commissioning:
  - 1. Measure Incoming Power Phase-to-Phase and Phase-to-Ground
  - 2. Measure DC Bus Voltage
  - 3. Measure AC Current Unloaded and Loaded
  - 4. Measure Output Voltage Phase-to-Phase and Phase-to-Ground
  - 5. Verify input reference signal
- C. All measurements shall be recorded.
- D. Drive shall be tuned for system operation.
- E. Drive parameter listing shall be provided.

### 3.04 TRAINING

- A. Manufacturer to provide a quantity of one (1) 8-hour sessions of on-site instruction.
- B. The instruction shall include the operational and maintenance requirements of the variable frequency drive.
- C. The basis of the training shall be the variable frequency drive, the engineered drawings and the user manual. At a minimum, the training shall:
  - 1. Review the engineered drawings identifying the components shown on the drawings.
  - 2. Review starting / stopping and speed control options for the controller.
  - 3. Review operation of the Human Interface Module for programming and monitoring of the variable frequency drive.
  - 4. Review the maintenance requirements of the variable frequency drive.
  - 5. Review safety concerns with operating the variable frequency drive.

**END OF SECTION**

# **SECTION 6**

**CONTRACT NO. "G-1"**

## **CONTRACT AND BOND FORMS**

**AGREEMENT**

**PAYMENT BOND**

**PERFORMANCE BOND**

**CERTIFICATE OF INSURANCE**

**NOTICE OF AWARD**

**NOTICE TO PROCEED**

**CHANGE ORDER**

**PARTIAL PAYMENT REQUEST**

**CERTIFICATE OF SUBSTANTIAL COMPLETION**

**FORM OF WAIVER AND RELEASE OF LIEN**

(General Contractor)

**FORM OF WAIVER AND RELEASE OF LIEN**

(Sub-Contractor)



## AGREEMENT BETWEEN OWNER AND CONTRACTOR

THIS AGREEMENT is by and between the **Big Sandy Water District** ("Owner") and ("Contractor"), doing business as (an individual, corporation, or partnership). Owner and Contractor in consideration of the mutual covenants hereinafter set forth, agree as follows:

### ARTICLE 1 –WORK

Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Contract No. "G-1" - Water Booster Pump Station - Upgrades.**

### ARTICLE 2 – THE PRODUCT

2.01. The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: **Contract No. "G-1" Water Booster Pump Station - Upgrades.**

### ARTICLE 3 - ENGINEER

3.01. The Project has been designed by **Sisler-Maggard Engineering, PLLC**, who is to act as the Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

### ARTICLE 4 – CONTRACT TIMES

#### 4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

#### 4.02 *Days to Achieve Substantial Completion and Final Payment*

A. The Work will be substantially completed within **150** days after the date when the Contract Time commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **150** days after the date when the Contract Time commence to run.

#### 4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **\$500** for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner **\$500** for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

**ARTICLE 5 – CONTRACT PRICE**

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.A:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

**BID SCHEDULE**

TO BE INSERTED AFTER BID

Contractor agrees to perform all of the Work described in the Specifications and shown on the Plans for the bid price of: \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents (\$\_\_\_\_\_). The Unit Price shall govern. The Owner will make corrections in extensions and additions to determine the Total Bid Amount for Award.



## **ARTICLE 6 – PAYMENT PROCEDURES**

### *6.01 Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

### *6.02 Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 20<sup>th</sup> day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:
  - a. 95 percent of Work completed (with the balance being retainage); and
  - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions.

### *6.03 Final Payment*

A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

## **ARTICLE 7 – INTEREST**

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

## **ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS**

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions.
- E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
- F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 9 – CONTRACT DOCUMENTS

### 9.01 *Contents*

- A. The Contract Documents consist of the following:
  - 1. Advertisement for Bids
  - 2. Instructions to Bidders
  - 3. Agreement (pages 1 to 6 inclusive).
  - 4. Performance bond (pages 1 to 3, inclusive).
  - 5. Payment bond (pages 1 to 3, inclusive).
  - 6. Bid bond with Power of Attorney (pages 1 to 2, inclusive)
  - 7. Certificate of Insurance
  - 8. General Conditions (pages 1 to 66, inclusive).
  - 9. Supplementary Conditions (pages 1 to 15, inclusive).
  - 10. Special Conditions (pages 1 to 12, inclusive).
  - 11. Specs. as listed in the table of contents of the Project Booklet

