

**PROJECT MANUAL**  
**FOR**  
**TOWN OF RIDGELAND**  
**WELL SITE NO.3 IMPROVEMENTS**  
**RIDGELAND, SC**

**REQUEST FOR BIDS NO.: TOR-2024-05**



**THE TOWN OF RIDGELAND,  
SOUTH CAROLINA**

**VOLUME I**  
**CDBG AWARD # CI-22-21**

**PREPARED BY:**  
**FOUR WATERS ENGINEERING, INC.**  
**FOR**  
**THE TOWN OF RIDGELAND, SC**  
**June 2024**

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**DATE: JUNE 2024**

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## **SECTION 00010**

### **NOTICE TO BIDDERS**

Notice is hereby given that sealed bids will be received for **Town of Ridgeland Well Site No.3 Improvements**, by the Town of Ridgeland, South Carolina, until **Tuesday July 2, 2024, at 2:00 PM**, at which time all bids received will be publicly opened and read aloud.

**Mail Bid Response to:**

Town of Ridgeland  
ATTN: Dennis E. Averkin, Town Administrator  
P.O. Box 1119  
Ridgeland, SC 29936

**Hand Deliver Bid Response to:**

Town of Ridgeland  
ATTN: Dennis E. Averkin, Town Administrator  
1 Town Square  
Ridgeland, SC 29936

Any bids delivered after the above time will not be accepted under any circumstances and submission of no bid is considered a bid. Any uncertainty regarding the time a bid is delivered will be resolved against the Bidder.

Bid opening will take place at the Town of Ridgeland municipal offices at the address given below:

**Town of Ridgeland  
1 Town Square  
Ridgeland, South Carolina 29936**

The Town's points of contact for this project is Dennis E. Averkin, Town Administrator, who can be reached at (843) 726-7500 or by email at [daverkin@ridgelandsc.gov](mailto:daverkin@ridgelandsc.gov).

Construction Contract Documents, including Bidding and Contract Documents, General Requirements, Plans and Technical Specifications may be viewed electronically and downloaded in Adobe Acrobat PDF from the Town of Ridgeland website, <https://www.ridgelandsc.gov/bid-opportunities>

It is requested that interested parties contact Four Waters Engineering, Inc., Engineer of Record, to be added to the Plan Holders List. Contact Angela Bryan of Four Waters Engineering, Inc., 324 6<sup>th</sup> Avenue North, Jacksonville Beach, Florida 32250 by email: [abryan@4weng.com](mailto:abryan@4weng.com) or phone (904) 414-2400 Ext 51. A hard copy of the Construction Contract Documents (plans in 11"x17" format) may be requested through Angela Bryan with the payment of \$100.00.

### Description of Work:

Construction of water system Well Site No. 3 improvements are generally listed below:

- Building Modifications
  - Expand building footprint to the west 6' out across entire building width;
    - Form one room within the expanded area for separate chemical storage/pumping equipment for the disinfection and corrosion control;
    - Provide double doors with louvers to new room
    - Provide wall mounted exhaust fan
    - Seal louver on west side of building to separate new chemical room from well and electrical equipment room;
  - Remove interior walls for chlorine gas room;
  - Remove door for chlorine gas room and enclose opening on outer face of building, east side;
  - Replace double doors to main building and provide louvers;
  - Replace roofing, seal over opening for removed roof turbine, extend roof for building expansion;
  - Seal any new/modified building penetrations;
  - Provide wall mounted exhaust fan;
  - Paint building;
- Electrical Modifications
  - Demolish existing overhead service entrance and weather head at building;
  - Demolish existing power distribution equipment and existing control panels in the building;
  - Coordinate with Dominion Energy and install new electrical service on site and new main disconnect switch at well building;
  - Relocate existing automatic transfer switch to extended north wall of well building;
  - Install new building lighting - interior and exterior;
  - Install new electrical distribution within building;
  - Install new grounding delta;
  - Install new grounding ring around elevated storage tank;
  - Furnish and install new SCADA control panel;
  - Retrofit existing SCADA pole as necessary and provide upgrades to coax cable, radio systems and control panel;
  - Furnish and install new instrumentation systems;
  - Furnish and install new reduced voltage solid state motor starter;
  - Connect and power all mechanical equipment requiring electrical power service;
- Civil/Mechanical Modifications:
  - Replace/relocate eye wash station from within building and provide new water service;
  - Relocate chemical feed systems to new room in building.
  - Remove and replace 10" ductile iron well discharge piping – interior and exterior of building;
  - Replace flow meter on well discharge piping;
  - Replace 10" check valve on well discharge piping and provide limit switch;
  - Replace grating over valve vault;
  - Replace three 10" valves and piping in vault;



- Install sump pump in valve vault, core common wall in vaults, and route pump discharge piping;
  - Install two new metering pumps for chemical feed and injection;
  - Replace concrete spillways for well flushing pipe at building and pipe at vault .
  - Provide all disinfection and testing required for SCDHEC clearance.
- Additive Alternates
- Well Pump Replacement
    - Replace existing well pump with 125 Hp vertical turbine well pump and motor.
    - Install well water level gauge
  - Video Log of Well
  - Drainage Discharge from Blowoff at Well Building

Pre-bid Conference:

**There will not be a pre-bid conference for this project.**

Bid Document Questions:

Questions or concerns related to the bid documents must be written and sent by email to Dennis E. Averkin, Town Administrator, at [daverkin@ridgelandsc.gov](mailto:daverkin@ridgelandsc.gov). The last day to submit questions is **Monday June 24, 2024**.

Bid Requirements:

Bidders are to submit (1) hardcopy and (1) electronic copy of the bid.

Each bid must be accompanied by Bid security made payable to Town of Ridgeland (Owner) in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond issued by a surety authorized to write bonds of such character and amount under the laws of South Carolina and meeting the requirements of the General Conditions.

The successful Bidder will be required to furnish to the Owner a Payment Bond and a Performance Bond, each in the amount of one hundred percent (100-percent) of the Contract Price.

Each Bidder must be qualified under the provisions of the most current State of South Carolina Contractor's Licensing Law Code. No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Contractor's Licensing Law.

All Bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening. The Town of Ridgeland (Owner) reserves the right to reject any or all bids, including without limitation the right to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids. Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. The terms of Award of Contract are included in Article 17 of the Instructions to Bidders.

This project is being funded in whole or in part by the Community Development Block Grant Program (CDBG). All federal CDBG requirements will apply to the contract. All contractors and subcontractors are required to be registered in the federal System for Award Management (SAM). Bidders on this work will be required to comply with the President's Executive Order No. 11246 & Order No. 11375 which prohibits discrimination in employment regarding race, creed, color, sex, or national origin. Bidders must comply with Title VI of the Civil Rights Act of 1964, the Davis-Bacon Act, the Anti-Kickback Act, the Contract Work Hours and Safety Standards Act, and 40 CFR 33.240. The CDBG application, including the cost estimate, is available for review by contacting Jessica Dailey, Lowcountry Council of Governments at (843) 473-3960.

Bidders must also make positive efforts to use small and minority-owned businesses and to offer employment, training and contracting opportunities in accordance with Section 3 of the Housing and Urban Development Act of 1968. Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

Any prospective bidder, offeror, contractor or subcontractor who is aggrieved in connection with the solicitation of this contract may protest to Owner in accordance with Section 11-35-4210 of the SC Code of Laws, within 15 days of the date of issuance of the Notice of Intent to Award.

The owner reserves the right to waive any irregularities, or to reject any or all bids.

No bidder may withdraw his bid within 90 days after the actual date of the opening thereof.

“EQUAL EMPLOYMENT OPPORTUNITY”

Date: June 14, 2024

## SECTION 00100

### INSTRUCTIONS TO BIDDERS

#### 1. Defined Terms

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions of the Construction Contract (No. C-700) (2007 Edition) have the meaning assigned to them in the General Conditions.

Certain additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof.

1.1. Bidder—one who submits a Bid directly to Owner as distinct from a sub-bidder, who submits a bid to a Bidder.

1.2. Issuing Office—the office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

1.3. Successful Bidder—the responsible and responsive Bidder to whom Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

1.4. OWNER  
TOWN OF RIDGELAND  
1 TOWN SQUARE  
P.O. BOX 1119  
RIDGELAND, SC 29936  
(843) 726-7500

1.5. ENGINEER  
FOUR WATERS ENGINEERING, INC.  
324 6TH AVENUE N  
JACKSONVILLE BEACH, FL 32250  
(904) 414 -2400

#### 2. Copies of Bidding Documents

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Notice to Bidders may be obtained from the Issuing Office. The deposit will not be refunded.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 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 confer a license or grant for any other use.

#### 3. Qualifications of Bidders.

3.1 To demonstrate qualifications to perform the work, each Bidder must be prepared to submit within five days after the Bid opening upon Owner's request detailed written evidence such as financial data, previous experience, present commitments and other such data as may be called for below (or in the Supplementary Conditions). Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

#### 4. Examination of Contract Documents and Site.

4.1 It is the responsibility of each Bidder Before submitting a Bid:

4.1.1 To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including "technical data" referred to below);

4.1.2 To visit the site to become familiar with and satisfy Bidder as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work;

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### **INSTRUCTIONS TO BIDDERS**

4.1.3. To consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;

4.1.4 To study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data; and

4.1.5 To promptly notify Engineer of all conflicts, errors, ambiguities or discrepancies which Bidder has discovered in or between the Contract Documents and such other related Documents

4.2 Before submitting a Bid each Bidder will be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.3 On request, Owner will provide each Bidder access to the project site(s) to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidder must fill all holes and clean up and restore the site to its former conditions upon completion of such explorations, investigations, tests and studies.

4.4 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with

every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and applying the specific means, methods, techniques, sequences or procedures of construction (if any) that may be shown or indicated or expressly required by the Contract Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

4.5 The provisions of I-4.1 through 4.4, inclusive, do not apply to Asbestos, Polychlorinated biphenyls (PCBs), Petroleum, Hazardous Waste or Radioactive Material covered by Paragraph 4.06 of the General Conditions.

#### **5. Availability of Lands for Work, etc.**

The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

#### **6. Interpretations and Addenda.**

6.1. All questions about the meaning or intent of the Bidding Documents are to be directed to Owner. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions

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### INSTRUCTIONS TO BIDDERS

answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

6.3 Receipt of Addenda shall be acknowledged in the Bid Proposal Form, Section 00300.

#### **7. Bid Security.**

7.1. Each Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached) issued by a surety meeting the requirements of Paragraph 5.01 of the General Conditions.

7.2 The Bid security of Successful Bidder will be retained until such Bidder has executed the Agreement, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the thirty-sixth day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven days after the Bid opening.

#### **8. Contract Times.**

The number of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the term "Contract Times" is defined in paragraph 1.01, A.14 of the General Conditions) are set forth in the Agreement.

#### **9. Liquidated Damages.**

Provisions for liquidated damages, if any, are set forth in the Agreement.

#### **10. Substitute and "Approved Equals" Items.**

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications with the consideration of substitute or "approved equals," as approved by the engineer of record.

#### **11. Not Used.**

#### **12. Bid Form.**

12.1. The Bid Form is included with the Bidding Documents; additional copies may be obtained from Engineer (or the Issuing Office).

12.2. All blanks on the Bid Form must be completed by printing in black ink or by typewriter.

12.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

## SECTION 00100

### INSTRUCTIONS TO BIDDERS

12.4. Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

12.5. All names must be typed or printed in black ink below the signature.

12.6. The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

12.7. The address and telephone number for communications regarding the Bid must be shown.

12.8. Evidence of authority to conduct business as an out-of-state corporation in the state where the Work is to be performed shall be provided in accordance with Paragraph 3 above. State contractor license number, if any, must also be shown.

#### **13. Submission of Bids.**

13.1 Bids shall be submitted at the time and place indicated in the Notice to Bidders and shall be enclosed in an opaque sealed envelope, marked with the Project title and name and address of Bidder and accompanied by the Bid security and other required documents. Bidder's Contractor License Number must appear on the front of the envelope containing his Bid. If the Bid is sent through the mail or other delivery system the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

13.2 Bidder shall complete and include with the Bid all of the documents referenced in the Bid Proposal Form Section of the Contract Documents.

#### **14. Modification and Withdrawal of Bids.**

14.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

If, within ninety (90) days 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, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

#### **15. Opening of Bids.**

Bids will be opened and (unless obviously non-responsive) read aloud publicly at the place where Bids are to be submitted. 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.

#### **16. Bids to Remain Subject to Acceptance.**

All Bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to that date.

#### **17. Award of Contract.**

17.1 Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced or conditional

## SECTION 00100

### INSTRUCTIONS TO BIDDERS

Bids and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. 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. Discrepancies between words and figures will be resolved in favor of the words.

17.2 In evaluating Bids, Owner will consider the qualification of Bidders, 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.

17.3 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

17.4 If the contract is to be awarded, it will be awarded to Bidder whose evaluation of price and schedule by Owner indicates to Owner that the award will be in the best interests of the Project.

17.5 If the contract is to be awarded, Owner will give Successful Bidder a Notice

of Intent to Award within thirty-five days after the day of the Bid opening.

#### **18. Contract Security.**

Paragraph 5.01 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and payment Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required performance and payment Bonds.

#### **19. Signing of Agreement.**

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten days thereafter Owner shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

#### **20. Pre-Bid Conference.**

There will not be a pre-bid conference for this project. All questions regarding this project and associated bid documents should be directed to the Owner during the question period.

#### **21. Not Used.**

#### **22. Retainage.**

Provisions concerning retainage and Contractors' rights to deposit securities in lieu of retainage are set forth in the Agreement.

**END OF SECTION 00100**



**SECTION 00300  
BID PROPOSAL FORM**

NAME OF BIDDER: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

\_\_\_\_\_

BUSINESS TELEPHONE: \_\_\_\_\_

\_\_\_\_\_

PROJECT IDENTIFICATION:

**Town of Ridgeland Well Site No.3 Improvements**

THIS BID IS SUBMITTED TO:

**Town Administrator  
Town of Ridgeland  
1 Town Square  
Ridgeland, SC 29936**

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. BIDDER accepts all of the terms and conditions of the Advertisement or Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for ninety days after the day of Bid opening. BIDDER will sign and deliver the required number of counterparts of the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen days after the date of OWNER's Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement that:

- (a) BIDDER has examined and carefully studied the Bidding Documents and the following Addenda, receipt of all which is hereby acknowledged: (List Addenda by Addendum Number and Date)

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Date: \_\_\_\_\_

- (b) BIDDER has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work;
- (c) BIDDER is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Works.
- (d) BIDDER acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to above ground or Underground Facilities at or contiguous to the site. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by BIDDER and safety precautions and programs incidental thereto. BIDDER does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price, and other terms and conditions of the Contract Documents.
- (e) BIDDER is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which the Bid is submitted as indicated in the Contract Documents.
- (f) BIDDER has correlated the information known to BIDDER, 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.
- (g) BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that BIDDER has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
- (h) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly

or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

4. BIDDER will complete the Work in accordance with the Contract Documents for the following prices:

**Schedule of Bid Prices for  
Town of Ridgeland Well Site No. 3 Improvements  
(Base Bid)**

Item No.	M&P No.	Item	Quantities	Unit	Unit Price	Total Price
1	1	Well Site No. 3 Building Modifications and Improvements	1	LS	\$	\$
2	2	Well No. 3 Discharge Piping	1	LS	\$	\$
3	3	Well Site No. 3 Electrical Service and Power distribution equipment	1	LS	\$	\$
4	4	Well Site No. 3 Instrumentation, SCADA, and control systems	1	LS	\$	\$
5	5	Well Site No. 3 Lighting and receptacles	1	LS	\$	\$
6	6	Well Site No. 3 Grounding systems	1	LS	\$	\$
7	7	Well Site No. 3 Discharge Vaults Modifications	1	LS	\$	\$
8	8	Well No. 3 Chemical Feed Systems	1	LS	\$	\$
9	9	All Other Required Well Site No. 3 Improvements	1	LS	\$	\$
<b>TOTAL BASE BID - WELL SITE NO. 3 IMPROVEMENTS</b>					<b>\$</b>	

**The Total Well Site No. 3 Improvements Cost (Base Bid) 1 through 9 inclusive:**

\_\_\_\_\_

\_\_\_\_\_ dollars and cents (in words).

**Schedule of Bid Prices for  
Town of Ridgeland Well Site No. 3 Improvements  
(Additive Alternate No. 1)**

Item No.	M&P No.	Item	Quantities	Unit	Unit Price	Total Price
1	10	Vertical Turbine Pump System	1	LS	\$	\$
<b>TOTAL ADDITIVE ALTERNATE NO. 1 - WELL SITE NO. 3 IMPROVEMENTS</b>					<b>\$</b>	

**The Total Well Site No. 3 Improvements Cost (Additive Alternate No. 1) inclusive:**

\_\_\_\_\_

\_\_\_\_\_dollars and cents (in words).

**Schedule of Bid Prices for  
Town of Ridgeland Well Site No. 3 Improvements  
(Additive Alternate No. 2)**

Item No.	M&P No.	Item	Quantities	Unit	Unit Price	Total Price
1	11	Video Log of Well	1	LS	\$	\$
<b>TOTAL ADDITIVE ALTERNATE NO. 2 - WELL SITE NO. 3 IMPROVEMENTS</b>					<b>\$</b>	

**The Total Well Site No. 3 Improvements Cost (Additive Alternate No. 2) inclusive:**

\_\_\_\_\_

\_\_\_\_\_dollars and cents (in words).

**Schedule of Bid Prices for  
Town of Ridgeland Well Site No. 3 Improvements  
(Additive Alternate No. 3)**

Item No.	M&P No.	Item	Quantities	Unit	Unit Price	Total Price
1	12	Drainage Discharge from Blowoff at Well Building	1	LS	\$	\$
<b>TOTAL ADDITIVE ALTERNATE NO. 3 - WELL SITE NO. 3 IMPROVEMENTS</b>					<b>\$</b>	

**The Total Well Site No. 3 Improvements Cost (Additive Alternate No. 3) inclusive:**

\_\_\_\_\_ dollars and cents (in words).

**Note:** All scheduled Bid Items may not be awarded. In such case, the OWNER shall select the most advantaged combination that meets project requirements, specification details, and budget availability.

Unit Prices have been computed in accordance with paragraph 11.03 of the General Condition.

Bidder acknowledges that quantities are not guaranteed and final payment will be based on actual quantities determined as provided in the Contract Documents.

5. BIDDER agrees that the Work will be substantially complete within **240 calendar days** after the date when the Contract Time commences 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 **270 calendar days** after the date when the Contract Time commences to run.

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified in the Agreement.

6. The following documents are attached to and made a condition of this Bid:

(a) Required Bid Security in the form of \_\_\_\_\_

7. Communications concerning this Bid shall be addressed to the address of BIDDER indicated on Page 00300-1.

## Notes on Bid Form:

1. Bidder shall submit a detailed Work Plan and schedule with the Bid. The Work Plan must include all anticipated project milestones, including dates of commencement, substantial completion, and final completion. Dates may be referenced (by days) from the Notice to Proceed. Final critical dates shall be determined during Contract negotiations between the selected CONTRACTOR and OWNER.

2. Bid form is given for general guidance only. Bidders shall inspect the project site and be familiar with local conditions and develop a detailed breakdown of quantities and costs.

3. All supporting documentation and drawings shall be included as attachments to the Bid Forms, including:

- Qualifications and experience documentation including:
  - Experience List
  - Reference List
  - Equipment List
  - Subcontractor List
  - Business License
  - Contractor's License
- Work Plan including proposed methods and schedule (can be submitted after project is awarded)
- Acknowledgment of Receipt of Addenda.