12. Drawings consisting of 8 sheets with each sheet bearing the following general title: **Contract No. "G-1" Water Booster Pump Station – Upgrades** and dated **May 2019**.
  13. Addenda (numbers    to   , inclusive).
  14. Exhibits to this Agreement (enumerated as follows):
    - a) Contractor's Bid (pages 1 to 5, inclusive) with Certifications.
    - b) Subcontractor's List
    - c) Manufacturer's List
  15. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    - a. Notice of Award (1 page)
    - b. Notice to Proceed (1 page)
    - c. Work Change Directives.
    - d. Change Order(s).
    - e. Certificate of Substantial Completion
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

## ARTICLE 10 – MISCELLANEOUS

### 10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

### 10.02 *Assignment of Contract*

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### 10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

### 10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Other Provisions: NONE

IN WITNESS WHEREOF, Owner and Contractor, Engineer, and Agencies. All portions of the Contract Documents have been signed, initialed, or identified by Owner and Contractor or identified by Engineer on their behalf. Contractor have signed this Agreement in six copies. One counterpart each has been delivered to Owner

This Agreement is dated \_\_\_\_\_. This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER: Big Sandy Water District

CONTRACTOR

By: Paul E. Thomas

By: \_\_\_\_\_

Title: Chairman

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

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

By: David Salisbury

\_\_\_\_\_

Title: Secretary

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

Address for giving notices:

Address for giving notices:

Big Sandy Water District

\_\_\_\_\_

18200 State Route 3

\_\_\_\_\_

Catlettsburg, KY 41129-9325

\_\_\_\_\_

Agent for service of process:

\_\_\_\_\_

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal,  
(Corporation, Partnership or Individual)

and \_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

\_\_\_\_\_  
Big Sandy Water District  
(Name of Owner)

\_\_\_\_\_  
18200 S. R. 3, Catlettsburg, Ky. 41129  
(Address of Owner)

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the \_\_\_\_ day of \_\_\_\_\_, 2019, a copy of which is hereto attached and made a part hereof for the construction of: **Contract "G-1" - Water Booster Pump Station - Upgrades.**

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extensions or modifications thereof, including all amounts due for materials, lubricants, oil, gasoline, coal, and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it

acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said Surety for value received stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder of the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL (or with the GOVERNMENT in the event the GOVERNMENT is performing the obligations of the OWNER), shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, is being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 6 (six) counterparts,  
(number)

each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 2019.

ATTEST:

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

\_\_\_\_\_  
(Principal Secretary)

(SEAL)

BY: \_\_\_\_\_(s)

\_\_\_\_\_  
(Witness as to Principal)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Address)

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

ATTEST:

BY: \_\_\_\_\_  
Attorney-in-Fact

\_\_\_\_\_  
(Witness to Surety)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Address)

NOTE: Date of BOND must not be prior to date of CONTRACT. If CONTRACTOR is a partnership, all partners shall execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Kentucky.





PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

\_\_\_\_\_, hereinafter called Principal, and  
(Corporation, Partnership or Individual)

\_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

**Big Sandy Water District**  
(Name of Owner)

18200 S. R. 3, Catlettsburg, Ky. 41129  
(Address of Owner)

hereinafter called OWNER in the total aggregate sum of \_\_\_\_\_  
Dollars (\$\_\_\_\_\_)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the \_\_\_\_\_ day of \_\_\_\_\_, 2019 a copy of which is hereto attached and made a part hereof for the construction of:

**Contract "G-1" – Water Booster Pump Station - Upgrades**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period, and if the PRINCIPAL shall

satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then his obligation shall be void otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no financial settlement between the OWNER and the PRINCIPAL shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied. The OWNER are the only beneficiaries hereunder.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ counterparts, each  
(Number)

one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 2019.

ATTEST:

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

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

BY: \_\_\_\_\_(s)

\_\_\_\_\_  
(Witness as to Principal)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Address)

\_\_\_\_\_

ATTEST:

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

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

BY: \_\_\_\_\_(s)

\_\_\_\_\_  
(Witness to Surety)

(Attorney-in-Fact)

\_\_\_\_\_  
(Typed Name)

\_\_\_\_\_

(Address)

\_\_\_\_\_  
(Phone)

NOTE: Date of BOND must not be prior to date of CONTRACT.

If CONTRACTOR is a partnership, all partners shall execute BOND.  
IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.