4. The following sections shall be included with the Bid and all associated forms and certificates therein shall be completed:

00010	Notice to Bidders
00100	Instructions to Bidders
00300	Bid Proposal Form
00400	Bid Bond with Payment
00500	Contract
00502	Wage Determination – General Decision Number: SC20240001 01/05/2024
00504	Federal Labor Standards Provisions
00506	CDBG Contract Special Provisions
00508	Debarment Certification
00509	W-9 Request for Taxpayer Identification Number and Certification
00510	Section 3 Information Sheet
00511	Section 3 Business Self-Certification
00520	South Carolina Illegal Immigration Reform Act Contractor Certification
00521	Mitigation Measures and Conditions

If BIDDER is:

An Individual

By \_\_\_\_\_  
(Individual's Name)

Signature \_\_\_\_\_

doing business as \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_

A Partnership

By \_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
(general partner signature)

Business address: \_\_\_\_\_

\_\_\_\_\_

PhoneNo.: \_\_\_\_\_

A Corporation

By \_\_\_\_\_  
(Corporation Name)

\_\_\_\_\_  
(state of incorporation)

By \_\_\_\_\_  
(signature of authorized person)

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

(Corporate Seal)

Attest \_\_\_\_\_  
(Secretary)

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No.: \_\_\_\_\_

(V) Date of Qualification to do business is \_\_\_\_\_

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**SECTION 00400**  
**BID BOND**

(Submit in triplicate – two (2) originals and one (1) copy. Attach triplicate copies of Power of Attorney and Agent’s Current South Carolina license

STATE OF \_\_\_\_\_) SS  
COUNTY OF \_\_\_\_\_)

KNOW ALL MEN BY THESE PRESENT that we, \_\_\_\_\_

as Principal, and \_\_\_\_\_ as Surety, are

held and firmly bound unto the Town of Ridgeland, South Carolina, hereinafter called the Owner,

in the sum of \_\_\_\_\_ Dollars

(\$ \_\_\_\_\_) for the payment of which sum well and

to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns,

jointly and severally firmly by these presents.

WHEREAS, the Principal, on the \_\_\_\_\_ day of \_\_\_\_\_, 2024 entered into a certain Contract with the Owner, hereto attached, for Contract entitled

# TOWN OF RIDGELAND WELL SITE NO. 3 IMPROVEMENTS

## RIDGELAND, SOUTH CAROLINA

NOW THEREFORE, If the Principal shall not withdraw said Bid within ninety (90) calendar days after date of opening of the same, and shall within ten (10) calendar days after the prescribed forms are presented to him/her for signature, enter into a written Contract with the Owner in accordance with the Bid as accepted, and give a Performance Bond and a Payment Bond with good and sufficient surety or sureties, as required by the Contract Documents, for the faithful performance and proper fulfillment of such Contract and for the proper payment of all persons furnishing labor or materials in connection therewith, or in the event or withdrawal of said Bid within the period specified, or in the event of failure to enter into such Contract and give such Bonds within the time specified, if the Principal shall pay the Owner the difference between the amount specified in said Bid and the amount of which the Owner may procure the required work and/or supplies, provided the latter amount be in excess of the former then the above obligations shall be void and of no effect; otherwise, to remain in full force and effect.

IN WITNESS WHEREOF, the Principal and Surety have hereunto caused this Bond to be duly executed and acknowledged by their appropriate officials as set forth below this \_\_\_\_\_ day of \_\_\_\_\_, 2024.

PRINCIPAL (If Sole Proprietor or Partnership)

(Firm Name)

ATTEST

By: \_\_\_\_\_  
(SEAL)

\_\_\_\_\_  
Title (Sole Proprietor or Partner)

PRINCIPAL (If Corporation)

\_\_\_\_\_  
(Corporate Name)

By: \_\_\_\_\_  
(President)

Attest: \_\_\_\_\_  
(Secretary)

(Impress Corporate Seal)

COUNTERSIGNED BY  
RESIDENT SOUTH CAROLINA  
AGENT OF SURETY:

SURETY:

\_\_\_\_\_  
(Copy of Agent's current license  
as issued by State of South Carolina  
Insurance Commissioner

By: \_\_\_\_\_  
Attorney-In-Fact  
(Power of Attorney Must Be Attached)

(Impress Corporate Seal)

**END OF SECTION 00400**

00400-2

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

**SECTION 00500**  
**CONTRACT**

**THIS CONTRACT** made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2024, by and between the Town of Ridgeland, South Carolina, hereinafter referred to as the “Owner”, a body politic and corporate and political subdivision of the State of South Carolina, whose administrative address is: 1 Town Square, Ridgeland, South Carolina 29936; and, \_\_\_\_\_ hereinafter referred to as the “Contractor”, a corporation formed and existing under the laws of the State of \_\_\_\_\_ and authorized to do business within the State of South Carolina, whose administrative address is: \_\_\_\_\_

**WITNESSETH:**

**WHEREAS**, the Owner has a project entitled **Town of Ridgeland Well Site No. 3 Improvements, Ridgeland, SC** hereinafter referred to as the “Project”, and;

**WHEREAS**, the Contractor has submitted the lowest responsible and responsive bid for the Project at \$ \_\_\_\_\_ and the Owner has awarded the Project to the Contractor; and

**NOW, THEREFORE**, in consideration of the mutual promises and covenants contained herein, as well as other good and valuable consideration not specifically mentioned, the parties agree as follows:

1. The Contractor, for and in consideration of the payments hereinafter specified and agreed to be made by the Owner, hereby covenants and agrees to furnish and deliver all materials required, to do and perform all the work and labor, in a satisfactory and workmanlike manner, required to complete the Project within the time specified, in strict and entire conformity with the Construction Contract Documents, on file at the Town of Ridgeland offices, Ridgeland, SC, which are duly approved by the Owner and which said Project Manual, Drawings, Technical Specifications and other Contract Documents are hereby made part of this Contract as fully and with the same effects as if the same had been set forth at length in the body of this Contract.
2. The Contractor hereby agrees to indemnify, defend and hold the Owner and its agents, representatives and employees harmless from any and all liabilities, losses, damages, penalties, judgments, awards, claims, demands, costs, expenses, including reasonable attorney’s fees and court costs, actions, lawsuits or other proceedings arising directly or indirectly, in whole or in part, out of the negligence or willful acts or omissions of the Contractor, its prime contractor, trade subcontractors and consultants or their respective agents, directors, officers or employees in connection with this Contract or in any way with the services or Work described herein, any occurrence at the Project site, or any occurrence arising in connection with or at the Project site or in connection with the Work, whether within or beyond the scope of its duties hereunder.
3. The Contractor’s indemnity and defense obligations under this Contract shall be absolute notwithstanding any provision contained herein or elsewhere to the contrary, and shall survive Final Completion and Final Payment for a period equal to the statute of limitations for any action which could

be brought against the Owner or its agents, officers, directors and employees and shall continue through the duration of any action brought during the applicable time periods.

4. The Contractor agrees to indemnify, defend and hold the Owner and its agents, representatives, officers, directors and employees harmless from all costs, damages and expenses, including reasonable attorneys fees, incurred by the Owner and its consultants by virtue of any claim or claims filed by any trade prime or subcontractor, mechanic, laborer, or material-man making claims arising from the performance of the Work by, through, or under the Contractor, provided the Contractor has received from the Owner all amounts properly due under this Contract concerning the claim. The Contractor shall execute and deliver to the Owner's title insurer similar indemnifications or such other document as such title insurer shall reasonably request in order to protect it against lien claims from trade prime or subcontractors. The Contractor also hereby agrees to indemnify and hold harmless, protect and defend the Owner and its consultants from and against any liability, claim, judgment, loss or damage, including, but not limited, to direct damages, attorney's fees, court costs and expenses of collection, occasioned in whole or in part by the sole failure of the Contractor, and its trade prime or subcontractors to comply with any of the terms or provisions of this Contract.

5. In any and all claims against the Owner by any employee of the Contractor or trade prime or subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 2 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any trade prime or subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6. The Owner hereby agrees to pay to the Contractor for the said work, when fully completed, the total sum of \$ \_\_\_\_\_ (the said sum being the total of the Contractor's bid, a copy of which is attached hereto and made a part hereof for all purposes), subject to such additions and deductions as may be provided for in the Construction Contract Documents. In the event the Bid contains multiple pay items, it is understood that the amount to be paid shall be the total based on the unit prices, together with lump sum prices, contained in said bid, for the work actually completed. Payments on accounts will be made as provided for in the Construction Contract Documents, Project Manual, Division 1, General Requirements, Section 01290, Payment Procedures. The Contractor shall submit bills for fees or other compensation for services or expenses in detail sufficient for a proper pre-audit and post audit thereof. Any unit of provision of goods and services must be approved in writing by the Owner prior to payment.

7. The Owner may unilaterally cancel this Contract and the goods and services thereunder in the event that the Contractor fails and refuses to allow public access to all documents, papers, letters, or other material subject to the provisions of the applicable South Carolina Statutes, made or received by the Contractor in conjunction with this Contract.

8. The Construction Contract Documents provide the criteria and the final date for completion of the Work of the Project.

9. This Contract has been executed by the parties prior to the rendering of any goods or services by the Contractor.

10. The Contractor shall provide a payment and material bond and performance bond (the Bonds) to the Owner meeting the requirements of Applicable South Carolina Statute in the sum of \$ \_\_\_\_\_ each and shall cause the Bonds to be recorded with the Notice of Award in the Public Records of the Town of Ridgeland, South Carolina

11. This Contract shall be subordinate to any rule, regulation, order or law of the United States of America, or the State of South Carolina.

12. Contractor and its employees shall promptly observe and comply with then applicable provisions of all Federal, State and local laws, rules and regulations which govern or apply to the goods and services rendered by the Design/Builder hereunder, or to the wages paid by the Contractor to its employees. Contractor shall require all of its prime and subcontractors and consultants to comply with the provisions of this paragraph.

13. Contractor shall procure and keep in force during the term of this contract all necessary licenses, registrations, certificates, permits and other authorizations as are required by law in order for Contractor to render its services hereunder. Contractor shall require all of its prime and subcontractors and consultants to comply with the provisions of this paragraph.

14. All remedies provided in this Contract shall be deemed cumulative and additional and not in lieu of or exclusive of each other or of any other remedy available to any party at law or in equity. In the event one party shall prevail in any action (including appellate proceedings), at law or in equity arising hereunder, the losing party will pay all costs, expense, reasonable attorneys' fees and all other actual and reasonable expenses incurred in the defense and/or prosecution of any legal or arbitration proceedings, including, but not limited to, those for paralegal, investigate and legal support services and actual fees charged by expert witnesses for testimony and analysis, incurred by the prevailing party referable thereto.

15. Contractor represents and warrants unto Owner that no officer, employee or agent of Owner has any interest, either directly or indirectly, in the business of the Contractor to be conducted hereunder. Contractor further represents and warrants to Owner that it has not employed or retained any company person, other than a bona fide employee working solely for Contractor, to solicit or secure this Contract, that it has not paid or agreed to any person, company, corporation, individual or firm, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, gift, or any other consideration contingent upon or resulting from the award or making of this Contract, and that it has not agreed, as an express or implied condition for obtaining this Contract, to employ or retain the services of any firm or person in connection with carrying out this Contract. Contractor assures that it will insert the above provision in each of its prime and subcontractor and consultants' agreements relating to the services to be performed hereunder.

16. The headings of the sections of this Contract are for the purpose of convenience only and shall not be deemed to expand or limit the provisions contained in such sections.

17. This Contract, including all Contract documents, constitute the entire understanding and agreement between the parties and shall supersede and replace all prior agreements or understandings, written or oral, relating to the matters set forth herein.

18. This Contract shall not be amended or modified other than in writing signed by the parties hereto. Notwithstanding the foregoing, any Amendments that are not being paid for, in whole or in part, with funds granted by the United States of America or State of South Carolina need not be approved by them.

19. The validity, interpretation, construction and effect of this Contract shall be in accordance with and be governed by the laws of the State of South Carolina. In the event any provision hereof shall be finally determined to be unenforceable, or invalid, such unenforceability or invalidity shall not affect the remaining provisions of this Contract which shall remain in full force and effect.

20. All Construction Contracts Over \$2,000: Contract Work Hours and Safety Standard Act Requirements. The contracts must include a provision for compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 USC 327-330) as supplemented by the Department of Labor regulations (29 CFR Part 5). Under Section 103 of the Act, each Contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard workweek is permissible provided that the worker is compensated at a rate not less than one times the basic rate of pay for all hours worked in excess of 40 hours in the workweek. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to health and safety as determined under construction, safety and health standards promulgated by the Secretary of Labor. These requirements do not apply to the purchases of supplies, materials, or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

## 21. Payment

### A. Retainage

1. Prior to Final Completion, progress payments will be made in an amount equal to the percentages 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 the General Conditions:
  - a. Ninety percent (90%) of the Work completed (with the balance being retainage).
  - b. Ninety percent (90%) of any materials stored on-site (with the balance being retainage) in accordance with the conditions in 21.B.1.g below.
  - c. Seventy-Five percent (75%) of any materials stored off site (with the balance being retainage) in accordance with the conditions in 21.B.1.h below.

### B. Initial (First) Monthly Application for Payment

1. Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include, but are not limited to the following:
  - a. List of all prime contractors, first and second tier subcontractors.
  - b. Contractor's Sworn Statement of principal suppliers, fabricators, prime and subcontractors.
  - c. Schedule of Values.
  - d. Contractor's construction schedule, to be updated monthly.
  - e. Initial progress report.
  - f. Certificates of Insurance and insurance policies.
  - g. Any materials stored on-site must carry insurance (All Risk Rider) stating Owner as insured. All materials will be inspected by the Owner before billing can be approved. Bill of Sale and receipts for items being billed at cost only are required and 10% retainage will be held for on-site stored materials. Paperwork must accompany request two weeks prior to billing to insure adequate time to schedule Owner's inspection.
  - h. Any material stored off site must carry additional insurance (All Risk Rider) stating Owner as insured. All material will be inspected by the Owner before billing can be approved. Bill of Sale and receipts for items being billed at cost

only are required and 25% retainage will be held for off-site stored materials. Paperwork must accompany request two weeks prior to billing to insure adequate time to schedule Owner's inspection.

- i. Contractor's Construction Safety Plan (Initial Only).

#### C. Application for Payment at Substantial Completion

The Contractor shall, upon issuance of the Certificate of Substantial Completion, submit his/her Application for payment, which shall reflect any Certificates of Substantial Completion issued previously for Owner occupancy for designated portions of the Work.

Application shall include, but not be limited to and as may be determined by the Owner, the following:

- a. Certificates of Occupancy and such other permits and approvals as may be required.
- b. Warranties (Guarantees) and maintenance agreements as may be applicable.
- c. Changeover information related to Owner's occupancy, use, operation and maintenance.
- d. Final cleaning of paved areas.
- e. Consent of Surety.
- f. List of incomplete Work, recognized as exceptions to issuance of Certificate of Substantial Completion.

#### D. Final Application for Payment

1. Administrative actions and submittals that shall precede or coincide with this final Application for Payment shall include, but not be limited to and as may be determined by the Owner, the following:

- a. Completion of Project Closeout requirements.
- b. Completion of items specified for completion after Substantial Completion.
- c. Prepare and submit to the Owner a list of unsettled claims, as may be applicable.
- d. Transmit to the Owner all required project records including permit drawings, as constructed drawings both on hard copy and in electronic format.
- e. Provide to the Owner evidence that all requisite taxes, fees and similar obligations have been paid in full.
- f. Removal of all temporary facilities and services.
- g. Removal of all surplus materials, rubbish and similar elements.
- h. Application for Reduction of Retainage.

#### 22. Liquidated Damages

- A. The Contractor agrees to commence Work under this Contract on the effective date established as "Notice to Proceed", and to complete the Work in conformance with the allotted time described in the Project Manual. Should the Contractor neglect, fail or refuse to complete the Work within the established Completion date then the Contractor shall pay to the Owner **Liquidated Damages in the amount of Five hundred (\$500.00) per day** for those damages suffered by the Owner as a result of delay for each and every calendar day that the Contractor has failed to complete the work within the established Completion date. The aforementioned Liquidated Damages are not a

penalty, but rather are a pre-agreed liquidation of the losses incurred by the Owner due to failure of the Contractor to complete the Work on time.

### 23. Termination of Contract

- A. The Owner may, by written notice, terminate this Contract in whole or in part at any time, either for the Owner's convenience or because of failure to fulfill the Contract obligations. Upon receipt of such notice, services shall be immediately discontinued (unless the notice directs otherwise) and all materials as may have been accumulated in performed this Contract, whether completed or in process, delivered to the Owner.
- B. Contract price shall be made, but no amount shall be allowed for anticipated profit on unperformed services.
- C. If the termination is due to failure to fulfill the Contractor's obligations, the Owner may take over the work and prosecute the same to completion by contract or otherwise. In such case, the Contractor shall be liable to the Owner for any additional cost occasioned to the Owner thereby.
- D. If, after notice of termination for failure to fulfill its Contract obligations, it is determined that the Contractor had not failed, the termination shall be deemed to have been effected for the convenience of the Owner. In such event, adjustment in the Contract price shall be made as provided in paragraph 21.a of this clause.
- E. The rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract.

IN WITNESS WHEREOF, the Owner and Contractor hereto have signed and sealed this Contract on the day and date first above written in three counterparts, each deemed an original contract.

TOWN OF RIDGELAND, SC  
OWNER

\_\_\_\_\_  
Witness:

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

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

CONTRACTOR

\_\_\_\_\_  
Witness:

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

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

(SEAL)

**END OF SECTION 00500**

00500-6

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS



## SECTION 00502

### WAGE DETERMINATION

General Decision Number: SC20240001 01/05/2024

Superseded General Decision Number: SC20230001

State: South Carolina

Construction Types: Heavy (Heavy and Sewer and Water Line)

Counties: Abbeville, Allendale, Bamberg, Barnwell, Beaufort, Cherokee, Chester, Chesterfield, Clarendon, Colleton, Dillon, Georgetown, Greenwood, Hampton, Jasper, Lancaster, Lee, Marion, Marlboro, McCormick, Newberry, Oconee, Orangeburg, Union and Williamsburg Counties in South Carolina.

DOES NOT INCLUDE SAVANNAH RIVER SITE IN ALLENDALE AND BARNWELL COUNTIES

HEAVY CONSTRUCTION PROJECTS (includes Sewer & Water Line projects)

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658.

Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none"><li>• Executive Order 14026 generally applies to the contract.</li><li>• The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.</li></ul>
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none"><li>• Executive Order 13658 generally applies to the contract.</li><li>• The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.</li></ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024

SUSC1990-005 02/08/1990

	Rates	Fringes
Boilermaker (tank work).....	\$ 12.96 **	3.315
Bricklayer.....	\$ 7.25 **	
Carpenter.....	\$ 7.42 **	
Cement mason/concrete finisher.....	\$ 7.25 **	
Ironworker.....	\$ 10.98 **	
Laborers:		
Chain saw.....	\$ 7.25 **	
General.....	\$ 7.25 **	
Pipelayer.....	\$ 7.25 **	
Pipefitter.....	\$ 9.09 **	
Power equipment operators:		
Backhoe.....	\$ 7.25 **	
Bulldozer.....	\$ 7.25 **	
Crane.....	\$ 7.98 **	
Dragline.....	\$ 7.25 **	
Front End Loader.....	\$ 7.25 **	
Mechanic.....	\$ 7.25 **	
Motor grader.....	\$ 7.25 **	

Pan Scraper.....\$ 7.25 \*\*

Line Construction: line

technician.....\$ 10.08 \*\*

MANHOLE BUILDER.....\$ 7.25 \*\*

TRUCK DRIVER.....\$ 7.25 \*\*

-----  
WELDERS - Receive rate prescribed for craft performing  
operation to which welding is incidental.