**CERTIFICATE OF INSURANCE**

**TO BE FURNISHED**

**BY SUCCESSFUL BIDDER**



NOTICE OF AWARD

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

PROJECT Description: The project includes but is not limited to, the construction of:

**Contract "G-1" – Water Booster Pump Station Upgrades**

The OWNER has considered the BID submitted by you for the above described WORK in response to its Bids received \_\_\_\_\_ 2019, and Instructions for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$\_\_\_\_\_.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, and Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this \_\_\_\_ day of \_\_\_\_\_, 2019.

Big Sandy Water District  
OWNER

BY: \_\_\_\_\_  
Paul E. Thomas

TITLE: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by \_\_\_\_\_

this the \_\_\_\_\_ day of \_\_\_\_\_, 2019.

By: \_\_\_\_\_

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





NOTICE TO PROCEED

TO: \_\_\_\_\_, 2019  
(Contractor)

ADDRESS:

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

OWNER'S PROJECT NO. 15030  
PROJECT Contract "G-1" - Water Booster Pump Station Upgrades  
OWNER'S CONTRACT NO. "G-1"

You are hereby notified to commence WORK in accordance with the Agreement dated \_\_\_\_\_, 2019 on or before \_\_\_\_\_, 2019 and you are to complete the WORK within **150** consecutive calendar days thereafter. The date of completion of all WORK is therefore \_\_\_\_\_, 2019.

Big Sandy Water District  
Owner

By: \_\_\_\_\_

Name: Paul E. Thomas

Title: Chairman

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

\_\_\_\_\_

this the \_\_\_\_ day of \_\_\_\_\_, 2019.

By: \_\_\_\_\_

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

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



Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES <i>[note changes in Milestones if applicable]</i>
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

<b>RECOMMENDED:</b>	<b>ACCEPTED:</b>	<b>ACCEPTED:</b>
By: _____ Engineer (if required)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title: \_\_\_\_\_



**PARTIAL PAYMENT REQUEST**

**DISC WILL BE FURNISHED  
TO SUCCESSFUL BIDDER  
AT TIME OF CONTRACT AWARD**



**CERTIFICATE OF SUBSTANTIAL COMPLETION**

---

OWNER's Project No: \_\_\_\_\_ ENGINEER's Project No.: 15030  
Project Contract "G-1" – Water Booster Pump Station

---

CONTRACTOR  
Contract For Contract "G-1" – Water Booster Pump Station Upgrades

---

This Certificate of Substantial completion applies to all Work under the Contract Documents or to the following specified parts thereof:

ALL

To Big Sandy Water District  
OWNER

And To \_\_\_\_\_  
CONTRACTOR

---

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

\_\_\_\_\_  
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within \_\_\_\_\_ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance, and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: ALL

CONTRACTOR: NONE

The following documents are attached to and made a part of this Certificate:

NONE

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on \_\_\_\_\_

Sisler-Maggard Engineering, PLLC  
ENGINEER

By: \_\_\_\_\_  
Joseph F. Sisler, P.E., P.L.S., President

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_ 2019

CONTRACTOR

By: \_\_\_\_\_

OWNER accepts this Certificate of Substantial Completion on \_\_\_\_\_ 2019

Big Sandy Water District  
OWNER

By: \_\_\_\_\_  
Paul Thomas, Chairman



FORM OF WAIVER AND RELEASE OF LIEN

(General Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of Contract No. "G-1" Water Booster Pump Station - Upgrades  
\_\_\_\_\_ for Big Sandy Water District  
\_\_\_\_\_ at Boyd County, Catlettsburg, Ky.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, Big Sandy Water District  
\_\_\_\_\_, or on or against Big Sandy Water District  
\_\_\_\_\_, on account of labor performed or to be performed or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said project; so that Big Sandy Water District  
\_\_\_\_\_, its successors and assigns, shall and my have, hold and enjoy the same freed and discharged now has or might or could have if these presents had not been made.

IN WITNESS WHEREOF, the undersigned has hereunto set his hand and seal this \_\_\_\_\_  
day \_\_\_\_ of \_\_\_\_\_, 2019

\_\_\_\_\_  
Name of General Contractor

By \_\_\_\_\_  
Signature of Officer or Partner

\_\_\_\_\_  
Title or Officer

WITNESS:

- \_\_\_\_\_  
\*Insert name of building or project  
\*\*Insert address of building project  
\*\*\*Insert name of Owner



FORM OF WAIVER AND RELEASE OF LIEN

(Sub-Contractor)

TO WHOM IT MAY CONCERN:

WHEREAS, the undersigned has performed or furnished, is performing, or furnishing, or will perform or furnish labor or material, fuel, equipment, tools, etc., in connection with the construction of **Contract "G-1" - Water Booster Pump Station - Upgrades** at Boyd County Catlettsburg, Kentucky.