=====

\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular

rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

**SECTION 00504**  
**FEDERAL LABOR STANDARD PROVISIONS**  
**(Pages 1 – 10)**

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**A. APPLICABILITY**

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

**1. Minimum wages and fringe benefits**

- i. All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in 29 CFR 5.5(d) and (e), the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act (40 U.S.C. 3141(2)(B)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(v) of these contract clauses; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under 29 CFR 5.5(a)(1)(iii)) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

**ii. Frequently recurring classifications**

- A.** In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in 29 CFR part 1, a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to 29 CFR 5.5(a)(1)(iii), provided that:
1. The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;
  2. The classification is used in the area by the construction industry; and
  3. The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.
- B.** The Administrator will establish wage rates for such classifications in accordance with 29 CFR 5.5(a)(1)(iii)(A)(3). Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

**iii. Conformance**

- A.** The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be

classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
  2. The classification is used in the area by the construction industry; and
  3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- B. The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.
- C. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to [DBAconformance@dol.gov](mailto:DBAconformance@dol.gov). The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- D. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to [DBAconformance@dol.gov](mailto:DBAconformance@dol.gov), refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- E. The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division under 29 CFR 5.5 (a)(1)(iii)(C) and (D). The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to 29 CFR 5.5 (a)(1)(iii)(C) or (D) must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

**iv. Fringe benefits not expressed as an hourly rate**

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

**v. Unfunded plans**

If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in 29 CFR 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

- vi. Interest** In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

## **2. Withholding**

### **i. Withholding requirements**

The U. S. Department of Housing and Urban Development may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in 29 CFR 5.5(a) for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work (or otherwise working in construction or development of the project under a development statute) all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in 29 CFR 5.5(a)(3)(iv), HUD may on its own initiative and after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

### **ii. Priority to withheld funds**

The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

- A.** A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- B.** A contracting agency for its procurement costs;
- C.** A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- D.** A contractor's assignee(s);
- E.** A contractor's successor(s); or
- F.** A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

## **3. Records and certified payrolls**

### **i. Basic record requirements**

**A. Length of record retention.** All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

**B. Information required** Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

**C. Additional records relating to fringe benefits.** Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(v) that the wages of any laborer or mechanic include the amount of any

costs reasonably anticipated in providing benefits under a plan or program described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

**D. Additional records relating to apprenticeship** Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

**ii. Certified payroll requirements**

**A. Frequency and method of submission** The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to HUD if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the certified payrolls to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system

**B. Information required** The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i)(B), except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the sponsoring government agency (or the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records).

**C. Statement of Compliance** Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

1. That the certified payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information and basic records are being maintained under 29 CFR 5.5 (a)(3)(i), and such information and records are correct and complete;
2. That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly

from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3; and

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.
  - D. **Use of Optional Form WH-347** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the “Statement of Compliance” required by 29 CFR 5.5(a)(3)(ii)(C).
  - E. **Signature** The signature by the contractor, subcontractor, or the contractor’s or subcontractor’s agent must be an original handwritten signature or a legally valid electronic signature.
  - F. **Falsification** The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 3729.
  - G. **Length of certified payroll retention** The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.
- iii. **Contracts, subcontracts, and related documents** The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.
- iv **Required disclosures and access**
- A. **Required record disclosures and access to workers** The contractor or subcontractor must make the records required under 29 CFR 5.5(a)(3)(i)–(iii), and any other documents that HUD or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by 29 CFR 5.1, available for inspection, copying, or transcription by authorized representatives of HUD or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.
  - B. **Sanctions for non-compliance with records and worker access requirements** If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to 29 CFR 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under 29 CFR part 6 any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.
  - C. **Required information disclosures** Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address of each covered worker, and must provide them upon request to HUD if the agency is a party to

the contract, or to the Wage and Hour Division of the Department of Labor. If the Federal agency is not such a party to the contract, the contractor, subcontractor, or both, must, upon request, provide the full Social Security number and last known address, telephone number, and email address of each covered worker to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

#### **4. Apprentices and equal employment opportunity**

##### **i. Apprentices**

- A. Rate of pay** Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- B. Fringe benefits** Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.
- C. Apprenticeship ratio** The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to 29 CFR 5.5(a)(4)(i)(D). Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in 29 CFR 5.5(a)(4)(i)(A), must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- D. Reciprocity of ratios and wage rates** Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

- ii Equal employment opportunity** The use of apprentices and journeymen under this part must be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

#### **5 Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**6 Subcontracts.** The contractor or subcontractor must insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (11), along with the applicable wage determination(s) and such other clauses or contract modifications as the U.S. Department of Housing and Urban Development may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate.

**7 Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8 Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9 Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

**10. Certification of eligibility.**

i. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

ii. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

iii. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, 18 U.S.C. 1001.

**11 Anti-retaliation** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5; or

iv. Informing any other person about their rights under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5.

**B. Contract Work Hours and Safety Standards Act (CWHSSA)**

The Agency Head must cause or require the contracting officer to insert the following clauses set forth in 29 CFR 5.5(b)(1), (2), (3), (4), and (5) in full, or (for contracts covered by the Federal Acquisition Regulation) by reference, in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses must

be inserted in addition to the clauses required by 29 CFR 5.5(a) or 4.6. As used in this paragraph, the terms “laborers and mechanics” include watchpersons and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in 29 CFR 5.5(b)(1) the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in 29 CFR 5.5(b)(1), in the sum of \$31 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in 29 CFR 5.5(b)(1).

**3. Withholding for unpaid wages and liquidated damages**

**i. Withholding process** The U.S Department of Housing and Urban Development or the recipient of Federal assistance may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in 29 CFR 5.5(b) on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

**ii Priority to withheld funds** The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

- A.** A contractor’s surety(ies), including without limitation performance bond sureties and payment bond sureties;
- B.** A contracting agency for its procurement costs;
- C.** A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor’s bankruptcy estate;
- D.** A contractor’s assignee(s);
- E.** A contractor’s successor(s); or
- F.** A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

**4. Subcontracts.** The contractor or subcontractor must insert in any subcontracts the clauses set forth in 29 CFR 5.5(b)(1) through (5) and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in 29 CFR 5.5(b)(1) through (5). In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss,



due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

- 5 Anti-retaliation** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:
- i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in 29 CFR part 5;
  - ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or 29 CFR part 5;
  - iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or 29 CFR part 5; or
  - iv. Informing any other person about their rights under CWHSSA or 29 CFR part 5.
- C. CWHSSA required records clause** In addition to the clauses contained in 29 CFR 5.5(b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other laws referenced by 29 CFR 5.1, the Agency Head must cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor must maintain regular payrolls and other basic records during the course of the work and must preserve them for a period of 3 years after all the work on the prime contract is completed for all laborers and mechanics, including guards and watchpersons, working on the contract. Such records must contain the name; last known address, telephone number, and email address; and social security number of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid; daily and weekly number of hours actually worked; deductions made and actual wages paid. Further, the Agency Head must cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph must be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview workers during working hours on the job.
- D. Incorporation of contract clauses and wage determinations by reference** Although agencies are required to insert the contract clauses set forth in this section, along with appropriate wage determinations, in full into covered contracts, and contractors and subcontractors are required to insert them in any lower-tier subcontracts, the incorporation by reference of the required contract clauses and appropriate wage determinations will be given the same force and effect as if they were inserted in full text.
- E. Incorporation by operation of law** The contract clauses set forth in this section (or their equivalent under the Federal Acquisition Regulation), along with the correct wage determinations, will be considered to be a part of every prime contract required by the applicable statutes referenced by 29 CFR 5.1 to include such clauses, and will be effective by operation of law, whether or not they are included or incorporated by reference into such contract, unless the Administrator grants a variance, tolerance, or exemption from the application of this paragraph. Where the clauses and applicable wage determinations are effective by operation of law under this paragraph, the prime contractor must be compensated for any resulting increase in wages in accordance with applicable law.

#### **F. HEALTH AND SAFETY**

The provisions of this paragraph (F) are applicable where the amount of the prime contract exceeds **\$100,000**.

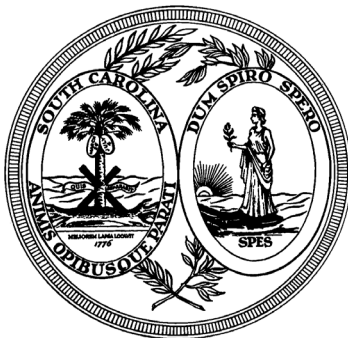
1. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
2. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.
3. The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

**SECTION 00506**

**CDBG CONTRACT SPECIAL PROVISIONS**

**(Pages 1 – 18)**

**DEPARTMENT OF COMMERCE  
GRANTS ADMINISTRATION  
COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM**



**CONTRACT SPECIAL PROVISIONS**

*The following CDBG Contract Special Provisions should be used with all construction contracts, including housing rehabilitation, as applicable, and professional service contracts, where CDBG funds are being used in whole or in part.*

## CONTRACT SPECIAL PROVISIONS

1. **Definitions:** For purposes of this Contract, the following terms shall have the meanings set forth below:
  - (a) “Assistance” means the CDBG grant funds provided, or to be provided, to the Grantee by the State, pursuant to the Grant Award Agreement.
  - (b) “CDBG” means Community Development Block Grant.
  - (c) “Contract” means the contractual agreement between the Owner and the Contractor to which these Contract Special Provisions have been incorporated and made a part thereof.
  - (d) “Contractor” means the contractor whose services are retained pursuant to the Contract.
  - (e) “Grantee” means the unit of local government designated as the recipient of the Assistance in the Grant Award and signing the acceptance provision of the Grant Award.
  - (f) “HUD” means U.S. Department of Housing and Urban Development, which is the federal agency that awards and has authority over CDBG funding to the State.
  - (g) “Owner” means the Grantee or Subrecipient, as applicable.
  - (h) “Project” means the project for which the services of the Contractor have been retained pursuant to the Contract which are funded, in whole or in part, with CDBG funds.
  - (i) “State” means the State of South Carolina, or that agency, agency division, or Office of State government which has been delegated the responsibility for administering the CDBG program for the State of South Carolina, as appropriate.
  - (j) “Subrecipient” means the agent of the unit of local government as designated by an agreement.
  - (k) “Labor Surplus Area” means a civil jurisdiction that has an unemployment rate at least 20% above the average unemployment rate for all states, the District of Columbia, and Puerto Rico during the previous two calendar years. The Department of Labor issues the labor surplus area list on a fiscal year basis.

2. **Prime Contractor Responsibilities:** The Contractor is required to assume sole responsibility for the complete effort and enforcement of laws and regulations under this Contract. The Owner will consider the Contractor to be the sole point of contact with regard to contractual matters. All contractors must be registered in SAM and eligible to receive federal contracts.
3. **Federal and State Laws:** The Contractor agrees to comply with all CDBG requirements as well as other federal and state laws, regulations, or Executive Orders. The State reserves the right to add or delete terms and conditions of this Contract as may be required by revisions and additions or changes in the requirements, regulations, and laws governing the CDBG Program.
4. **Procurement and Contracting:** In accordance with 2 CFR Part 200, the cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used. This provision shall supersede any conflicting provision in an executed contract document or agreement funded in whole or in part with CDBG funds.
  - (a) The Grantee shall ensure compliance with the requirements of the Build America, Buy America Act, as amended 41 U.S.C 8301 et. Seq. and all applicable HUD regulations. This domestic content procurement preference requires that all iron, steel, manufactured products, and construction materials used in covered infrastructure projects are produced in the United States.
5. **Ownership:** Ownership of all real or personal property, acquired in whole or in part with CDBG funds for use on this Project, shall be vested in the Grantee, unless otherwise authorized by the State. When the Grantee determines that the property is no longer required for the purposes of this Project, the Grantee must notify the State and obtain approval for disposition of the property in accordance with applicable guidelines.
6. **Copyright:** Except as otherwise provided in the terms and conditions of this Contract, the Contractor paid through this Contract is free to copyright any books, publications or other copyrightable materials developed in the course of the Project and under this Contract. However, HUD and the State reserve a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use and to authorize others to use, for Federal government and State purposes:
  - (a) the copyright in any work developed under this Contract; and
  - (b) any rights of copyright to which a subcontractor purchases ownership with grant support.

The Federal government's rights and the State's rights identified above must be conveyed to the publisher and the language of the publisher's release form must insure the preservation of these rights.
6. **Reporting Requirements:** The Contractor agrees to complete and submit all reports, in such form and according to such schedule, as may be required by the State or HUD. Further, the Contractor agrees to require any subcontractors to submit reports that may be required and to incorporate such language in its agreements. Failure to meet deadlines with the required information could result in sanctions.

7. **Access to Records:** All records with respect to all matters covered by this Contract shall be made available at any time for audit and inspection by HUD, the State or the Grantee or their representatives upon their request.
8. **Maintenance of Records:** Records for non-expendable property purchased totally or partially with Federal funds must be retained for five years after final close-out of the grant. All other pertinent contract records including financial records, supporting documents and statistical records shall be retained for a minimum of five years after the final close-out report. However, if any litigation, claim, or audit is started before the expiration of the five-year period, then records must be retained for five years after the litigation, claim or audit is resolved.
9. **Confidential Information:** Any reports, information, data, etc., given to, prepared by, or assembled by the Contractor under this Contract, which the Grantee or the State requests to be kept confidential, shall not be made available to any individual or organization by the Contractor without prior written approval of the Grantee or the State, as applicable.
10. **Reporting of Fraudulent Activity:** If at any time during the term of this Contract anyone has reason to believe by whatever means that, under this or any other program administered by the State, a recipient of funds has improperly or fraudulently applied for or received benefits, monies or services pursuant to this Contract or any other contract, such information shall be reported immediately to the appropriate authorities.
11. **Political Activity:** None of the funds, materials, property or services provided directly or indirectly under this Contract shall be used for any partisan political activity, or to further the election or defeat of any candidate for public office or otherwise in violation of the provisions of Section 8-13-765 of the Code of Laws of South Carolina, 1976, as amended.
12. **Conflicts of Interest and Ethical Standards, South Carolina Consolidated Procurement Code:** The following provisions regarding “conflicts of interest” apply to the use and expenditure of CDBG funds by the Grantee and its subrecipients, including the Contractor.

In the procurement of supplies, equipment, construction and services, the more restrictive conflict of interest provisions of the State of South Carolina Ethics, Government Accountability and Campaign Reform Act of 1991 or of the Contractor shall apply.

In cases not governed by the above, such as the acquisition and disposition of real property and the provision of CDBG assistance to individuals, businesses and other private entities, the following provisions shall apply.

Except for eligible administrative or personnel costs, the general rule is that no person who is an employee, agent, consultant, officer, or elected or appointed official of the State or a unit of general local government or any designated public agencies or subrecipient which are receiving CDBG funds who exercise or have exercised any function or responsibilities with respect to CDBG activities assisted herein or are in a position to participate in a decision making process or gain inside information with regard to such activities, may obtain a financial interest or benefit from the activity, or have an interest in any contract, subcontract or agreement with respect thereto, or the proceeds thereunder either for themselves or those with whom they have family or business ties during their tenure or for

one year thereafter. Exceptions may be granted by the State on a case by case basis as requested upon full disclosure in writing.

Should any governmental entity, contractor, subcontractor, employee or official know or perceive any breach of ethical standards or conflict of interest under the CDBG grant awarded to the Grantee or any other CDBG grant, they shall immediately notify in writing the Department of Commerce, Grants Administration, 1201 Main Street, Suite 1600, Columbia, South Carolina, 29201. If the State finds any circumstances that may give rise to a breach of ethical standards or conflict of interest, under any grant, they shall notify the participating governmental entity and the State Ethics Commission as appropriate. The State may undertake any administrative remedies it deems appropriate, where there is a breach of ethical standards or conflict of interest under the regulations governing the CDBG Program and the State policies.

13. **Applicable Law:** In addition to the applicable Federal laws and regulations, this Contract is also made under and shall be construed in accordance with the laws of the State. By execution of this Contract, the Contractor agrees to submit to the jurisdiction of the State for all matters arising or to arise hereunder, including but not limited to performance of said Contract and payment of all licenses and taxes of whatever kind or nature applicable hereto.
14. **Limitation of Liability:** The Contractor will not assert in any legal action by claim or defense, or take the position in any administrative or legal procedures that he is an agent or employee of the Owner. This provision is not applicable to contracts for CDBG administration services where the Contractor is a Council of Government. The State shall not be liable for failure on the part of the Grantee or any other party to perform all work in accordance with all applicable laws and regulations. The Grantee agrees to defend, indemnify, and hold harmless the State from and against all claims, demands, judgments, damages, actions, causes of actions, injuries, administrative orders, consent agreement and orders, liabilities, penalties, costs, and expenses of any kind whatsoever, including, without limitation, claims arising out of loss of life, injury to persons, property, or business or damage to natural resources in connection with the activities of the Grantee and any other third parties in a contractual relationship with the Grantee, or a subsidiary, whether or not occasioned wholly or in part by any condition, accident, or event caused by any act or omission of the State as a result of the Assistance.
15. **Legal Services:** No attorney-at-law shall be engaged through the use of any funds provided under this Contract in any legal action or proceeding against the State, the Grantee, any local public body or any political subdivision.
16. **Contract:** If any provision in this Contract shall be held to be invalid or unenforceable, the remaining portions shall remain in effect. In the event such invalid or unenforceable provision is considered an essential element of this Contract, the parties shall promptly negotiate a replacement provision, which addresses the intent of such provision.
17. **Amendments:** Any changes to this Contract affecting the scope of work of the Project must be approved, in writing, by the Owner and the Contractor and shall be incorporated in writing into this Contract. Any amendments of the original contract must have written approval by the State prior to execution.



**18. Termination for Convenience:** This Contract may be terminated for convenience in accordance with 2 CFR Part 200.

**19. Sanctions:** If the Contractor fails or refuses to comply with the provisions set forth herein, the State or Owner may take any or all of the following actions: cancel, terminate or suspend in whole or in any part the contract, or refrain from extending any further funds to the Contractor until such time as the Contractor is in full compliance.

**20. Subcontracting:** If any part of the work covered by this Contract is to be subcontracted, the Contractor shall identify the subcontracting organization and the contractual arrangements made therewith to the Owner and to the State. All subcontracts must be approved by the Owner and the State to insure they are not debarred or suspended by the Federal or State governments and to insure the Owner and the State understand the arrangements.

**21. Subcontracting with Small and Minority Firms, Women's Business Enterprise and Labor Surplus Areas:** It is national policy to award a fair share of contracts to disadvantaged business enterprises (DBEs), small business enterprises (SBEs), minority business enterprises (MBEs) and women's business enterprises (WBEs). Accordingly, affirmative steps must be taken to assure that DBEs, SBEs, MBEs and WBEs are utilized when possible as sources of supplies, equipment, construction and services. Affirmative steps shall include the following:

- (a) Including qualified DBEs, SBEs, MBEs and WBEs on solicitation lists;
- (b) Assuring that DBEs, SBEs, MBEs and WBEs are solicited whenever they are potential sources;
- (c) Whenever economically feasible, dividing total requirements into smaller tasks or quantities so as to permit maximum participation by DBEs, SBEs, MBEs and WBEs;
- (d) Where the requirement permits, establishing delivery schedules which will encourage participation by DBEs, SBEs, MBEs and WBEs;
- (e) Using the services and assistance of the Small Business Administration, Minority Business Development Agency, the State Office of Small and Minority Business Assistance, the U.S. Department of Commerce and the Community Services Administration as required; and
- (f) Requiring the subcontractor, if any, to take the affirmative actions outlined in (1) – (5) above.

**22. Debarment Certification:** The Contractor must comply with Executive Orders 12549 and 12689 regarding Federal debarment and suspension regulations prior to entering into a financial agreement for any transaction as outlined below.

- (a) Any procurement contract for goods and services, regardless of type, expected to equal or exceed the Federal procurement small purchase threshold (which is \$100,000 and is cumulative amount from all federal funding sources).
- (b) Any procurement contract for goods and services, regardless of amount, under which the Contractor will have a critical influence on or substantive control over the transaction.

In addition, no contract may be awarded to any contractors who are ineligible to receive contracts under any applicable regulations of the State.

- 23. South Carolina Illegal Immigration Reform Act:** The Owner and the Contractor are required to comply with the South Carolina Illegal Immigration Reform Act (signed June 4, 2008) requiring verification of lawful presence in the United States of any alien eighteen years of age or older who has applied for state or local public benefits, as defined in 8 U.S.C. Section 1621, or for federal public benefits, as defined in U.S.C. Section 1611.
- 24. Equal Employment Opportunity:** The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the State.

In carrying out the Project, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor must take affirmative action to ensure that applicants for employment 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 shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. The Contractor will, in all solicitations or advertisements for employees 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. The Contractor shall incorporate the foregoing requirements of this paragraph in all of its subcontracts for the Project unless exempted by rules, regulations, or orders of the State issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor.

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 State advising the said labor union or workers' representatives of the Contractor's commitment under this Section and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the State, or pursuant thereto, and will permit access to its books, records, and accounts by HUD and the State for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

In the event of the Contractor's noncompliance with the non-discrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further State government contracts or federally assisted construction contract procedures authorized in Executive Order 11246 of September 24, 1965, or by rules, regulations, or orders of the State, or as otherwise provided by law.

- 25. Age Discrimination:** In accordance with 45 CFR, Parts 90 and 91, the Contractor agrees there shall be no bias or age discrimination as to benefits and participation under this Contract.
- 26. Section 109 of the Housing and Community Development Act of 1974:** No person in the United States shall on the grounds of race, color, national origin or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under the CDBG program of the State.
- 27. Section 504 of the Rehabilitation Act of 1973, as amended:** The Contractor agrees that no otherwise qualified individual with disabilities shall, solely by reason of his disability, be denied the benefits, or be subjected to discrimination including discrimination in employment, any program or activity that receives the benefits from the Assistance.
- 28. Section 3, Compliance and Provision of Training, Employment and Business Opportunities:** The work to be performed under this Contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, (12 USC § 1701u). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3 shall, to the greatest extent feasible be directed to low and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

The parties to this said Contract agree to comply with HUD's regulations in 24 CFR Part 75, which implement Section 3. As evidenced by their execution of this Contract, the parties to this Contract certify that they are under no contractual or other impediment that would prevent them from complying with the 24 CFR Part 75 regulations.

The contractor agrees to send to each labor organization or representative of workers with which the Contractor has a collective bargaining agreement or other understanding, if any, a notice advising the organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions; the qualifications for each; and the name and location of person(s) taking applications for each of the positions; and the anticipated date the work shall begin. The Contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 75. The Contractor will not subcontract with any subcontractor where the Contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 75.

The Contractor will certify that any vacant employment positions including training positions, that are filled (1) after the Contractor is selected but before this Contract has been executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 75 require employment opportunities to be directed, were not filled to circumvent the Contractor's obligations under 24 CFR Part 75.

The Contractor agrees to submit such reports as required to document compliance with 24 CFR Part 75. Noncompliance with the regulations in 24 CFR Part 75 may result in sanctions, termination of this Contract for default, and debarment or suspension from future HUD assisted contracts.

- 29. Lead-Based Paint:** The construction or rehabilitation of residential structures with any portion of the Assistance is subject to the HUD Lead-Based Paint regulations found at 24 CFR Part 35. Any grants or loans made by the Grantee for the rehabilitation of residential structures with any portion of the Assistance shall be made subject to the provisions for the elimination of lead-base paint hazards under subpart B of said regulations, and the Grantee shall be responsible for the inspections and certifications required under Section 35.14(f) thereof.

- 30. Compliance with Air and Water Acts:** (Applicable to construction contracts and related subcontracts exceeding \$100,000) This Contract is subject to the requirements of the Clean Air Act, as amended, 42 USC § 7401 et seq., the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC § 1251 et seq., and the regulations of the Environmental Protection Agency with respect to 40 CFR Part 15, as amended from time to time, and the South Carolina Stormwater Management and Sediment Reduction Act. In particular, the following are required:

- (a) A stipulation by the Contractor or subcontractor that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the List of Violating Facilities, issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR § 15.20.
- (b) Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 USC § 7414) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC § 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Sections 114 and 308, and all regulations and guidelines issued thereunder.
- (c) A stipulation that as a condition of award of contract prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized or to be utilized for the contract under consideration is to be listed on the EPA list of Violating Facilities.
- (d) Agreement by the Contractor that the Contractor will include or cause to be included the criteria and requirements in these subparagraphs (1) through (4), in every nonexempt subcontract and requiring that the Contractor will take such action as the State may direct as a means of enforcing such provisions.

In no event shall any amount of the Assistance be utilized with respect to a facility which has given rise to a conviction under section 113(c)(1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.

- 31. Federal Labor Standards Provisions:** (*Applicable to construction contracts in excess of \$2,000 or residential rehabilitation contracts involving more than eight units*)

The Project or program to which the construction work covered by this Contract pertains is being assisted by the United States of America and the Federal Labor Standards Provisions as set forth on Attachment 1 are included in this Contract pursuant to the provisions applicable

to such Federal assistance. These provisions must be complied with or sanctions will be instituted.

## Attachment 1

U.S. Department of Housing and Urban Development, Office of Labor Relations form HUD-4010 (06/2009) ref. Handbook 1344.1

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached thereto and made a part thereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5 (a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification of the time actually work therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification an wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

**(ii) (a)** Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2)** The classification is utilized in the area by the construction industry; and
- (3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

**(b)** If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve,

modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1214-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federal-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension or any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for an on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1 (b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment of provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices and trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

**(ii) (a)** the contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget Under OMB Control Number 1215-0129.)

**(b)** Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays for supervises the payment of the persons employed under the contract and shall certify the following:

**(1)** That the payroll for the payroll period contains the information required to be maintained under 29 CFR 5.5 (a)(3)(i) and that such information is correct and complete;

**(2)** That each laborer or mechanic (including each apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

**(3)** That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

**(c)** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).



(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **4. Apprentices and Trainees.**

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment Training Administration, Office of Apprenticeship Training, Employer and Training Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as state above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved

**(ii) Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every Trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**(iii) Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 of this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause

include disputes between the contractor (or any if its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(ii)** No part of this contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(iii)** The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provided in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, 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."

**11. Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B. Contract Work Hours and Safety Standards Act.** The provisions of this paragraph B are applicable only where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**(1) Overtime Requirements.** No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violations of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

**(3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

**(4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable only where the amount of the prime contract exceeds \$100,000.

**(1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to this health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**(2)** The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et. seq.

**(3)** The Contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

**SECTION 00508**

**DEBARMENT CERTIFICATION**

**(Pages 1 – 2)**

10/16

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION,  
INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS**

This certification is required by the regulations implementing Executive Orders 12549 and 12689, Debarment and Suspension, and 2 CFR Part 200, Participants' responsibilities. )

*(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS BELOW)*

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles are 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.

**Grant Number:** CI-22-21

**Name of Participant:** \_\_\_\_\_

**Address of Participant:** \_\_\_\_\_

Name and Title of Authorized Representative	Signature	Date
<p>1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.</p> <p>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.</p> <p>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.</p> <p>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 Orders 12549 and 12689.</p> <p>5. The prospective lower tier participant agrees by submitting this proposal 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.</p> <p>6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -- Lower Tier Covered Transactions", without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.</p> <p>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 check the System for Award Management (SAM).</p> <p>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.</p> <p>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.</p>		

**SECTION 00509**

**W-9 REQUEST FOR TAXPAYER IDENTIFICATION NUMBER AND  
CERTIFICATION**

**(Pages 1 – 6)**

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# Request for Taxpayer Identification Number and Certification

Give Form to the  
requester. Do not  
send to the IRS.

► Go to [www.irs.gov/FormW9](http://www.irs.gov/FormW9) for instructions and the latest information.

Print or type. See Specific Instructions on page 3.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only <b>one</b> of the following seven boxes.  <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ► _____ <b>Note:</b> Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is <b>not</b> disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner. <input type="checkbox"/> Other (see instructions) ► _____	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):  Exempt payee code (if any) _____  Exemption from FATCA reporting code (if any) _____  <i>(Applies to accounts maintained outside the U.S.)</i>
	5 Address (number, street, and apt. or suite no.) See instructions.	Requester's name and address (optional)
	6 City, state, and ZIP code	
	7 List account number(s) here (optional)	

## Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

**Note:** If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number									
				-				-	
or									
Employer identification number									
				-					

## Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	Signature of U.S. person ►	Date ►
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## General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

**Future developments.** For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to [www.irs.gov/FormW9](http://www.irs.gov/FormW9).

## Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

*If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.*

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting*, later, for further information.

**Note:** If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

**Definition of a U.S. person.** For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

**Foreign person.** If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, *Withholding of Tax on Nonresident Aliens and Foreign Entities*).

**Nonresident alien who becomes a resident alien.** Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

**Example.** Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

## Backup Withholding

**What is backup withholding?** Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

**Payments you receive will be subject to backup withholding if:**

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the instructions for Part II for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships*, earlier.

## What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

## Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

## Penalties

**Failure to furnish TIN.** If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

**Civil penalty for false information with respect to withholding.** If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

**Criminal penalty for falsifying information.** Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

**Misuse of TINs.** If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

## Specific Instructions

### Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

**Note: ITIN applicant:** Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or “doing business as” (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a “disregarded entity.” See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, “Business name/disregarded entity name.” If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

### Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

### Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

### Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

#### Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 <sup>1</sup>	Generally, exempt payees 1 through 5 <sup>2</sup>
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

<sup>1</sup> See Form 1099-MISC, Miscellaneous Income, and its instructions.

<sup>2</sup> However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

**Exemption from FATCA reporting code.** The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

**Note:** You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

## Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

## Line 6

Enter your city, state, and ZIP code.

## Part I. Taxpayer Identification Number (TIN)

**Enter your TIN in the appropriate box.** If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

**Note:** See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

**How to get a TIN.** If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at [www.SSA.gov](http://www.SSA.gov). You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at [www.irs.gov/Businesses](http://www.irs.gov/Businesses) and clicking on Employer Identification Number (EIN) under Starting a Business. Go to [www.irs.gov/Forms](http://www.irs.gov/Forms) to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to [www.irs.gov/OrderForms](http://www.irs.gov/OrderForms) to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

**Note:** Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

**Caution:** A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

## Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

**Signature requirements.** Complete the certification as indicated in items 1 through 5 below.



**1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.**

You must give your correct TIN, but you do not have to sign the certification.

**2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

**3. Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.

**4. Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

**5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

**What Name and Number To Give the Requester**

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account <sup>1</sup>
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor <sup>2</sup>
5. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee <sup>1</sup>
b. So-called trust account that is not a legal or valid trust under state law	The actual owner <sup>1</sup>
6. Sole proprietorship or disregarded entity owned by an individual	The owner <sup>3</sup>
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	Give name and EIN of:
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity <sup>4</sup>
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee

For this type of account:	Give name and EIN of:
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

<sup>1</sup> List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

<sup>2</sup> Circle the minor's name and furnish the minor's SSN.

<sup>3</sup> You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

<sup>4</sup> List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships*, earlier.

**\*Note:** The grantor also must provide a Form W-9 to trustee of trust.

**Note:** If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

**Secure Your Tax Records From Identity Theft**

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

**Protect yourself from suspicious emails or phishing schemes.**

Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to [phishing@irs.gov](mailto:phishing@irs.gov). You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at [spam@uce.gov](mailto:spam@uce.gov) or report them at [www.ftc.gov/complaint](http://www.ftc.gov/complaint). You can contact the FTC at [www.ftc.gov/idtheft](http://www.ftc.gov/idtheft) or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see [www.IdentityTheft.gov](http://www.IdentityTheft.gov) and Pub. 5027.

Visit [www.irs.gov/IdentityTheft](http://www.irs.gov/IdentityTheft) to learn more about identity theft and how to reduce your risk.

## Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

**SECTION 00510**

**SECTION 3 INFORMATION SHEET FOR CONTRACTORS/BUSINESSES**

**(Pages 1-2)**

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## Section 3 Information Sheet for Contractors/Businesses

### What is Section 3?

Section 3 is a provision of the Housing and Urban Development (HUD) Act of 1968. The purpose of Section 3 is to ensure that employment and other economic opportunities generated by certain HUD financial assistance shall, to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulation, be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons.

### What is a Section 3 worker?

Section 3 workers are:

- Any worker who currently or when hired (within the past five years) is below documented to fit at least one of the below categories:
  - The worker's income for the previous or annualized calendar year is below the income limit established by HUD; or
  - The worker is employed by a Section 3 business concern
  - The worker is a YouthBuild participant

### What is a Targeted Section 3 Worker

- A worker employed by a Section 3 business concern; or
- A worker who currently fits or when hired (within the past 5 years) is documented to fit at least one of the following categories:
  - Living within the service area or the neighborhood of the project, meaning; or
  - A YouthBuild participant

### What is a Section 3 Business Concern?

A Section 3 Business Concern meets one of the following criteria:

- Is 51 percent or more owned and controlled by low- or very low-income persons;
- Over 75 percent of the labor hours performed for the business over the prior 3-month period were performed by Section 3 workers; or
- Is at least 51 percent owned and controlled by current public housing residents; residents who currently live in Section 8-assisted housing

### What types of economic opportunities should be made available under Section 3?

- Job training
- Employment
- Contracts

### Examples of Opportunities include:

- |                        |                         |                       |
|------------------------|-------------------------|-----------------------|
| • Accounting           | • Electrical            | • Marketing           |
| • Architecture         | • Elevator Construction | • Painting            |
| • Appliance repair     | • Engineering           | • Payroll Photography |
| • Bookkeeping          | • Fencing               | • Plastering          |
| • Bricklaying          | • Florists              | • Plumbing            |
| • Carpentry            | • Heating               | • Printing Purchasing |
| • Carpet Installation  | • Iron Works            | • Research            |
| • Catering             | • Janitorial            | • Surveying           |
| • Cement/Masonry       | • Landscaping           | • Tile setting        |
| • Computer/Information | • Machine               | • Transportation      |
| • Demolition           | • Operation             | • Word processing     |
| • Drywall              | • Manufacturing         |                       |

### Who receives priority under Section 3?

For training and employment:

- Persons in public and assisted housing
- Persons in the area where the HUD financial assistance is spent
- Participants in HUD Youthbuild programs
- Homeless persons

For contracting:

- Businesses that meet the definition of a Section 3 business concern

### **How can businesses find Section 3 workers to work for them?**

Businesses can recruit Section 3 residents in public housing developments and in the neighborhoods where the HUD assistance is being spent. Effective ways of informing residents about available training and job opportunities are:

- Contacting resident organizations, local community development and employment agencies
- Distributing flyers
- Posting signs
- Placing ads in local newspapers

### **Are recipients, contractors, and subcontractors required to provide long-term employment opportunities, not simply seasonal or temporary employment?**

Recipients are required, to the greatest extent feasible, to provide all types of employment opportunities to low and very low-income persons, including permanent employment and long-term jobs.

Grantees and contractors are encouraged to have Section 3 workers make up at least 25 percent and targeted workers make up 5 percent of their permanent, full-time staff.

A Section 3 worker who has been employed for 5 years may no longer be counted towards meeting the 25 percent for section 3 and 5 percent for targeted section 3 worker requirements. This encourages recipients to continue hiring Section 3 and targeted Section 3 workers when employment opportunities are available.

### **What if it appears an entity is not complying with Section 3?**

There is a complaint process. Section 3 and targeted workers, business concerns, or a representative for either may file a complaint if it seems a recipient is violating Section 3 requirements are being on a HUD-funded project.

### **Will HUD require compliance?**

Yes. HUD monitors the performance of contractors, reviews annual reports from recipients, and investigates complaints. HUD also examines employment and contract records for evidence that recipients are training and employing Section 3 workers and awarding contracts to Section 3 business concerns.

**SECTION 00511**

**SECTION 3 BUSINESS SELF-CERTIFICATION**

**(Page 1)**

# Section 3 Business Concern Self-Certification

## **BASIC INFORMATION**

1. Company Name: \_\_\_\_\_
2. Company Address: \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ County \_\_\_\_\_
3. Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
 Email address: \_\_\_\_\_
4. Contractor's License: Class ☐A ☐B ☐C ☐N/A License Number: \_\_\_\_\_
5. Business License \_\_\_\_\_ Number Federal ID Number \_\_\_\_\_
6. Type of Business: \_\_\_\_\_

## **TYPES OF SECTION 3 BUSINESS ENTERPRISES**

Please check "Yes" or "No". If you answer "YES" to one or more of the following questions, you may designate your company as a Section 3 Business Enterprise.

1. 51% or more of your business is owned by a Section 3 workers\*; or

☐ Yes ☐ No

*Attach list of Section 3 owners and income certifications*

2. Over 75% of the labor hours over the previous 3-month period are performed by Section 3 workers; or

☐ Yes ☐ No

*Attach list of employees, Section 3 employees, and self certifications*

3. At least 51% owned and controlled by current residents of public housing or Section 8 assisted housing.

☐ Yes ☐ No

*Attach list of subcontracted businesses, types and amounts*

**VERIFICATION** - The company hereby agrees to provide, upon request, documents verifying the information provided on this form.

**I declare and affirm under penalty of law that the statements made herein are true and accurate to the best of my knowledge. I understand that falsifying information and incomplete statements will disqualify certification status.**

Signature of Business Owner or Authorized Representative: \_\_\_\_\_

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

Attested by: Date: \_\_\_\_\_

**\*Section 3 Worker and Targeted Section 3 Worker definitions can be found in the "Section 3 Definitions" document.**

**SECTION 00520**

**ILLEGAL IMMIGRATION REFORM ACT CONTRACTOR CERTIFICATION**

**(Page 1)**

## SOUTH CAROLINA ILLEGAL IMMIGRATION REFORM ACT

### CONTRACTOR CERTIFICATION

In accordance with the requirements of the South Carolina Illegal Immigration Reform Act, Contractor Name (“Contractor”) hereby certifies that it is currently in compliance with the requirements of Title 8, Chapter 14 of the S.C. Code Annotated and will remain in compliance with such requirements throughout the term of its contract with Town of Ridgeland (“Owner”).

Contractor hereby acknowledges that in order to comply with requirements of S.C. Code Annotated Section 8-14-20(B), it will:

1. Register and participate in the federal work authorization program (E-Verify) to verify the employment authorization of all new employees; and require agreement from its subcontractors, and through the subcontractors, the sub-subcontractors, to register and participate in the federal verification the employment authorization of all new employees.

Contractor agrees to provide to Owner any documentation required to establish the applicability of the South Carolina Illegal Immigration Reform Act to the Contractor, subcontractor, or sub-subcontractor. Contractor further agrees that it will provide Owner with any documentation required to establish that the Contractor and any subcontractors or sub-subcontractors are in compliance with the requirements of Title 8, Chapter 14 of the S.C. Code Annotated.

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

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

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

**SECTION 00521**

**MITIGATION MEASURES AND CONDITIONS**

### **Mitigation Measures and Conditions [40 CFR 1505.2(c)]**

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure
Clean Air Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	<p>Project is not located in York County which is the only non-attainment area in South Carolina.</p> <p>Project does not indicate potential for significant air quality environmental impact provided permits and any required mitigation are properly followed. The Bureau offers the following information and suggestions:</p> <p>Emissions from construction equipment are regulated by federal standards. The Bureau also offers the following suggestions on how this project can help them stay in compliance with the NAAQS. More importantly, these strategies are beneficial to the health of citizens of South Carolina.</p> <ul style="list-style-type: none"><li>• Utilize alternatively fueled equipment.</li><li>• Utilize emission controls applicable to your equipment</li><li>• Reduce idling time on equipment</li><li>• Fugitive dust emissions should be minimized through good operating practices.</li></ul> <p>Regarding the change in activity, the original determination is still correct. See DHEC Bureau of Air Quality letter 9/23/22</p>
Endangered Species Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402	<p>Because the activities are within previously disturbed lands (right of ways), the Fish &amp; Wildlife Blanket Clearance letter applies.</p> <p>Please note that obligations under the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect any listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner which was not considered in this assessment; (3) a new species is listed or critical habitat is designated that may be affected by the identified action.</p>
Historic Preservation National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800	<p>SHPO: If archaeological materials are encountered, stop project and notify.</p> <p>Catawba: If cultural resources or human remains are encountered, stop project and notify.</p> <p>Muscogee: If cultural resources or human remains are encountered, stop project and notify.</p>
Wetlands Protection Executive Order 11990, particularly sections 2 and 5	<p>There are no wetlands within our project area, as shown on the NWI map. The proposed project will not have any negative impacts on the project area. A letter from Army Corps is pending. If any permits are required by ACE, they will be obtained. A Section 404 permit will be obtained, if required, prior to any physical activities taking place at the site.</p> <p>Angela Bryan, PE -Four Waters Engineering, Inc.</p>



**SECTION 00524**

**NOTICE OF INTENT TO AWARD**

00524-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

## **NOTICE OF INTENT TO AWARD**

OWNER: Town of Ridgeland  
(Name)

PROJECT: CI-22-21 Well Site No.3 Improvements  
(Number) (Name)

### TO ALL BIDDERS

**This is to notify all bidders that it is the intent of the owner to award a contract as follows:**

NAME OF BIDDER: \_\_\_\_\_

DATES BIDS WERE RECEIVED: \_\_\_\_\_

AMOUNT OF BASE BID: \$ \_\_\_\_\_

ALTERNATE(S) ACCEPTED: # \$ \_\_\_\_\_

TOTAL AMOUNT OF BASE BID WITH ALTERNATE(S): \$ \_\_\_\_\_

**The owner has determined that the above named bidder is responsible and has submitted the lowest responsive bid. The owner may enter into a contract with this bidder subject to the contract review by Department of Commerce, Grants Administration.**

Dennis E. Averkin Town Administrator  
(PRINT OR TYPE NAME) (AWARD AUTHORITY TITLE)

\_\_\_\_\_  
(SIGNATURE) (DATE POSTED)

.....  
POST A COPY OF THIS FORM AT THE LOCATION ANNOUNCED AT BID OPENING

**SECTION 00525**

**NOTICE OF AWARD**

00525-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

## NOTICE OF AWARD

**TO:**            **Company**  
                  **Address**

**OWNER:**       **Town of Ridgeland**  
                  **PO Box 1119, Ridgeland, SC 29936**

### PROJECT DESCRIPTION: TOWN OF RIDGELAND WELL SITE NO. 3 IMPROVEMENTS

The owner has considered the bid dated \_\_\_\_\_ submitted by you for the above described work in response to its Advertisement for Bids and its Information for Bidders.