NOW, THEREFORE, THESE PRESENTS WITNESS, that the undersigned, for a good and valuable consideration to the undersigned well and truly paid at or before the signing and delivery hereof, the receipt whereof is hereby acknowledged, does hereby waive, release and relinquish any and all claims, liens and rights and claims of liens which the undersigned now has, or may hereafter have, on or against the said premises and the building, plant, equipment and machinery of their Owner, **Big Sandy Water District**, or on or against **Big Sandy Water District**, its successors and assigns, or on or against the General Contractor **Big Sandy Water District**, his or its heirs, executors, administrators, successors and assigns, under the laws of the Commonwealth of Kentucky, on account of labor performed or to be performed, or material, fuel, equipment, tools, etc., furnished or to be furnished by the undersigned for use in or in connection with the construction and erection of said building; so that the said **Big Sandy Water District**, its successors and assigns, shall may have, hold and enjoy same freed and discharged from all liens, claims and demands whatsoever which the undersigned now has or might or could have if these presents had not been made.

IN WITNESS WEREOF, the undersigned has hereunto set his hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

\_\_\_\_\_  
Name of Sub-Contractor

By \_\_\_\_\_  
Signature of Officer or Partner

\_\_\_\_\_  
Title or Officer

WITNESS:

\_\_\_\_\_

- \*Insert name of building or project
- \*\*Insert address of building project
- \*\*\*Insert name of Owner
- \*\*\*\*Insert name of General Contractor



# **SECTION 7**

**CONTRACT NO. "G-1"**

## **BID FORMS AND BID BONDS**

**BID FORMS INCLUDING  
SUBCONTRACTORS & MANUFACTURERS LIST**

**BID BOND WITH POWER OF ATTORNEY**

**BIDDER'S QUALIFICATIONS STATEMENT**

**RURAL DEVELOPMENT FORMS**

COMPLIANCE STATEMENT – RD 400-6  
NOTICE OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES  
CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS – 1940-Q  
EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION – EEO-1  
USDA – CERTIFICATION REGARDING DEBARMENT AND SUSPENSION – AD-1048  
INSTRUCTIONS FOR CERTIFICATION  
USDA – EQUAL OPPORTUNITY AGREEMENT – RD 400-1  
CONTRACTOR'S CERTIFICATE CONCERNING LABOR STANDARDS AND PREVAILING WAGE  
REQUIREMENTS

**Forms presented in this Section 7 must be used. No Substitutes will be allowed.  
An extra set of the above forms will be furnished to each plan holder for preparation  
of bids.**

**All of the above forms must be submitted with bids on each contract.**



**BID FORM**

**BIG SANDY WATER DISTRICT**

**CONTRACT NO. "G-1" – WATER BOOSTER PUMP STATION - UPGRADES**

**BIDDER'S PROPOSAL**

Proposal of \_\_\_\_\_ (hereinafter called "BIDDER"), organized and existing under the laws of the State of \_\_\_\_\_, doing business as (a partnership, or a corporation, or an individual) \_\_\_\_\_, to **Big Sandy Water District** (hereinafter called "OWNER").

In compliance with the Advertisement for Bids, BIDDER hereby proposes to furnish all equipment, materials, and labor for the work required to construct the **Contract No. "G-1" – Water Booster Pump Station – Upgrades** in strict accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

**BID SCHEDULE**

ITEM NO.	ITEM DESCRIPTION	UNIT QUANTITY		UNIT COST	TOTAL COST
1	Proposed Quarry Branch Pump Station Complete	1	EA.		
2	Proposed Fuller Ridge Pump Station Complete	1	EA.		
3	Existing "U.S. 60" Pump Station (Coalton) - Furnish & Install - V.F.D	1	EA.		
4	Existing "The Point" Pump Station - Furnish & Install - V.F.D	1	EA.		
<b>TOTAL ITEMS BID (1 - 4)</b>					

BIDDER agrees to perform all of the Work described in the Specifications and shown on the Plans for the bid price of : \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents (\$\_\_\_\_\_).