You are hereby notified that your base bid has been accepted in the total amount of \_\_\_\_\_ dollars and \_\_\_\_\_ cents (\$).

You are required by the Instructions for Bidders to execute the Agreement and furnish the required Contractor's performance bond, payment bond, and certificates of insurance with 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 the notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your bid 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 \_\_\_\_\_, 2024.

Town of Ridgeland

Owner

(Signature)

By: Dennis E. Averkin

(Print Name)

Title: Town Administrator

### Acceptance of Notice

Receipt of the above Notice of Award is hereby acknowledged by \_\_\_\_\_ this  
the \_\_\_\_\_ day of \_\_\_\_\_, 2024.

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

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

**SECTION 00526**  
**NOTICE TO PROCEED**

00526-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

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

You are hereby notified to commence WORK in accordance with the Agreement  
executed \_\_\_\_\_, on or before \_\_\_\_\_, and  
you are to complete the WORK within \_\_\_\_\_ consecutive calendar days thereafter. The  
date of completion of all WORK is therefore \_\_\_\_\_.

Title: Town Administrator

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

**SECTION 00600**  
**PERFORMANCE BOND**

00600-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

**SECTION 00600**  
**PERFORMANCE BOND**

BOND NO. \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS that we, \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are held and firmly bound unto the Town of Ridgeland, South Carolina herein after called the Obligee, in the Penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) 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.

WHEREAS, the Principal, on the \_\_\_\_\_ day of \_\_\_\_\_, 2024 entered into a certain Contract with the Owner, included herein, for the Contract entitled Town of Ridgeland Well Site No. 3 Improvements, Ridgeland, South Carolina.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract, and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be void; otherwise, to remain in full force and effect.

Whenever the Principal shall be and is declared by the Owner to be in default under the Contract, or wherever the contract has been terminated by default of the Contractor, the Owner having performed the Owner's obligations hereunder, the Surety shall:

1. Complete the Contract in accordance with its terms and conditions, or at the Owner's sole option.
2. Obtain a Bid or Bids for submission to the Owner for completing the Contract in accordance with its terms and conditions, and upon determination by the Owner and Surety of the lowest responsible Bidder, arrange for a Contract between such Bidder and the Owner, and made available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost completion less the balance of the Contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term balance of the Contract price: as used in this paragraph, shall mean the total amount payable by the Owner to the Contractor under the Contract and any amendments thereto, less the amount properly paid by the Owner to the Contractor.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the successors or assignees thereof.

In the case of termination of the Contract, as provided in the Construction Contract Documents, there shall be assessed against the Principal and Surety herein, all expenses, including design/engineering, geo-technical, surveying, and legal services incidental to collecting losses to the Owner under this Bond.



This Bond shall remain in full force and effect for such period or periods of time after the date of acceptance of the project by the Owner as are provided for in the Construction Contract Documents, and the Principal hereby guarantees to repair or replace for the said periods all work performed and materials and equipment furnished, which were not performed or furnished according to the terms of the Construction Contract Documents. If no specific periods of warranty are stated in the Construction Contract Documents for any particular item of work, material, or equipment, the Principal hereby guarantees the same for a minimum period of one (1) year from the date of final acceptance by the Owner.

The Surety shall permit arbitration and be ultimately responsible for the payment of any award.

IN WITNESS WHEREOF, the above bounden parties have caused this Bond to be signed and sealed by their appropriate officials as of the \_\_\_\_\_ day of \_\_\_\_\_, 2024.

PRINCIPAL

\_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
WITNESS By: \_\_\_\_\_  
(Title)

SURETY

\_\_\_\_\_  
(Firm Name)

\_\_\_\_\_  
WITNESS By: \_\_\_\_\_  
(Title)

END OF SECTION 00600

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**SECTION 00601**  
**PAYMENT AND MATERIAL BOND**

00601-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

## SECTION 00601

### PAYMENT AND MATERIAL BOND

BOND NO. \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS that we, \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are held and firmly bound unto the Town of Ridgeland, South Carolina hereinafter called the Obligee, in the Penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) 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.

WHEREAS, the Principal, on the \_\_\_\_\_ day of \_\_\_\_\_, 2024 entered into a certain Contract with the Owner, included herein, for Contract entitled Town of Ridgeland Well Site No. 3 Improvements, Ridgeland, South Carolina.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payments to all persons supplying labor, materials and supplies used directly or indirectly by said Principal or his Subcontractors in the prosecution of the work provided for in said Contract, then this obligations shall be void; otherwise to remain in full force and effect, subject, however, to the following conditions:

1. This bond is executed for the purpose of complying with the applicable State of South Carolina Statutes and all acts amendatory thereof, and this Bond shall inure to the benefit of any and all persons supplying labor, material and supplies used directly or indirectly by the Principal or his Subcontractors in the prosecution of the work provided for in said Contract so as to give such persons a right of action to recover upon this Bond in a separate suit brought on this Bond. No right of action shall accrue hereunder to or for the use of any person except as such right of action may be given and limited by the applicable State of South Carolina Statutes.
2. In each and every suit brought against the Principal and Surety upon this Bond in which the plaintiff shall be successful, there shall be assessed therein against the Principal and Surety herein, in favor of the Plaintiff therein, reasonable counsel fees, which the Principal and Surety hereby expressly agree to pay as a part of the cost and expense of said suit.
3. A claimant, except a laborer, who is not in privity with the Principal and who has not received payment for his labor, materials, or supplies, shall, within forty-five (45) calendar days after beginning to furnish labor, materials, or supplies for the prosecution of the work, furnish the Principal with a notice that he intends to look to the bond for protection.
4. A claimant who is not in privity with the Principal and who has not received payment for his labor, materials or supplies shall, within ninety (90) calendar days after performance of the labor or after complete delivery of the materials or supplies, deliver to the Principal and to the Surety written notice of the performance of the labor or delivery of the materials or supplies and of the non-payment.

5. No action for the labor, materials, or supplies may be instituted against the Principal or the Surety unless both notices have been given. No action shall be instituted against the Principal or the Surety on the bond after one (1) year from the performance of the labor or completion of delivery of the materials or supplies.

The Surety shall permit arbitration and be ultimately responsible for the payment of any award.

IN WITNESS WHEREOF, the above bounden parties have caused this Bond to be signed and sealed by their appropriate officials as of the \_\_\_\_\_ day of \_\_\_\_\_, 2024.

PRINCIPAL

\_\_\_\_\_  
(Firm Name)

By: \_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness)

SURETY

\_\_\_\_\_  
(Firm Name)

By: \_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Witness)

**END SECTION 00601**

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**SECTION 00640**  
**PAY REQUEST FORM**

00640-1

TOWN OF RIDGELAND  
WELL SIT NO.3 IMPROVEMENTS

**TOWN OF RIDGELAND**  
**APPLICATION AND CERTIFICATION FOR PAYMENT**

**TO OWNER:** TOWN OF RIDGELAND  
1 TOWN SQUARE  
RIDGELAND, SC 29936

**APPLICATION NO.:**  
**PERIOD TO:**  
**PROJECT NO.:** CI-22-21

Distribution to:  
\_\_\_ Owner  
\_\_\_ Engineer  
\_\_\_ Contractor

**FROM CONTRACTOR:** Contractor's Name & Address

**CONTRACT FOR:** TOWN OF RIDGELAND WELL SITE NO.3 IMPROVEMENTS

**CONTRACTORS APPLICATION FOR PAYMENT**

Application is made for payment, as shown below, in connection with the Contract.

- |  |          |
|--|----------|
| 1. ORIGINAL CONTRACT SUM   | \$ _____ |
| 2. Net change by Change Orders   | \$ _____ |
| 3. CONTRACT SUM TO DATE (LINE 1 + 2)   | \$ _____ |
| 4. TOTAL COMPLETED & STORED TO DATE  | \$ _____ |
| 5. RETAINAGE:  |          |
| a. _____ % of Completed Work   | \$ _____ |
| b. _____ % of Stored Material  | \$ _____ |
| Total Retainage (Line 5a + 5b)   | \$ _____ |
| 6. TOTAL EARNED LESS RETAINAGE<br>(Line 4 less Line 5 Total)                 | \$ _____ |
| 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT<br>(Line 6 from prior Certificate) | \$ _____ |
| 8. CURRENT PAYMENT DUE   | \$ _____ |
| 9. BALANCE TO FINISH, INCLUDING RETAINAGE<br>(Line 3 less Line 6)            | \$ _____ |

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
TOTALS		
NET CHANGES by Change Order		

The undersigned Contractor certifies that to the best of the Contractors knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

**CONTRACTOR:**

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

State of: \_\_\_\_\_

County of: \_\_\_\_\_

Subscribed and sworn to before  
me this \_\_\_\_\_ day of \_\_\_\_\_

Notary Public:

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

**ENGINEER'S CERTIFICATE FOR PAYMENT**

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Engineer certifies to the Owner that to the best of the Engineers Knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ \_\_\_\_\_

(Attach explanation if amount certified differs from the amount applied for. Initial all figures on this Application and on the Continuation Sheet that are changed to conform to the amount certified.)

**ENGINEER:**

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

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

Attach a Schedule of Values which includes a description of work completed along with any supporting documentation.



**SECTION 00641**  
**CHANGE ORDER FORM**

**SECTION 00641**

**CHANGE ORDER FORM**

CHANGE ORDER NO. \_\_\_\_\_

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

CONTRACTOR: \_\_\_\_\_

OWNER: Town of Ridgeland

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

The following changes are made to the Contract Documents:

Original CONTRACT AMOUNT \$ \_\_\_\_\_

Current CONTRACT AMOUNT ADJUSTED  
by Previous CHANGE ORDER \$ \_\_\_\_\_

Net (Increase) (Decrease) of CONTRACT AMOUNT  
Resulting from this CHANGE ORDER \$ \_\_\_\_\_

Current CONTRACT AMOUNT Including this CHANGE ORDER \$ \_\_\_\_\_

ORIGINAL CONTRACT TIME \_\_\_\_\_ Calendar Days

Current CONTRACT TIME ADJUSTED  
by Previous CHANGE ORDER \_\_\_\_\_ Calendar Days

Net (Increase) (Decrease) Resulting  
from this CHANGE ORDER \_\_\_\_\_ Calendar Days

Current CONTRACT COMPLETION DATE  
including this CHANGE ORDER \_\_\_\_\_

(Change Order No. \_\_\_\_\_, Page 1 of 3)

00641-1

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

CHANGES ORDERED:

I. GENERAL: This CHANGE ORDER is necessary to cover changes in the Work to be performed under the Contract. GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, SPECIFICATIONS, DRAWINGS and all other CONTRACT DOCUMENTS govern all Work under this CHANGE.

II. REQUIRED CHANGES:

III. JUSTIFICATION:

IV. PAYMENT:

(Change Order No. \_\_\_\_\_, Page 2 of 3)

VI. APPROVAL AND CHANGE AUTHORIZATION:

Acknowledgments: The aforementioned change, and work effected thereby, is subject to all provisions of the original contract not specifically changed by the Change Order; and it is expressly understood and agreed that the approval of the Change Order shall have no effect on the original Contract other than matters expressly provided herein.

Change Order Requested by:

RECOMMENDED BY:

\_\_\_\_\_  
Engineer

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

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

ACCEPTED BY:

\_\_\_\_\_  
Contractor

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

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

APPROVED BY:

\_\_\_\_\_  
Owner

By:\_\_\_\_\_  
Signature and Title

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

(Change Order No. \_\_\_\_\_, Page 3 of 3)

00641-3

TOWN OF RIDGELAND  
WELL SITE NO.3 IMPROVEMENTS

## **SECTION 00700**

### **GENERAL CONDITIONS**

#### **1.1 GENERAL**

- A. The GENERAL CONDITIONS for this contract are the Standard General Conditions of the Construction Contract. Document C-700, 2007 Edition, prepared by Engineers Joint Contract Documents Committee (EJCDC) and issued and published jointly by National Society of Professional Engineers (NSPE), ACEC, ASCE and CSI (EJCDC).
- B. All provisions of the GENERAL CONDITIONS of EJCDC Document C-700 not amended or supplemental herein, or in the SUPPLEMENTARY CONDITIONS, shall remain in full force and effect.

#### **1.2 SUPPLEMENTARY CONDITIONS**

- A. The provisions of the GENERAL CONDITIONS and the Modifications herein, may be further modified in the SUPPLEMENTARY CONDITIONS and in Division 1, GENERAL REQUIREMENTS.

**END OF SECTION**

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE  
*A Practice Division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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# 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 and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. 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 which is evidence of the agreement between Owner and Contractor covering the Work.
  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. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
  7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
  8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. *Change Order*—A document recommended by Engineer 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, issued on or after the Effective Date of the Agreement.
  10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
  11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given 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 under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *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.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *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.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *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 for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *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 at the Site.
44. *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.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *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 Subcontractor.
48. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

## 1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F 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 Paragraph 9.09 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 14.04 or 14.05).

### 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. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- 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. 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 Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

### **2.02   *Copies of Documents***

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### **2.03   *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 Agreement 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 Agreement. 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 Agreement, whichever date is earlier.

## 2.04 *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 the date on which the Contract Times commence to run.

## 2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), 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 Documents;
  - 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.

## 2.06 *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 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, 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 instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

## 2.07 *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 2.05.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 component parts of the Work.

### **ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, 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. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

#### **3.02 *Reference Standards***

- A. Standards, Specifications, Codes, Laws, and Regulations
  1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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, 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 Contract Documents. 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 Contract Documents.

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

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, 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) any standard, specification, manual, or code, or (c) 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 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
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 Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
  1. A Field Order;
  2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

### 3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier 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
  2. 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.
- 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.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

### 4.01 *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. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- 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 the Work is to be performed 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.

#### 4.02 *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 contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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.

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed 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 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments*:

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in Paragraph 4.03.A; and
  - 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 Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final 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
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous 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 shall not be responsible for 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 such information and data;
  - b. locating all Underground Facilities shown or indicated in the Contract Documents;
  - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
  - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.



#### 4.05 *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.

#### 4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) 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 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. 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. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. 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: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. 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 a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 – BONDS AND INSURANCE

### 5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, 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 Documents. 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 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds 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 each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, 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 requirements of Paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

### 5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

#### 5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which 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:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  - 5. 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; and
  - 6. 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.
- B. The policies of insurance required by this Paragraph 5.04 shall:
  - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
  - a. Such insurance shall remain in effect for two years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

#### 5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, 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.

#### 5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full 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 interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, 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.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

#### 5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies 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 of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their 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 Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (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 as trustee 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 utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.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, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

#### 5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

#### 5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

#### 5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.



## ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

### 6.01 *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. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- 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.

### 6.02 *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. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

### 6.03 *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.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, 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.

#### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 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 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

#### 6.05 *Substitutes and "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 specification or description 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 or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
  - 1. *"Or-Equal" Items:* If in Engineer's sole discretion 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, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, 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; and
      - 3) it has a proven record of performance and availability of responsive service.
    - 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.

## 2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. 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:
  - 1) shall certify that the proposed substitute item will:
    - a) perform adequately the functions and achieve the results called for by the general design,
    - b) be similar in substance to that specified, and
    - c) be suited to the same use as that specified;
  - 2) will state:
    - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
    - b) 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
    - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and
    - b) available engineering, sales, maintenance, repair, and replacement services; and
  - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. 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.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

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

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. 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 any right of Owner or Engineer to reject defective Work.

- C. 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. 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 moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. 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.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (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 such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

#### 6.07 *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.

#### 6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 6.09 *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 knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear 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. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 6.10 *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.

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

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. 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 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 by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other 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 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 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 property to stresses or pressures that will endanger it.

## 6.12 *Record Documents*

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

## 6.13 *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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- 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 6.13.A.2 or 6.13.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 (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 for protection of the Work 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 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *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.

#### 6.15 *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.

#### 6.16 *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.

#### 6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

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

- a. Submit number of copies specified in the General Requirements.
- 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 6.17.D.

##### 2. *Samples:*

- a. Submit number of Samples specified in the Specifications.

- b. 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 6.17.D.
- B. 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. *Submittal Procedures:*

- 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated each 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 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 and approval of that 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 both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval 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 6.17.C.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's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

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.

6.18 *Continuing the Work*

- A. 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, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *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 representation of 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 or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

#### 6.20 *Indemnification*

- A. 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 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 6.20.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 6.20.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.

## 6.21 *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 law.
- 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, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to 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 6.21, 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 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **ARTICLE 7 – OTHER WORK AT THE SITE**

### 7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe

access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. 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. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, 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.

#### 7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
  - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
  - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

## ARTICLE 8 – OWNER’S RESPONSIBILITIES

### 8.01 *Communications to Contractor*

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

### 8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### 8.03 *Furnish Data*

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

### 8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### 8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### 8.06 *Insurance*

- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### 8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

### 8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

### 8.09 *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.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *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.

8.12 *Compliance with Safety Program*

- 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 pursuant to Paragraph 6.13.D.

## **ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *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 Documents.

9.02 *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 9.09. 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.



### 9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. 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.

### 9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

### 9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

### 9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with 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, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

### 9.07 *Determinations for Unit Price Work*

- A. 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 Paragraph 10.05.

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 14.07.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 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

#### 9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

### **ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

#### 10.01 *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 by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

#### 10.02 *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 as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

#### 10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
  - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  - 2. 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; and
  - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

#### 10.04 *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.

#### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
  - 1. deny the Claim in whole or in part;
  - 2. approve the Claim; or
  - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## **ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **11.01 *Cost of the Work***

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs 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 11.01.B, 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, 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 11.01.

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 5.06.D), 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 telegrams, long distance telephone calls, telephone 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 Contractor is required by the Contract Documents to purchase and maintain.

B. *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 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which 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 Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work 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 or when a Claim for an 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 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, 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.

## 11.02 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:*
1. Contractor agrees that:
    - a. 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
    - b. 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:*

1. 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.

11.03 *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. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- 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. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 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; and
  2. there is no corresponding adjustment with respect to any other item of Work; and
  3. Contractor believes that Contractor 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 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.



- B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee*: 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 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.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 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
    - 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 12.01.C.2.a through 12.01.C.2.e, inclusive.

## 12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

## 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, 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 Price or the Contract Times, or both. 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.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is 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 described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

## **ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### **13.01 *Notice of Defects***

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### **13.02 *Access to Work***

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests 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.

### **13.03 *Tests and Inspections***

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
  - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
  - 3. as otherwise specifically provided in the Contract Documents.
- 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 and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

- E. 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.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, 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 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 Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. 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, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 13.05 *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, 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.

#### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *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 land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair such defective land or areas; or
  - 2. correct such defective Work; or
  - 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 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. 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) will be paid by Contractor.
- 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 13.07, 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 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

### 13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. 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) 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 pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

### 13.09 *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 in accordance with Paragraph 13.06.A, 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, 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 13.09, 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, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. 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 13.09.