Amount shall be shown in both words and figures. The Unit Price shall govern. The Owner will make corrections in extensions and additions to determine the Total Bid Amount for Award.

No bid will be considered unless all **Items 1 thru 4** in the Bid Schedule are priced, and only one contract will be awarded.

The quantities of each item on the bid, as finally ascertained at the close of the contract, will determine the total payments to accrue under the contract.

No bid will be considered unless all items in the Bid Schedule are priced, and only one contract will be awarded.





The bid will be awarded in the aggregate total of the Bid Schedule.

The above price shall include all labor, materials, overhead, profit, insurance, and other costs necessary to cover the finished work of the several kinds called for including incidentals not set out as specific bid items and in accordance with Basis for Payment (Section 01740 of Specifications). The price per foot for pipe installation includes all labor, materials, excavation backfill, clean-up, seeding, testing etc., for a finished product.

By submission of this Bid, the BIDDER certifies, and in the case of a joint Bid, each party thereto certifies as to its own organization, that this Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid, with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence work under this Contract on or before a date to be specified in the Notice to Proceed and to fully complete the project within 150 consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of \$ 500.00 for each consecutive calendar day thereafter.

Accompanying this Proposal is a certified check or standard Bid Bond in the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) in accordance with the Information for Bidders to the OWNER that the amount of the bid security deposited with this Bid fairly and reasonably represents the amount of damages the OWNER will suffer due to the failure of this BIDDER to fulfill his agreements as provided in this Proposal.

BIDDER acknowledges receipt of the following Addenda:

<u>Addenda #1</u>	<u>Dated</u>	<u>Addenda #5</u>	<u>Dated</u>
<u>Addenda #2</u>	<u>Dated</u>	<u>Addenda #6</u>	<u>Dated</u>
<u>Addenda #3</u>	<u>Dated</u>	<u>Addenda #7</u>	<u>Dated</u>
<u>Addenda #4</u>	<u>Dated</u>	<u>Addenda #8</u>	<u>Dated</u>

BIDDER agrees that the OWNER reserves the right to delete the whole or any part of the Project from the Contract.

BIDDER understands that the OWNER reserves the right to reject any or all Bids and to waive any informalities in the Bidding.

BIDDER agrees that this Bid shall be good and may not be withdrawn for a period of 90 (ninety) calendar days after the actual date of bid opening.



Within ten (10) calendar days after receiving written notice of the acceptance of this Bid by the OWNER, the Bidder will execute and deliver to the OWNER 6 (six) copies of the Agreement and such other required Contract Documents.

BIDDER: \_\_\_\_\_

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

TYPED NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

(Seal - If bid is by a corporation)

ADDRESS: \_\_\_\_\_

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

PHONE NO.: \_\_\_\_\_

FAX NO.: \_\_\_\_\_













**TO CONTRACTORS: THIS FORM MUST BE USED**

**BID BOND**

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

**BIDDER (Name and Address):**

**SURETY (Name and Address of Principal Place of Business):**

**OWNER (Name and Address):**

**BIG SANDY WATER DISTRICT  
18200 State Route 3  
Catlettsburg, KY 41129**

**BID**

**Bid Due Date:**

**Project (Brief Description Including Location):**

**CONTRACT "G-1" - WATER BOOSTER PUMP STATION - UPGRADES**

**BOND**

**Bond Number:**

**Date (Not later than Bid due date):**

**Penal sum**

\_\_\_\_\_ (Words)

\_\_\_\_\_ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

**BIDDER**

**SURETY**

\_\_\_\_\_  
Bidder's Name and Corporate Seal (Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature and Title

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

**Note: Above addresses are to be used for giving required notice.**

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

BIDDER'S QUALIFICATIONS

The Bidder's Qualifications are required by the Owner to be submitted as set forth herewith:

1. Name of Firm : \_\_\_\_\_
2. This Firm is Corporation or \_\_\_\_\_Partnership or \_\_\_\_\_Proprietorship.
3. A permanent place of business is maintained at:

Street	City	State	Zip Code
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4. The following construction plant and equipment will be made available for use on this contract:

\_\_\_\_\_

5. In the event the contract is awarded the undersigned, surety bonds will be furnished by:

\_\_\_\_\_

6. Experience of Contractor on other similar work:

Total Contract	Client Name & Address	Phone	Reference
----------------	-----------------------	-------	-----------

Contract No. \_\_\_\_\_

Type \_\_\_\_\_ \$ \_\_\_\_\_

Contract No. \_\_\_\_\_

Type \_\_\_\_\_ \$ \_\_\_\_\_

Contract No. \_\_\_\_\_

Type \_\_\_\_\_ \$ \_\_\_\_\_

Contract No. \_\_\_\_\_

Type \_\_\_\_\_ \$ \_\_\_\_\_

7. We now have the following jobs under contract and bonded:

Total Contract	Percent Completed	Client Name & Address	Phone	Name of Reference
----------------	-------------------	-----------------------	-------	-------------------

Contract No. \$ \_\_\_\_\_

Location \_\_\_\_\_

Contract No. \$ \_\_\_\_\_

Location \_\_\_\_\_

Contract No. \$ \_\_\_\_\_

Location \_\_\_\_\_

Contract No. \$ \_\_\_\_\_

Location \_\_\_\_\_

8. FINANCIAL STATEMENT: SEE ATTACHED BALANCE SHEET

Statement of Assets and Liabilities as of \_\_\_\_\_, 2018.

This Statement should be prepared by applicant, his bookkeeper, or accountant. Audit report by CPA or licensed accountant may be required.

ASSETS	LIABILITIES
--------	-------------

Cash in Bank  
Cash on Hand

Notes Payable  
(a) Banks  
(b) Material men  
(c) Other

Accounts Receivable (Including Retentions)

(a) Completed Contracts  
(b) Uncompleted Contracts

Accounts Payable  
Unbilled Job Costs

(a) Sub-Contractors

## (b) Material men

Other Accounts Receivable	
Marketable Securities	Billings in Excess of Job Costs
Materials in Stock Not Included in Items above	Current Debt (Due in 1 Year)
(a) For Jobs underway	(a) Equipment
(b) Other	(b) Real Estate
Income Tax	
(a) Current	
Automobiles	
Sub-Total Current Assets	Sub-Total Current Liabilities
Notes Receivable	Equipment Debt-Over 1 year
Cash Value Life Insurance	Real Estate Debt-Over 1 year
Equipment at Book Value	
Real Estate at Book Value	
(a) Business	
(b) Homestead	
(c) Investment	
Automobiles	
Furniture & Fixtures	Capital Stock Surplus & Undivided Profits
Total Assets	Total Liabilities

TOTAL ASSETS MUST EQUAL TOTAL LIABILITIES

Respectfully Submitted: \_\_\_\_\_

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Signature Address

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

\_\_\_\_\_  
Title Date

\_\_\_\_\_  
Phone Fax

ATTEST: \_\_\_\_\_

COMPLIANCE STATEMENT

This statement relates to a proposed contract with \_\_\_\_\_

\_\_\_\_\_  
*(Name of borrower or grantee)*

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1.  I have,  have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract,  I have,  have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3.  I have,  have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract,  I have,  have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

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*According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.*

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**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR  
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date \_\_\_\_\_

\_\_\_\_\_  
*(Signature of Bidder or Prospective Contractor)*

\_\_\_\_\_  
*Address (including Zip Code)*



CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form – LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

\_\_\_\_\_  
(name)

\_\_\_\_\_  
(date)

\_\_\_\_\_  
(title)

o0o







**U.S. DEPARTMENT OF AGRICULTURE**

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**Certification Regarding Debarment, Suspension, Ineligibility  
and Voluntary Exclusion - Lower Tier Covered Transactions**

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This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

**(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)**

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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Organization Name

PR/Award Number or Project Name

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Name(s) and Title(s) of Authorized Representative(s)

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Signature(s)

Date

#### Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transaction and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.



**EQUAL OPPORTUNITY AGREEMENT**

This agreement, dated \_\_\_\_\_ between \_\_\_\_\_

(herein called "Recipient" whether one or more) and United States Department of Agriculture (USDA), pursuant to the rules and regulations of the Secretary of Labor (herein called the 'Secretary') issued under the authority of Executive Order 11246 as amended, witnesseth:

In consideration of financial assistance (whether by a loan, grant, loan guaranty, or other form of financial assistance) made or to be made by the USDA to Recipient, Recipient hereby agrees, if the cash cost of construction work performed by Recipient or a construction contract financed with such financial assistance exceeds \$10,000 - unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965.