## **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.01 *Schedule of Values***

- A. The Schedule of Values established as provided in Paragraph 2.07.A 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.

### **14.02 *Progress Payments***

#### ***A. 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 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.

#### ***B. Review of Applications:***

1. Engineer will, within 10 days after receipt of each Application for Payment, 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 9.07, 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 Documents; 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 moneys 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:



- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

*C. Payment Becomes Due:*

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

*D. Reduction in Payment:*

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. 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;
  - c. there are other items entitling Owner to a set-off against the amount recommended; or
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
- 2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action 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, when Contractor remedies the reasons for such action.
- 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 14.02.C.1 and subject to interest as provided in the Agreement.

**14.03 Contractor's Warranty of Title**

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *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 (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- 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 tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and 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 Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. 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 tentative list.

#### 14.05 *Partial Utilization*

- 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. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and 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 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and 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 14.04 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 5.10 regarding property insurance.

#### 14.06 *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 is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *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, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) 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.

*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 Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. 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 14.09. 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. Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

*14.08 Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### 14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

### **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

#### 15.01 *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 notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

#### 15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will 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 established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's repeated disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. 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
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.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 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed 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.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. 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. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

#### 15.03 *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;
  3. 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

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

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) 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 15.03.

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 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 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 16 – DISPUTE RESOLUTION**

#### 16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or
3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

## **ARTICLE 17 – MISCELLANEOUS**

### **17.01 *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 to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### **17.02 *Computation of Times***

- A. When any period of time is referred to in the Contract Documents 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.

### **17.03 *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 Documents. 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.

### **17.04 *Survival of Obligations***

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

### **17.05 *Controlling Law***

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

### **17.06 *Headings***

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



## SECTION 00800

### SUPPLEMENTARY CONDITIONS TO THE GENERAL CONDITIONS

The following supplements modify, change from or add to the Standard General Conditions of the Construction Contract, EJCDC Document C-700, 2007 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions shall remain in effect.

#### ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01.A Add the following sentence to “27. Notice of Award”: “When requested by OWNER, the Notice of Award may be issued by the ENGINEER.”

SC-1.01.A Add the following sentence to “28. Notice to Proceed”: “When requested by OWNER, the Notice to Proceed may be issued by ENGINEER.”

SC 1.01.A Add the following new Defined Terms:

52. ARCHITECT/ENGINEER – The person, firm or corporation named as the ENGINEER in the Agreement shall be understood to mean:

Four Waters Engineering, Inc. (4Waters)  
324 6<sup>th</sup> Avenue N  
Jacksonville Beach, FL 32250  
904-414-2400

and their authorized representatives, acting either directly, or indirectly as authorized agents of the OWNER.

53. *Provide* – As used in the Project Manual, means to furnish and install, complete and ready for intended use.

54. *Product* - As used in the Project Manual, includes materials, fabrications, systems and equipment.

#### ARTICLE 2 – PRELIMINARY MATTERS

SC-2.01. Add the following:

The Town of Ridgeland and Four Waters Engineering, Inc. (4Waters) shall be named as additional insureds on all insurance policies and Certifications of Insurance.

SC-2.02.A In the first line, change the term “...ten...” to read “...three...”.

SC-2.03.A Delete Paragraph 2.03.A in its entirety and replace with the following:

“2.03 Commencement of Contract Times: Notice to Proceed

A. The date of commencement of the Work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the OWNER-CONTRACTOR Agreement or such other date as may be established therein.”

SC-2.05.A Add the following new subparagraphs to paragraph 2.05A:

“4. CONTRACTOR shall perform no portion of the Work at any time without Contract Documents or, where specified, approved Shop Drawings for such portion of the Work.

5. By executing the Contract, CONTRACTOR represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.”

### ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01.B Add the following sentence to Paragraph 3.01B: “CONTRACTOR shall be responsible for the construction and coordination of the parts of the Project, and all systems provided shall be completely compatible and fully functional without additional cost to OWNER.”

SC-3.02.A. Add the following new subparagraph to paragraph 3.02.A:

“3. Sections of Division One - General Requirements govern the execution of all sections of the Specifications.”

### ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCED POINTS

SC-4.01 Delete Paragraphs 4.01.C in its entirety.

SC-4.06 Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

“A. No reports on drawings related to Hazardous Environmental Conditions are known to Owner or Engineer.

B. Not Used.”

### ARTICLE 5 - BONDS AND INSURANCE

SC-5.04.A In the first line of Paragraph 5.04.A, following the word” ...maintain...”, insert the words, “...in a company or companies licensed to do business in the State of South Carolina,...”.

SC-5.04 Add the following new paragraph immediately after paragraph 5.04.B:

C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Worker's Compensation, and related coverages under paragraphs 4.04.A.1 and A.2 of the General Conditions:
  - a. State Statutory
  - b. Applicable Federal  
(e.g. Longshoreman's): Statutory
  - c. Employer's Liability Limits Provide Below
  
2. Contractor's General Liability under paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:
  - a. General Aggregate \$1,000,000
  - 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. Property Damage liability insurance will provide Explosion, Collapse and Underground coverages where applicable.
  - f. Excess or Umbrella Liability
    - 1) General Aggregate \$1,000,000
    - 2) Each Occurrence \$1,000,000
  
3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:
  - a. Bodily Injury:  
Each Person \$1,000,000
  - b. Property Damage:  
Each Accident \$ 1,000,000
  - c. Combined Single

	Limit of	\$ 1,000,000
4.	The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:	
	a.	
	Bodily Injury	
	Each Accident	\$1,000,000
	Annual Aggregate	\$1,000,000
	b.	
	Property Damage:	
	Each Accident	\$1,000,000
	Annual Aggregate	\$1,000,000

SC-5.06.A Delete Paragraph 5.06.A in its entirety and insert the following in its place:

- A. A CONTRACTOR shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:
1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.;
  2. be written on a Builder's Risk "all-risk" open peril or special causes of loss policy form that shall at least include insurance for physical loss and 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, extended coverage, theft vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER; and
  5. allow for partial utilization of the Work by OWNER;

6. including testing and startup; and
7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. CONTRACTOR shall be responsible for any deductible or self-insured retention.

C. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph SC-5.06 shall comply with the requirements of paragraph 5.06.C of the General Conditions.

SC-5.06.B Delete paragraph 5.06.B in its entirety.

SC-5.06.E Delete paragraph 5.06.E in its entirety.

#### ARTICLE 6 - CONTRACTORS'S RESPONSIBILITIES

SC-6.03.B Add the following after Paragraph 6.03.B: "The use of asbestos or asbestos-based fiber materials is prohibited in this Project."

SC-6.06. Add the following sentence at the end of paragraph 6.06.G:

"H. OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other individuals or entity, to the extent practicable, information about amounts paid to CONTRACTOR on account of Work performed for CONTRACTOR by a particular Subcontractor, Supplier, or other individual or entity."

SC-6.13 Add the following new paragraph:

"C. The Occupational Safety and Health Administration excavation safety standards, 29 CFR 1926.650 Subpart P trench safety standards are in effect during the period of construction of the Project. In compliance with current State of South Carolina statutes, the Contractor or subcontractor performing trench excavation work on the Project shall comply with the applicable trench safety standards."

SC-6.17 Add the following new paragraphs immediately after Paragraph 6.17.E:

"F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor."

## ARTICLE 7 - OTHER WORK AT THE SITE

SC-7.04 Add the following new paragraph immediately after paragraph GC-7.03:

SC-7.04 Claims Between Contractors

“A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor’s performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, Engineer’s Consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor’s performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor’s exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.”

## ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.01.A.3. Starting in the fourth line of Paragraph 11.01.A.3 delete the following sentence, “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 11.01.”

SC-11.02 Delete Paragraph 11.02.C in its entirety.

## ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.01 Delete Paragraph 12.01.B.3 in its entirety.

SC-12.01.C Delete Paragraph 12.01.C2 a-c in their entirety.

## ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02.C.1 In the first line of Paragraph 14.02.C.1, change “Ten days...”to read “thirty days...”.

## ARTICLE 16 - DISPUTE RESOLUTION

SC-16.01 Delete Paragraph 16.01.C in its entirety and insert the following in its place:

“C. If the Claim is not resolved by mediation, Engineer’s action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. gives to the other party written notice of intent to submit the Claim to a court of competent jurisdiction, or
2. agrees with the other party to submit the Claim to another dispute resolution process.

SC-16.01.D Add the following new paragraph immediately after Paragraph SC-16.01.C.

D. Notwithstanding any applicable statute of limitations, a party giving notice under Paragraph SC-16.01.C.1 shall commence an action on the Claim within one year of giving such notice. Failure to do so shall result in the Claim being time-barred and Engineer’s action or denial shall become final and binding.”

**END OF SECTION 00800**

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**SECTION 01025**  
**MEASUREMENT AND PAYMENT**

**A. GENERAL**

1. The CONTRACTOR shall receive and accept the compensation provided in the Proposal and the Contract as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the Engineer, or from the action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the OWNER.
2. The prices stated in the proposal include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and specified herein. The basis of payment for an item at the unit price shown in the proposal shall be in accordance with the description of that item in this Section.
3. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for any item of work has not been established by the Bid Form or Payment Items, he shall include the cost for that work in some other applicable bid item, so that his proposal for the project does reflect his total price for completing the work in its entirety.

**B. MEASUREMENT**

1. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the OWNER, in accordance with the applicable method of measurement therefor contained herein. A representative of the CONTRACTOR and OWNER shall witness all field measurements.

**C. WORK ITEMS NOT PAID FOR SEPARATELY**

1. Color Audio-Video Recording: Measurement for pre-construction color audio-video recording will not be made for payment and all items shall be included in the unit price of project unit items installed.
2. Construction Photographs: Measurement for construction photographs will not be made for payment and all items shall be included in the unit price of project unit items installed.
3. Maintenance of Traffic: Measurement for maintenance of traffic/temporary traffic control will not be made for payment and all items shall be included in the unit price of project items installed.
4. Erosion and Sediment Control: Measurement for erosion and sediment control will not be made for payment and all items shall be included in the unit price of project items installed.

5. Restoration: Measurement for restoration requirements (including but not limited to grassing, grading, restoring structures damaged by construction to preconstruction condition) other than pavement items noted in bid form will not be made for payment and all items shall be included in the unit price of project items installed.
6. Contractor Storage Site / Lay Down Yard / Temporary Office: Measurement for Contractor Storage Site / Lay Down Yard / Temporary Office will not be made for payment and all items shall be included in the unit price of project unit items installed.
7. Regular Excavation: Measurement for regular excavation will not be made for payment and all items shall be included in the unit price of project unit items installed.
8. Dewatering: Measurement for dewatering operations necessary for construction will not be made for payment and all items shall be included in the unit price of project unit items installed.
9. Stabilization: Measurement for stabilization operations necessary for construction will not be made for payment and all items shall be included in the unit price of project unit items installed.
10. Miscellaneous Work Items: Measurement for miscellaneous work items such as mobilization / demobilization, payment and performance bonds, testing and reporting, temporary fencing, temporary facilities, as-builts/record drawings, and other items not specifically listed in the Bid Proposal Form will not be made for payment and all items shall be included in the unit price of project unit items installed.
11. Project Sign: Measurement for Project Sign will not be made for payment and all items shall be included in the unit price of project unit items installed.
12. Permits: Any permits to be acquired by contractor will not be made for payment and all items and permit fees shall be included in the unit price of the related project items installed.

#### **D. PAY ITEMS**

##### **1. WELL SITE #3 BUILDING IMPROVEMENTS**

Measurement and payment for Well Site #3 Building Improvements item is lump sum and will be full compensation for constructing proposed modifications to the Well Site #3 building as defined in the construction drawings and specifications. Payment shall be full compensation for all labor, tools, materials, and equipment to provide all noted or required demolition and disposal, building expansion, modifications and roof improvements, exhaust/fan systems, louvers, painting, new doors, concrete foundations and stoops, painting and all other construction necessary for complete building expansion in accordance with the architectural and structural drawings. Payment will be based on a percentage of work complete.

##### **2. WELL NO. 3 – DISCHARGE PIPING**

Measurement for this item is lump sum and includes all materials and items of work to furnish,

satisfactorily install, disinfect, test, and place into successfully operating service the Well # 3 discharge piping from the vertical turbine pump discharge head to the limits of the contract, as included in the contract documents, accepted and installed in accordance with contract documents. This work includes, but is not limited to, all ductile iron piping, associated pipe fittings, restraints, air/vacuum release valve, stainless steel tubing and connections to existing systems (if Additive Alternate 1 is not contracted), butterfly valves, check valve, pipe supports, sample tap assemblies, pressure gauges, blowoff assemblies, gate valves, appurtenances and accessories, excavation and backfill. All labor, tools, material and equipment necessary for disinfection, sampling, and testing of the completed Well #3 piping system required for clearance in accordance with SCDHEC requirements, are included in this item. Demolition of the existing piping and valve assemblies shall also be included in this pay item. Payment will be made based on a percentage of the total work completed. Instrumentation systems equipment (including flow meter) shall be included in the separate pay item, Instrumentation, SCADA and Control Systems.

**3. WELL SITE NO. 3 ELECTRICAL SERVICE AND POWER DISTRIBUTION EQUIPMENT**

Measurement for this item is lump sum and includes all materials and items of work to furnish and satisfactorily install electrical service entrance and power distribution equipment associated with the Well # 3 project including such things as new underground Dominion Energy service entrance with main fused disconnect, relocated automatic transfer switch, panelboards, low voltage transformers, RVSS motor controllers, or other items included in the contract documents, accepted and installed in accordance with contract documents. The Work shall be as specified in Division 16 – Electrical and as shown on the Electrical Drawings and shall include installation, testing, and commissioning. Payment will be made based on a percentage of the total work completed.

**4. WELL SITE NO. 3 INSTRUMENTATION, SCADA, AND CONTROL SYSTEMS**

Measurement for this item is lump sum and includes all materials and items of work to furnish and satisfactorily install the instrumentation, SCADA, and control systems associated with the Well # 3 project including such things as new flow instrumentation, pressure instrumentation, level instrumentation, equipment control systems, SCADA systems, radio systems, control panels, or other items included in the contract documents, accepted and installed in accordance with contract documents. The DRACS-RTU panel is not included in this scope of work and will be provided by others under the Town of Ridgeland (EDA) Water & Sewer Resiliency project; although modifications to the panel may be necessary. Contractor shall coordinate with Lord & Company to determine required modifications of DRACS-RTU and shall include such cost in this pay item. Contractor shall coordinate work with others as required. The Work shall be as specified in Division 16 – Electrical and as shown on the Electrical Drawings and shall include installation, testing, and commissioning. Payment will be made based on a percentage of the total work completed.

**5. WELL SITE NO. 3 LIGHTING AND RECEPTACLES**

Measurement for this item is lump sum and includes all materials and items of work to furnish and satisfactorily install interior and exterior lighting and receptacle systems associated with the Well # 3 project included in the contract documents, accepted and installed in accordance with contract documents. The Work shall be as specified in Division 16 – Electrical and as shown on the Electrical Drawings and shall include installation, testing, and commissioning. Payment will be

made based on a percentage of the total work completed.

**6. WELL SITE NO. 3 GROUNDING SYSTEMS**

Measurement for this item is lump sum and includes all materials and items of work to furnish and satisfactorily install facility grounding and bonding systems associated with the Well # 3 project including such things as new grounding electrode conductors, equipment grounding conductors, ground rods, equipment bonding jumpers, or other items included in the contract documents, accepted and installed in accordance with contract documents. The Work shall be as specified in Division 16 – Electrical and as shown on the Electrical Drawings and shall include installation, testing, and commissioning. Payment will be made based on a percentage of the total work completed.

**7. WELL SITE NO. 3 DISCHARGE VAULTS MODIFICATIONS**

Measurement and payment for Well Site No. 3 Discharge Vaults Modifications is lump sum and will be full compensation for constructing required modifications to the two concrete vaults located outside of the well building including coring common wall, grating replacement, furnishing and installing sump pump system and discharge piping through vault wall and routing to swale, and all testing required for a complete installation. Payment will be made based on a percentage of the total work completed. Demolition of existing piping and valves in vault; new chemical feed systems; new discharge piping and fittings, valves; and electrical, instrumentation and control systems equipment shall be included in separate pay items.

**8. WELL NO. 3 CHEMICAL FEED SYSTEMS**

Measurement and payment for Well No. 3 Chemical Feed Systems is lump sum and will be full compensation for constructing required modifications to the existing chemical feed systems at Well Site. No. 3 for sodium hypochlorite and phosphate including furnishing and installation of new chemical feed metering pumps and associated accessories, relocating existing chemicals and equipment (as relevant) to new chemical feed room, installation of new chemical feed piping including conduit outside of building, valves, and injection systems from chemical feed pumps, through Well No. 3 building wall, underground to discharge into piping in vaults located outside of Well No. 3 building, and all testing required for a complete installation. Payment will be made based on a percentage of the total work completed. All electrical, instrumentation and control systems equipment shall be included in separate pay item, Instrumentation, SCADA, and Control Systems.

**9. ALL OTHER REQUIRED WELL SITE NO. 3 IMPROVEMENTS**

Measurement and payment for All Other Required Well Site No. 3 Improvements is lump sum and will be full compensation for constructing all other proposed demolition and construction at Well Site No. 3, in accordance with the construction drawings and specifications which are not included in other pay items. Payment will be full compensation for all labor, tools, materials and equipment to provide the remaining improvements at the Well Site No. 3 primarily comprising replacement of eye wash station, new water feed/service for eye wash, concrete spill pads outside of well building and adjacent to vault, and any other miscellaneous proposed improvements and modifications. Payment will be based on a percentage of work complete.

**10. VERTICAL TURBINE PUMP SYSTEM (ADDITIVE ALTERNATE NO. 1)**

Measurement and payment of this item is lump sum and includes all items of work required to remove existing well pump system as noted on construction drawings and to furnish, install and test and place into full operating condition the vertical turbine pump, 125 HP electric motor, accepted and installed in accordance with contract documents. Item includes all labor, materials and equipment necessary for the satisfactory installation and operation of the Well # 3 vertical turbine pump including, suction cone, pump bowl(s), pump column, lineshafts, pump base plate, wellhead companion flange (as necessary), discharge head, concrete equipment pad/foundation, stainless steel tubing inside and through well and connecting to tubing from discharge piping/valves, sample taps, well vent, and other access tubes, accessories and spare parts noted on drawings, as approved and accepted by the Engineer. All labor, tools, material and equipment necessary for disinfection, sampling, and testing of the completed Well #3 pump system required for clearance in accordance with SCDHEC requirements, are included in this item. Item includes but is not limited to all the labor, tools, material and equipment required. Payment will be made based on a percentage of the total work completed. All equipment necessary for the instrumentation and control systems shall be included in the separate pay item, Instrumentation, SCADA, and Control Systems.

**11. VIDEO LOG OF WELL (ADDITIVE ALTERNATE NO. 2)**

Measurement and payment for Video Log of Well is lump sum and will be full compensation for the video log of the existing well following removal of the existing well pump. Color TV video logging equipment shall be capable of logging the total well depth. During inspection, maintain continuous image on video screen displaying depth of camera below ground surface. Video logs shall be conducted with equipment that has both down-hole and side-view capabilities capable of providing a clear color image up to 24-inches in diameter with sufficient resolution to identify the targets of the survey. A video record of the entire well shall be made from land surface to the total depth of the well in the down-hole and up-hole directions. Each casing joint shall be inspected using a sideward-looking camera with full 360° rotation capability. The survey shall be logged at slow play (SP) on high quality Digital Video Disc (DVD). Payment will be full compensation for all labor, tools, materials and equipment to provide the video inspection and log.

**12. DRAINAGE DISCHARGE FROM BLOWOFF AT WELL BUILDING (ADDITIVE ALTERNATE NO. 3)**

Measurement and payment for Drainage Discharge from Blowoff at Well Building is lump sum and will be full compensation for installing a drainage structure, SCDOT Type 1, (3' depth), in lieu of 4'x4' concrete spill pad, under well discharge blowoff near well building and routing 12" PVC gravity storm piping and fittings (as needed) at 0.3% slope from drainage structure to fenceline with discharge to existing ditch system (approximately 75 LF). Shall also include routing of sump pump 3" discharge piping to drainage structure and connection and restoration of site.