1. To incorporate or cause to be incorporated into any contract for construction work, or modification thereof, subject to the relevant rules, regulations, and orders of the Secretary or of any prior authority that remain in effect, which is paid for in whole or in part with the aid of such financial assistance, the following "Equal Opportunity Clause":

During the performance of this contract, the contractor agrees as follows:

- (a) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited, to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the USDA setting forth the provisions of this nondiscrimination clause.
- (b) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
- (c) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the USDA, advising the said labor union or workers' representative of the contractor's commitments under this agreement and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (d) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of all rules, regulations and relevant orders of the Secretary of Labor.
- (e) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, rules, regulations, and orders, or pursuant thereto, and will permit access to his books, records, and accounts by the USDA Civil Rights Office, and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (f) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by Law.
- (g) The contractor will include the provisions of paragraph 1 and paragraph (a) through (g) in every subcontract or purchase order, unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the USDA may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the USDA, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

*According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.*

2. To be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the organization so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.
3. To notify all prospective contractors to file the required 'Compliance Statement', Form RD 400-6, with their bids.
4. Form AD-425, Instructions to Contractors, will accompany the notice of award of the contract. Bid conditions for all nonexempt federal and federally assisted construction contracts require inclusion of the appropriate "Hometown" or "Imposed" plan affirmative action and equal employment opportunity requirements. All bidders must comply with the bid conditions contained in the invitation to be considered responsible bidders and hence eligible for the award.
5. To assist and cooperate actively with USDA and the Secretary in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary, that it will furnish USDA and the Secretary such information such as, but not limited to, Form AD 560, Certification of Nonsegregated Facilities, to submit the Monthly Employment Utilization Report, Form CC-257, as they may require for the supervision of such compliance, and that it will otherwise assist USDA in the discharge of USDA's primary responsibility for securing compliance.
6. To refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by USDA or the Secretary of Labor pursuant to Part II, Subpart D, of the Executive Order.
7. That if the recipient fails or refuses to comply with these undertakings, the USDA may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the organization under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such organization; and refer the case to the Department of Justice for appropriate legal proceedings.

Signed by the Recipient on the date first written above.

\_\_\_\_\_  
 Recipient

\_\_\_\_\_  
 Recipient

(CORPORATE SEAL)

\_\_\_\_\_  
 Name of Corporate Recipient

Attest:  
 \_\_\_\_\_  
 Secretary

By \_\_\_\_\_  
 President

**CONTRACTOR'S CERTIFICATION CONCERNING  
LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS**

**CONTRACTOR'S CERTIFICATION CONCERNING  
LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS**

TO (Appropriate Recipient):	DATE
C/O	PROJECT NUMBER (if any)
	PROJECT NAME

1. The undersigned, having executed a contract with \_\_\_\_\_ for the construction of the above identified project, acknowledges that:

- (a) The Labor Standards provisions are included in the aforesaid contract;
- (b) Correction of any infractions of the aforesaid conditions, including infractions by any of his subcontractors and any lower tier subcontractors, is his responsibility.

2. He certifies that:

- (a) Neither he nor any firm, partnership or association in which he has substantial interest is designated as an ineligible contractor by the Comptroller of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary of Labor., Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended (40 U.S. C. 276a-2(a)).
- (b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

3. He agrees to obtain and forward to the aforementioned recipient within ten days after the execution of any subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements executed by the subcontractors.

4. He certifies that:

- (a) The legal name and the business address of the undersigned are:

\_\_\_\_\_

- (b) The undersigned is:

(1) A SINGLE PROPRIETORSHIP	(3) A CORPORATION ORGANIZED IN THE STATE OF:
(2) A PARTNERSHIP	(4) OTHER ORGANIZATION (Describe)

(c) The name, title and address of the owner, partners, or officers of the undersigned are:

NAME	TITLE	ADDRESS

(d) The names and addresses of all other persons, both natural and corporate, having a substantial interest in the undersigned, and the nature of the interest are (if none, so state)

NAME	ADDRESS	NATURE OF INTENT

(e) The names, addresses and trade classifications of all other building construction contractors in which undersigned ha a substantial interest (if none, so state):

NAME	ADDRESS	TRADE CLASSIFICATION

Date \_\_\_\_\_ (Contractor)

By: \_\_\_\_\_

**WARNING**

U.S. Criminal Code, Section 1010, Title 18, U.S. C., provides in part: "Whoever ..... makes, passes, utters, or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both