Payment will be made based on a percentage of the total work completed. Payment will be full compensation for all labor, tools, materials and equipment necessary to complete the drainage discharge system.

**END OF SECTION 01025**

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## **SECTION 01100**

### **SUMMARY OF WORK**

#### **PART 1-GENERAL**

The Summary of Work in this Section comprises the Town of Ridgeland Well Site No. 3 Improvements, Ridgeland, South Carolina. The following scope of work description is intended to be general in nature. The intention is to have the successful Contractor perform all of the work included and presented within the Construction Contract Documents, paying particular attention to the Schedule of Bid Prices. The Contractor shall comply with and be responsible for all of the requirements of the Project Manual including the Drawings and Specifications.

##### **1.01 RELATED REQUIREMENTS INCLUDED**

Project Manual, Division 0, Bidding and Contract Documents  
Project Manual, Division 1, General Requirements  
Project Manual, Divisions 2 – 16 as noted in Table of Contents for technical requirements

The Contractor shall comply with and be responsible for all of the requirements of the Project Manual, without exception.

The Contract Form for this Project shall be as stipulated in Division 0, Section 00500 in the Project Manual.

##### **1.02 SCOPE OF WORK**

- A. Base Bid includes all components of the Project that provide immediate operational service to the improvements to Town of Ridgeland Well Site No.3 Improvements. All work shall be to Town of Ridgeland, SCDHEC, and SCDOT requirements. The major components of the Base Bid include but are not limited to:
- Building Modifications
    - Expand building footprint to the west 6' out across entire building width;
      - Form one room within the expanded area for separate chemical storage/pumping equipment for the disinfection and corrosion control;
      - Provide double doors with louvers to new room
      - Provide wall mounted exhaust fan
      - Seal louver on west side of building to separate new chemical room from well and electrical equipment room;
    - Remove interior walls for chlorine gas room;
    - Remove door for chlorine gas room and enclose opening on outer face of building, east side;
    - Replace double doors to main building and provide louvers;
    - Replace roofing, seal over opening for removed roof turbine, extend roof for building expansion;
    - Seal any new/modified building penetrations;

- Provide wall mounted exhaust fan;
- Paint building;
- Electrical Modifications
  - Demolish existing overhead service entrance and weather head at building;
  - Demolish existing power distribution equipment and existing control panels in the building;
  - Coordinate with Dominion Energy and install new electrical service on site and new main disconnect switch at well building;
  - Relocate existing automatic transfer switch to extended north wall of well building;
  - Install new building lighting - interior and exterior;
  - Install new electrical distribution within building;
  - Install new grounding delta;
  - Install new grounding ring around elevated storage tank;
  - Furnish and install new SCADA control panel;
  - Retrofit existing SCADA pole as necessary and provide upgrades to coax cable, radio systems and control panel;
  - Furnish and install new instrumentation systems;
  - Furnish and install new reduced voltage solid state motor starter;
  - Connect and power all mechanical equipment requiring electrical power service;
- Civil/Mechanical Modifications:
  - Replace/relocate eye wash station from within building and provide new water service;
  - Relocate chemical feed systems to new room in building.
  - Remove and replace 10" ductile iron well discharge piping – interior and exterior of building;
  - Replace flow meter on well discharge piping;
  - Replace 10" check valve on well discharge piping and provide limit switch;
  - Replace grating over valve vault;
  - Replace three 10" valves and piping in vault;
  - Install sump pump in valve vault, core common wall in vaults, and route pump discharge piping;
  - Install two new metering pumps for chemical feed and injection;
  - Replace concrete spillways for well flushing pipe at building and pipe at vault .
  - Provide all disinfection and testing required for SCDHEC clearance.

B. Additive Alternates include the following:

- a. Well Pump Replacement
  - 1. Replace existing well pump with 125 Hp vertical turbine well pump and motor.
  - 2. Install well water level gauge
- b. Video Log of Well
- c. Drainage Discharge from Blowoff at Well Building

### 1.03 SUBSTANTIAL COMPLETION

Substantial completion is the time at which the Work has progressed to the point where, in the opinion of the Engineer, the Work is sufficiently complete in accordance with the Contract Documents so that the facilities can be utilized for the purposes for which they are intended. For this project, Substantial Completion includes all components of the Work of the Project that rehabilitates and restores to service the Well 3 pumping system, which has been tested, inspected



and approved by the Town and determined to be functioning properly. This requires the contractor to achieve completion of all Work of the Project less the final restoration.

#### 1.04 FINAL COMPLETION

Final completion is the time, as certified by the Engineer, when all Work of the Project is complete, post completion documents have been submitted by the contractor and are satisfactory, and the Project is ready for final payment. Final completion requires the contractor to be at the level of functionality defined complete with all "punch list" items addressed, grassing to have been established and to be complete in all respects as contained within the Construction Contract Documents. The date of final completion shall constitute the date of the beginning of the Guarantee and Warranty period.

#### 1.05 USE OF THE PREMISES

- A. Contractor shall have use of the area encompassing the Project Site as shown on the applicable drawings for execution of the Work of this Contract, except as may be otherwise indicated or necessitated by the requirements of the Project Manual, or as may be determined by the Owner.
- B. Contractor shall provide, or cause to be provided, and shall pay for all geotechnical services, testing, labor, equipment, materials and such other utilities, transportation and facilities necessary for the proper execution of the Work, whether temporary or permanent, and whether or not incorporated or to be incorporated in the Work.
- C. Contractor shall provide protection at all affected areas of the site during the performance of the Work.
- D. Contractor shall perform all work in conformance with O.S.H.A. requirements, which will be strictly enforced.
- E. Contractor shall coordinate the use of the premises consistent with the Project requirements as may be directed by the Owner.
- F. Contractor shall use access routes for delivery of materials and equipment only as indicated on the drawings approved by the Owner and as may be directed by the Owner. Do not use access routes other than those indicated. Contractor shall keep clean, maintain and repair all access routes used.
- G. Contractor shall assume full responsibility for the protection and safekeeping of all products under this contract, stored and / or installed on the Project Site as well as those products stored off the Project Site. Materials, products and equipment shall be stored on the Project Site only in those areas indicated or allowed for staging and approved by the Owner.
- H. Safe staging and material storage shall be limited to the area indicated on the drawings, which have been approved by the Owner and as may be designated by the Owner. Contractor must obtain specific permission from the Owner for the use of other areas for storage and staging.
- I. Contractor shall protect existing sidewalks, pavement, curbs, utilities, building exterior and interior surfaces subject to damage by Work performed under this contract. Contractor shall, at his sole cost and expense, repair or replace any existing work damaged by his/her prime and/or sub-contractor's personnel or equipment.

#### 1.06 WORK SEQUENCE AND COMPLETION

- A. Contractor shall work in an orderly manner coordinated with the work of other disciplines and trades.
- B. No disruption to, or use of adjacent facilities and access to those facilities will be allowed.
- C. Operation of the existing Well 3 facilities shall be maintained until such time as necessary project equipment has been delivered to the site. Contractor shall coordinate with Owner for approval in advance of taking Well 3 facilities out of service for construction.
- D. The Owner may require certain work to be performed after normal working hours or on holidays or weekends or as may be necessitated in the Public interest. Such work does not constitute a change of scope or additional cost.

#### 1.07 LIQUIDATED DAMAGES

The Contractor agrees to commence Work under this Contract on the effective date established as "Notice to Proceed", and to complete the Work in conformance with the allotted time described in the Project Manual. Should the Contractor neglect, fail or refuse to complete the Work within the established Completion date then the Contractor shall pay to the Owner Liquidated Damages in the amount of Five hundred (\$500.00) per day for those damages suffered by the Owner as a result of delay for each and every calendar day that the Contractor has failed to complete the work within the established Completion date. The aforementioned Liquidated Damages are not a penalty, but rather are a pre-agreed liquidation of the losses incurred by the Owner due to failure of the Contractor to complete the Work on time.

#### 1.08 SUBSTITUTIONS AND PRODUCT OPTIONS

Written requests for substitutions shall be forwarded to the Engineer for review and Owner approval.

#### 1.09 SURVEY

Contractor shall verify all survey data, geotechnical reports and investigations included within the Contract Documents and report any errors and inconsistencies in writing to the Owner before any work is performed in those areas where errors and inconsistencies may exist. Refer to Division 1, Section 01310, Project Management and Coordination in the Project Manual.

### **PART 2- PRODUCTS**

Not Used

### **PART 3- EXECUTION**

Not Used

**END OF SECTION 01100**

## **SECTION 01300**

### **REGULATORY REQUIREMENTS**

#### **PART 1 – GENERAL**

##### **1.01 RELATED REQUIREMENTS**

- A. Division 0, Bidding and Contract Documents of the Project Manual
- B. Division 1, General Requirements of the Project Manual
- C. Divisions 2 - 16, Technical Specifications of the Project Manual

##### **1.02 CODES, AUTHORITIES, REGULATORY AGENCIES, AND INDUSTRY REFERENCES**

- A. Where references are made on the Drawings or in the Technical Specifications to codes, they shall be considered an integral part of the Construction Contract Documents as minimum standards. Nothing contained in the Construction Contract Documents shall be so construed as to be in conflict with any law, bylaw, ordinance or regulation of the municipal, state, federal or other authorities having jurisdiction. The Contractor shall reflect reference to specific codes, as may be applicable, insuring conformance with code requirements.
- B. Perform Work in compliance with the following code:  
  
Current edition of all applicable building code(s), local, state and federal.  
International Building Code – latest edition
- C. Perform Work in compliance with the following Authorities and Regulatory Agencies:
  - 1. Town of Ridgeland, South Carolina
  - 2. South Carolina Department of Health Environmental Controls (SCDHEC / OCRM)
  - 3. South Carolina Department of Transportation (SCDOT)
  - 4. OSHA Code of Federal Regulations. (OSHA)
  - 5. All federal, state and local clean air, clean water, water rights, resource recovery, and solid waste disposal standards and the Federal Endangered Species Act, and the Occupational Safety and Health Acts.
  - 6. Environmental Protection Agency (EPA).

##### **1.04 PERMITTING**

- A. At no additional expense to the Owner, the Contractor shall file for and obtain necessary licenses and permits for any interim phases for construction including Town building permit and inspections, and be responsible for complying with any federal, state, county, and municipal laws, codes, regulations and ordinances applicable to the performance of the

Work, including, but not limited to, any laws or regulations requiring the use of licensed prime and /or subcontractors to perform parts of the Work.

- B. Town has acquired (or is acquiring) the following permits for the project work. All other permits are the responsibility of the contractor.

1. SCDHEC General Coastal Zone Consistency (GCZC) Certification
2. SCDHEC Construction Permit for Water Facilities for Improvements at the Well Site No. 3.

#### 1.05 INSPECTION AND CERTIFICATIONS

- A. Arrange inspection and obtain Certificates of approval from applicable authorities having jurisdiction. Furnish Certificates of Approval in accordance with the applicable Technical Specifications and the General Requirements of the Contract.
- B. Notify and coordinate for all appropriate Town, county and state inspections of the work. Allow enough time to maintain progress of the work.

#### 1.06 PERFORMANCE

- A. Should the Contractor knowingly perform any Work that does not conform with the requirements of applicable codes, ordinances, regulations, or standards, without given prior written notice to the Owner and obtaining required variance, etc. from the governing body, Contractor shall assume full responsibility thereof and shall bear all costs involved in correcting such non-complying Work. Costs shall include but not be limited to: All fines, inspection costs, damages, design and management fees in addition to the cost of removal and replacement of the work of all trades involved.

### **PART 2 – PRODUCTS**

Not Used.

### **PART 3 – EXECUTION**

Not Used.

**END OF SECTION 01300**

**SECTION 01310**  
**PROJECT MANAGEMENT AND COORDINATION**

**PART 1 – GENERAL**

**1.01 REQUIREMENTS INCLUDED**

- A. The Contractor shall comply with and be responsible for all of the requirements of the Project Manual and the Construction Contract Documents, without exception.
- B. Contractor shall be responsible for general project coordination of all construction phases and aspects, trades and disciplines of the Work of the Project.
- C. Contractor shall be responsible for general coordination of all construction site operations and with other improvement projects that may be conducted by the Owner.
- D. Contractor shall be responsible for general coordination with other interested parties including, but not limited to SCDHEC, OCRM, SCDOT, Owner, other Contractors working on abutting property projects, and all involved permitting authorities.

**1.02 RELATED REQUIREMENTS**

- A. Division 0, Bidding and Contract Documents in the Project Manual.
- B. Division 1, General Requirements in the Project Manual
- C. Divisions 2 - 16, Technical Specifications in the Project Manual

**1.03 GENERAL COORDINATION**

- A. Coordinate scheduling, submittals, and work of various Sections of the Technical Specifications to assure efficient and orderly sequence of installation of construction elements with provisions for accommodating any items furnished by the Owner, or others, to be installed by the Contractor.
- B. Coordinate sequence of Work to accommodate partial occupancy for the Owner as specified in Section 01100, Summary of Work and / or as directed by the Owner.
- C. Review and coordinate requirements of all Divisions of the Project Manual and Sections of the Technical Specifications. Report any discrepancies to the Owner
- D. Maintain services of prime and major sub-contractors throughout duration of the Contract, except as may be required by provisions of Conditions of Contract. Notify the Owner, in writing, of intention to replace prime or sub-contractor(s), outlying reasons for the action and naming proposed replacement contractor(s).
- E. Coordinate work of prime and sub-contractors and record contractor installation(s) data on Project Record (As Constructed) Drawings.

- F. All communications regarding Contract requirements shall be addressed to the Owner. Outline any special procedures required for coordination and include such items as required notices, reports and attendance at meetings.
- G. Arbitrate and resolve coordination conflicts between prime and sub-contractors to ensure complete and operational systems.
- H. Coordinate work with all existing utility systems.
- I. Coordinate construction activities to ensure that operations are carried out with due consideration given to energy, water and materials.
- J. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Salvage material shall include marketable deciduous and coniferous timber to be cut and removed by the Contractor on the project site.

#### 1.04 COORDINATION MEETINGS

- A. In addition to the meetings referred to in Section 01315, Progress Meetings, the Contractor shall conduct coordination meetings and pre-installation meetings with supervisory personnel, prime and sub-contractors, suppliers, the Owner and others as necessary and applicable, to assure coordination of different trades and disciplines
- B. Schedule coordination and pre-installation meetings with prime and sub-contractors, suppliers and the Owner to discuss hardware installation and specialty systems installation.

#### 1.05 COORDINATION OF SUBMITTALS

- A. Coordinate use of Project space and sequence of installation of equipment, walks, parking areas, mechanical, electrical, plumbing, or other Work that is indicated diagrammatically on the Contract drawings and/or contained in the Technical Specifications. Utilize space efficiently to maximize accessibility for Owner installations, maintenance and repairs.
- B. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in sequence required to obtain best results.
- C. Make adequate provisions to accommodate items scheduled for later installation, including accepted Bid Alternates, Owner supplied items, sub-subcontractor installed items, work by others, and installation of products purchased with allowances.

### **PART 2 – PRODUCTS**

Not Used

### **PART 3 – EXECUTION**

Not Used.

## **END OF SECTION 01310**

## **SECTION 01315 PROGRESS MEETINGS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Division 1, General Requirements of the Contract Documents apply to this Section.

#### **1.2 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
  - 1. Construction Progress Meetings.

#### **1.3 PROGRESS MEETINGS**

- A. Conduct monthly construction progress meetings at the Project site at regularly scheduled intervals. Notify the Owner of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. Agenda: Review and correct or approve minutes of the previous Construction progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate in the current status of the Project.
  - 1. Contractor's construction schedule: Provide overall construction schedule and two-week look ahead schedule. Review progress since the last meeting. Determine where each activity is in relation to the Contractor's schedule, whether on time or ahead or behind schedule. Determine how schedule can be improved if behind.
- C. Reporting: After each progress meeting date, the Contractor will distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
  - 1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

### **PART 2 - PRODUCTS**

(Not Applicable)

### **PART 3 - EXECUTION**

(Not Applicable)

**END OF SECTION 01315**

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**SECTION 01340**  
**SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

**A. Scope of Work:**

1. The Contractor shall submit to the Engineer for review and approval, such Working Drawings, Shop Drawings, Test Reports and Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Working Drawings, Shop Drawings, Data and Samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
2. Within fourteen (14) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary Data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings.
3. The construction procedures shall comply this Project Manual and with the latest edition of the Town of Ridgeland Water and Sewer Standards.
4. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:
  - a. Submittal-Description and Number assigned.
  - b. Date to Engineer.
  - c. Date returned to Contractor (from Engineer).
  - d. Status of Submittal (Approved as Noted, Rejected/Resubmit).
  - e. Date of Resubmittal and Return (as applicable).
  - f. Date material release (for fabrication).
  - g. Projected date of fabrication.
  - h. Projected date of delivery to site.
  - i. Status of O&M manuals submittal.

- j. Specification Section.
- k. Drawing Sheet Numbers.

## 1.02 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check all drawings, Data and Samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and Data shall bear the Contractor's stamp showing that they have been so checked. Shop Drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop Drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer.
- B. Determine and verify:
  - 1. Field measurements.
  - 2. Field construction criteria.
  - 3. Catalog numbers and similar Data.
  - 4. Conformance with Specifications.
- C. The Contractor shall furnish the Engineer a schedule of Shop Drawings submittals fixing the respective dates for the submission of Shop and Working Drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.
- D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer, with approval.
- E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.
- F. All submittals shall be accompanied with a transmittal letter containing the following information:
  - 1. Date.
  - 2. Project Title and Number.
  - 3. Contractor's name, address, phone and fax numbers.
  - 4. The number of each Shop Drawing, Project Data, and Sample submitted.

5. Notification of Deviations from Contract Documents.
  6. Submittal Log Number conforming to Specification Log Number.
- G. The Contractor shall submit Shop Drawings in electronic pdf format with the file name indicating the submittal and submittal date to the engineer via email. The Engineer will review and make comments electronically to the contractor and require updated shop drawings electronically until approved.
- Upon engineer's request, the contractor shall submit four (4) copies of descriptive or product Data submittals to complement Shop Drawings for the Engineer plus the number of copies which the Contractor requires returned. The Engineer will retain four (4) sets. All blueprint Shop Drawings shall be submitted with four (4) sets of prints plus the number of copies which the Contractor requires returned. The Engineer will review the blueprints and retain four (4) sets, returning the remainder to the Contractor with appropriate review comments.
- H. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review and approval by the Engineer of the necessary Shop Drawings.
- I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposed to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of drawings and specifications.

#### 1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

- A. The Engineer's review of Shop Drawings, Data and Samples submitted by the Contractor will cover only general conformity to the Specifications, external connections, and dimensions which affect the installation. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:
1. As permitting any departure from the Contract requirements.
  2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
  3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations per Paragraph 1.02A. herein, and show a departure from the Contract requirements which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract

Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

- D. When reviewed by the Engineer, each of the Shop Drawings will be identified as having received such review being so stamped and dated. Shop Drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmittal Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.
- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- G. Shop Drawings and submittal Data shall be reviewed by the Engineer for each original submittal and first and second resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor in accordance with the terms of the Engineer's Agreement with the Owner.
- H. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:
  - 1. Systems.
  - 2. Processes.
  - 3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product Data, certifications and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

- J. The shop drawings shall be approved by the Engineer prior to contractor ordering the construction materials.

#### 1.04 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive

literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

- B. Manufacturer's catalog sheets, brochures, diagrams, illustrations and other standard descriptive data shall be clearly marked to identify pertinent materials, product or models. Delete information which is not applicable to the Work by striking or cross-hatching.
- C. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.
- D. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
  - 1. Project Title and Number.
  - 2. Name of project building or structure.
  - 3. Number and title of the Shop Drawing.
  - 4. Date of Shop Drawing or revision.
  - 5. Name of contractor and subcontractor submitting drawing.
  - 6. Supplier/manufacturer.
  - 7. Separate detailer when pertinent.
  - 8. Specification title and number.
  - 9. Specification section.
  - 10. Application Contract Drawing Number.
- E. If Shop Drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.
- F. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item

thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent Data.

- G. 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.
- H. Only the Engineer will utilize the color "red" in marking Shop Drawing submittals.

#### 1.05 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.
- B. Copies of Working Drawings as noted in Paragraph 1.05A. above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for work.
- C. Working Drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of South Carolina and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, Working Drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the Owner and Engineer shall have no responsibility, therefore.

#### 1.06 SAMPLES

- A. The Contractor shall furnish, for the approval of the Engineer, Samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on Samples. Materials or equipment for which Samples are required shall not be used in work until approved by the Engineer.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
  - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
  - 2. Full range of color, texture and pattern.
  - 3. A minimum of two (2) Samples of each item shall be submitted.

- C. Each Sample shall have a label indicating:
1. Name of Project.
  2. Name of Contractor and Subcontractor.
  3. Material or Equipment Represented.
  4. Place of Origin.
  5. Name of Producer and Brand (if any).
  6. Location in Project.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

- D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of Samples containing the information required in paragraph 1.06B. above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a Sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- E. Approved Samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 01340**

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**SECTION 01381**  
**CONSTRUCTION AUDIO-VIDEO RECORDING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

Progress video tapes shall be made at periodic intervals, not to exceed 30 days, showing the extent and progress of the work performed as of that date. Video tapes shall be taken at each location of work on the day ending the period for which partial payment is requested, during the development of stages and condition of work, and as directed by the Engineer. Typical pipeline work shall be videotaped at different stages of construction at the direction of the Engineer.

- A. Initial video tape inspection of existing conditions shall be taken no later than 14 calendar days after notice to proceed and prior to beginning of any construction.
- B. At each specified time, take video tapes of each major area of work.
- C. Final video tapes shall be submitted and approved by the Engineer/Town prior to final acceptance and payment.

**1.2 QUALITY ASSURANCE**

- A. Video Camera Operator: The operator may be an employee of the Contractor and must be completely familiar with the proper operation of the video recording device (digital camera) and how to create a DVD. Employ operator only after review of his qualifications by Engineer.

**1.3 SUBMITTALS**

- A. Submit qualifications and experience record of operator.
- B. DVDs shall be submitted to the Engineer at the time of each payment request and shall become the property of the Town.

**PART 2- PRODUCTS**

**2.1 VIDEO REPORT**

- A. Provide a high quality DVD in a MPEG2 format video with a standard resolution of 720x480. Use a camera with lighting suitable to allow a clear picture of the entire project site.

**2.2 DIGITAL FILE**

- A. Recording can also be completed, stored and submitted as a digital file in Microsoft, Windows, Quicktime, Flash or other formats with file extensions such as AVI, MOV, WMV, etc.

**2.3 DIGITAL CAMERA**

- A. The video camcorder shall have a minimum resolution of 18.20 megapixels, sensor size 1/2.3-inch with an optical zoom; criteria based off Sony CyberShot DSC Wx500 but any approved equal is acceptable.
- B. At the end of the project all DVDs with index based on elapsed time of tape shall become the property of the Town.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. The following location information shall be provided on color audio-video tape recording.
  - 1. Audio: Each recording shall begin with a verbal description of the current date, project name and municipality and be followed by the general location, name of the street, viewing side and direction of progress.
  - 2. Video: Transparent information must appear on the viewing screen. This information will consist of the date and time of recording. The date information will contain the month, day and year.
  - 3. Digital: To preclude the possibility of tampering or editing in any manner, all video recordings by electronic means must display continuously and simultaneously generated transparent digital information to include the date and time of recording. The date information will include the month, day and year.
- B. The taped coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio description. Audio description shall be made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, fences, curbs, ditches, roadways, landscaping, trees, culverts, headwalls, retaining walls, or buildings located within such zone of influence. Particular and detailed attention shall be given to any defects noted, such as cracks, disturbed areas, damaged items, or as may be required by the Engineer. It is the intent of this coverage to accurately and clearly document pre-existing conditions and especially any items that could result in construction claims. The excavation areas shall be physically marked with high visibility fluorescent paint prior to videotaping. The markings shall include the job number and stationing.
- C. The zone of influence shall be defined as an area within 30 feet of the proposed work.
- D. The Contractor shall be able to televise and tape areas with paved roads, along co-owned easements through parks, lawns, and open fields. If videotaping on private property, the Contractor shall give the Town sufficient prior notice of such entry so that Owners may be advised of and their permission obtained for the work.
- E. To produce the proper detail and perspective, adequate lighting will be required to fill in the shadow area caused by trees, utility poles, road signs and other such objects in residential areas or as directed by the Engineer.
- F. Houses and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system, manholes on a sewer system and hydrants on a water system can be located by reference.
- G. The rate of speed in the general direction of travel of the conveyance used during taping shall not exceed 48 feet per minute in residential areas, nor exceed 100 feet per minute in non-residential areas. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that during playback will produce clarity of the object viewed. The playback picture shall be in focus and be of extreme clarity at all times.
- H. All taping shall be done during times of good visibility. No taping shall be done during periods of visible precipitation unless otherwise authorized by the Engineer.
- I. The Town shall have the authority to designate what areas may be omitted or added for audio-video coverage.

- J. All DVDs shall be properly identified by DVD number, location and project name and municipality in a manner acceptable to the Town.
- K. A record of the contents of each DVD shall be supplied by an index sheet identifying each segment in the recording by location, i.e., street or road viewing, elapsed time of video (no counter numbers), viewing side, point starting from, traveling direction and ending destination point.
- L. Any portion of the recording not conforming to specifications shall be rejected.
- M. Any recording not acceptable to the Town shall be refilmed at no additional charge. The Contractor shall reschedule unacceptable coverage within five (5) days after being notified.
- N. All recordings shall be performed by Contractor and reviewed and accepted prior to construction.
- O. One (1) original and one (1) copy are to be provided. Original to Town and copy to Engineer.

### **3.2 PROGRESS CONSTRUCTION VIDEO**

- A. Submit DVDs on a monthly basis to accompany each request for progress payment to the Town and Engineer.

**END OF SECTION 01381**

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**SECTION 01410**  
**TESTING LABORATORY SERVICES**

**PART 1 – GENERAL**

**1.01 REQUIREMENTS INCLUDED**

- A. Unless otherwise noted in a Section of the Technical Specifications, the Contractor shall employ and pay for the services of an Independent Testing Laboratory to perform specified testing of work and materials at the Project Site or at point of manufacture.
- B. The Contractor shall comply with and be responsible for all of the requirements of the Project Manual, without exception.

**1.02 RELATED REQUIREMENTS**

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders, or approvals of public authorities.
- B. Each specification section listed: Inspection and laboratory testing required, and standards for testing.
- C. Division 1, General Requirements of the Project Manual.

**1.03 QUALIFICATIONS OF LABORATORY**

- A. Meet “Recommended Requirements for Independent Laboratory Qualification,” published by American Council of Independent Laboratories.
- B. Comply with the following requirements:
  - 1. ANSI/ASTM D3740: Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
  - 2. ANSI/ASTM E329: Standard Recommended Practice for Inspection and Testing for Concrete, Steel, and Bituminous Materials as Used in Construction.
- C. Authorized to operate in the State of South Carolina
- 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. Testing 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.

- F. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Construction Contract Documents.
- G. Failure on part of Owner to make any tests of materials shall in no way relieve the Contractor of responsibility of furnishing materials or performing work conforming to the Construction Contract Documents.

#### 1.04 LABORATORY DUTIES

- A. Cooperate with the Owner and Contractor; provide qualified personnel after due notice from Contractor.
- 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 Owner and Contractor of observed irregularities or deficiencies of work or products.
- D. Promptly submit written report of each test and inspection: one (1) copy each to Owner and Contractor. Each report shall include:
  - 1. Date issued.
  - 2. Project title and Bid 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.
  - 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 Owner
- E. Perform additional tests as may be required by the Owner.

#### 1.05 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 Design/Builder.
  - 4. Stop the Work.

#### 1.06 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate, together with laboratory personnel, will provide access to the point/location of the Work, and to manufacturer's operations.
- B. Secure and deliver to laboratory at designated location(s) adequate quantities of representational material proposed to be used and which require testing together with applicable proposed design mixes.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which required control by the testing laboratory.
- D. Furnish copies of Products test reports to the Owner 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 facilitate inspections and tests.
  - 4. For storage and curing of test samples.
- F. Notify laboratory twelve (12) hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
  - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence on inability to perform the Work at the scheduled time.
- G. Make arrangements with laboratory and pay for services to perform inspections, sampling and testing required:
  - 1. For the Contractor's convenience.
  - 2. When the initial tests or inspections indicate Work does not comply with Contract Documents (i.e., re-tests).

#### 1.07 SOURCE OF MATERIALS

- A. Source of supply of each of materials required shall be acceptable to the Owner and before delivery is started.
- B. Representative samples shall be submitted for inspection or tests.
- C. Results obtained from testing samples will be used for preliminary approval, but will not be used as final acceptance of materials.
- D. The Owner may test materials proposed to be used at any time during preparation and use.

- E. If it is found that sources of supply, which have been approved, do not furnish product of uniform quality, or if product from any source proves unacceptable at any time, Contractor shall furnish approved material from another source without additional cost to Owner or delay in completion date.

#### 1.08 IDENTIFICATION

- A. Required samples submitted by Contractor shall be properly labeled for identification.
- B. Materials and/or equipment that have been inspected and/or tested shall be stored in a controlled area with suitable identification referencing tests and certifications.
- C. Continuous inventory shall be kept of all items in this area controlled by log in and log out with receiving and disbursing signatures.
- D. Copies of receiving or disbursing actions shall be sent to the Owner on a daily basis.
- E. Disbursing records shall show final destination and installation.

#### 1.09 MATERIAL STORAGE

- A. Materials shall be stored so as to ensure preservation of their quality and fitness for Work, in accordance with requirements of the Project Manual.

#### 1.10 SCHEDULE OF INSPECTIONS AND TESTS

- A. Refer to each individual Section of the Project Manual for specific testing requirements, or as otherwise required by the Contract Documents or appropriate regulatory agency.

### **PART 2 – PRODUCTS**

Not Used.

### **PART 3 – EXECUTION**

Not Used.

**END OF SECTION 01410**



**SECTION 01510**  
**TEMPORARY CONSTRUCTION CONTROLS**

**PART 1- GENERAL**

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall comply with and be responsible for all of the requirements of the Project Manual, without exception.
- B. Furnish, install and maintain temporary controls required for construction.
- C. Remove at completion of Work.

1.02 RELATED REQUIREMENTS

- A. Division 1, General Requirements of the Project Manual.
- B. Division 2 - 16, Technical Specifications of the Project Manual.

1.03 CONSTRUCTION SITE CLEANING

- A. Maintain areas within limits of the Project Work Site free of extraneous debris and litter.
- B. Initiate and maintain specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and off site hauls routes.
  - 1. Furnish on-site containers for collection of waste materials, debris and rubbish.
  - 2. Prohibit overloading of trucks to prevent spillage on access and haul routes.
  - 3. Provide periodic inspection of traffic areas to enforce requirements.
  - 4. Remove waste material, debris and rubbish from site and building area daily, or sooner as otherwise needed.
  - 5. Do not drop or throw materials from heights. Lower waste material in a controlled manner and with as few handlings as possible.
  - 6. During entire construction period, and at all times, keep the site access entry road, parking areas free from accumulation of waste materials, debris and rubbish caused by the Work of this Project.
  - 7. Dirt and debris shall be removed from all surfaces prior to closure of all areas (walls, ceilings, chases, etc.).
- C. Hazards Control:
  - 1. Store volatile wastes in covered metal containers.
  - 2. Remove containers from premises daily.
  - 3. Prevent accumulation of wastes, which create hazardous conditions.
  - 4. Provide adequate ventilation during use of volatile or noxious substances.
- D. 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.
2. Do not dispose of wastes into streams or waterways.
3. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

#### 1.04 DUST CONTROL

- A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from dispersing into atmosphere.
- B. Clean interior building areas to prevent accumulation of dirt and debris and execute prior to start of finish painting, special coatings, and/or other finish material installations.
- C. Wet down materials and rubbish to prevent blowing dust.
- D. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- E. Continue cleaning on an as-needed basis until building and/or site is ready for beneficial occupancy.

#### 1.05 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation. Wetland areas shall be protected as well.
  1. Hold areas of bare soil exposed at one time to minimum.
  2. Provide temporary control measures such as berms, dikes, and drains.
  3. Comply with federal, state and local regulations.
- B. Construct fills and soil waste areas by selective placement to eliminate surface soils or clay, which will erode.
- C. Periodically inspect earthwork to detect any evidence of start of erosion, apply corrective measures as required by erosion control.

#### 1.06 POLLUTION CONTROL

- A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious substances from construction operations.
- B. Contractor is responsible only for pollution control of the immediate Work of Contract, the actions and operations of the Contractor, and the workers employed or contracted to Contractor. Provide equipment and personnel to perform emergency measures required to contain spillage, and to remove contaminated soil or liquids.

- C. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals or other such substances adjacent to basins, or in sanitary or storm sewers.
- D. Provide systems for control of atmospheric pollutants. Prevent toxic concentrations of chemicals. Prevent harmful disposal of pollutants into atmosphere.

#### 1.07 WATER CONTROL

- A. Provide methods to control surface water to prevent damage to project site or adjoining properties. Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas. Direct drainage to proper runoff.
- B. Provide, operate, and maintain hydraulic equipment of adequate capacity to control surface and water.
- C. Dispose of drainage water in manner to prevent flooding, erosion or other damage to any portion of site or adjoining areas.
- D. Dewater areas in accordance with applicable local and state requirements and accepted professional practice.

#### 1.08 EARTH CONTROL

- A. Contractor shall, at his/her sole cost, remove excess soil, pier spoils, etc., at time of generation.

### **PART 2 – PRODUCTS**

Not Used

### **PART 3 – EXECUTIONS**

#### 3.01 REMOVAL

- A. Contractor shall, at his/her sole cost, remove temporary construction controls at completion of Work or as required by execution of Work.

**END OF SECTION 01510**

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## **SECTION 01570 TRAFFIC REGULATION**

### **PART 1 – GENERAL**

#### **1.01 REQUIREMENTS INCLUDED**

- A. The Contractor shall comply with and be responsible for all of the requirements of the Project Manual, without exception.
- B. Construction parking control, flagmen, flares and lights, haul routes, traffic signs and signals, and removal.
- C. Maintenance of safety and convenience of public.

#### **1.02 RELATED WORK**

- A. Division 1, General Requirements of the Project Manual.

#### **1.03 PUBLIC SAFETY AND CONVENIENCE**

- A. Materials and equipment shall be stored and Work conducted to minimize obstruction to pedestrian movement and vehicular traffic. Materials and equipment stored in or near path of traffic shall be protected with appropriate warning signs and barricades. At night, or as otherwise required, equipment not in use shall be stored in such manner and location to not interfere with safe passage of pedestrians and vehicles. Contractor shall provide and maintain flagmen at points and for periods of time required to provide safety and convenience of traffic, and as directed by the Owner or project permits.
- B. Contractor shall not close traffic to any bridge or any other portion of public road except as may be designated by the Owner. Prior to closing any access way and/or structure coordinate work schedule with the Owner.
- C. Contractor shall provide the Owner with notice at no less than 48 hours prior to movement of heavy equipment and/or wide or slow moving vehicles to or from Project Site. Contractor shall strictly adhere to vehicular routes established or as may be directed by the Owner or project permits.

#### **1.04 LANE CLOSURE RESTRICTIONS**

Contractor shall be responsible to verify with the Town of Ridgeland and/or South Carolina Department of Transportation (SCDOT), as appropriate, lane closure restriction hours. Contractor to verify restrictions on lane closures near schools and meet the required regulations.

Any work on SCDOT roads shall be planned so that closure of intersecting streets, road approaches or other access points is held to a minimum.

## 1.05 TRAFFIC CONTROLS AND SIGNALS

Traffic controls for utility construction and maintenance operations shall conform with the SCDOT Standard Drawings and Manual on Uniform Traffic Control Devices (MUTCD). All construction and maintenance operations shall be planned with full regard for safety and to keep traffic interference to an absolute minimum.

The contractor shall : a ) provide, erect and maintain all necessary barricades, lights, danger signals, signs and other control devices, provide qualified, trained and equipped flaggers and watchmen where necessary, as may be directed by the Owner or SCDOT; b) take all necessary precautions for the protection of the Work, the warning that work is under construction and the safety of the public. Suitable advance warning signs shall be erected in advance where operations interfere with the use of the road by traffic. Where a lane, or a portion of a lane is closed, traffic control devices and flaggers shall be used in accordance with the Standard Drawings and MUTCD. All barricades, signs and traffic control devices shall conform to the requirements of the MUTCD.

## 1.06 HAUL ROUTES

Based on regulations prescribed by the Town of Ridgeland, SCDOT, or other agency having jurisdiction, use only established roadways or use temporary roadways constructed by the contractor when and as authorized by the Owner. When materials and/or equipment are being transported in executing the Work, vehicles shall not be loaded beyond loading capacity recommended by manufacturer of vehicle or prescribed by federal, state or local law or regulation. When it is necessary to cross curbs or sidewalks contractor shall protect them from damage. Contractor shall repair / replace or pay for all damaged curbs, sidewalks, roads, and / or paving.

## 1.07 EQUIPMENT STORAGE

When equipment is not in use, on roadways open to public travel, contractor's equipment and vehicles shall be kept at least thirty (30) feet from the edge of the travel lanes. On Interstate routes or Freeways, no vehicles or equipment will be permitted on the shoulders at any time.

## 1.08 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic in landside areas only.

# PART 2 – PRODUCTS

## 2.01 SIGNS, SIGNALS AND DEVICES

- A. Post-mounted and wall-mounted at parking areas to indicate spaces designated for use by construction personnel.

- B. Traffic control signals, as may be required, and as approved by SCDOT and the Town of Ridgeland, as appropriate.
- C. Traffic cones and drums and lights, as approved by SCDOT and the Town of Ridgeland, as appropriate.
- D. Flagmen equipment as required by SCDOT and the Town of Ridgeland, as appropriate.

### **PART 3 – EXECUTION**

#### **3.01 REMOVAL**

- A. Contractor shall remove equipment and devices, at his/her sole cost, when no longer required. Repair damage caused by installation. Remove post settings to depth of three (3) feet.

**END OF SECTION 01570**

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**SECTION 01700**  
**EXECUTION REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 REQUIREMENTS INCLUDED**

- A. Contractor shall comply with and be responsible for all of the requirements of the Project Manual without exception.
- B. Contractor shall provide field engineering and general layout services required on the project as follows:
  - 1. Civil, structural or other professional engineering services specified, or required to execute construction methods.
  - 2. Survey work required for execution of the total Work of the Project.
  - 3. Continuous horizontal and vertical control regarding layout and execution of Work of the Project, as appropriate.
  - 4. Coordinate field engineering services with the Owner.

**1.02 RELATED REQUIREMENTS**

- A. Division 1, General Requirements of the Project Manual.
- B. The Drawings and all sections of the Technical Specifications as may be applicable.

**1.03 CONTROLS**

- A. Contractor will establish primary controls, horizontal and vertical control points at various locations at the Site. These will be described and indicated on the Contractor's as-constructed drawings and will be coordinated in the field by the Contractor.
- B. Existing control points and property line markers will be shown on the Construction Contract drawings.

**1.04 QUALIFICATIONS OF SURVEYOR OR ENGINEER**

- A. For required surveying, a qualified engineer or land surveyor, registered in the State of South Carolina and acceptable to the Owner shall be utilized.
- B. For required engineering, a registered professional engineer of a discipline required for this Project licensed in the State of South Carolina and acceptable to the Owner shall be utilized.

### 1.05 SURVEY REFERENCE POINTS

- A. Existing horizontal and vertical control points for the Project are those designated on the Construction Contract drawings or as determined from investigation of the existing conditions.
- B. Verify property lines, grades, levels and dimensions indicated.
- C. Locate and protect control points prior to starting Site Work and preserve permanent reference points during construction.
  - 1. Make no changes or relocations without prior approval of the Owner
  - 2. Report to the Owner when a reference point is lost, destroyed or requires relocation because of necessary changes in grades or locations.
  - 3. Require surveyor to replace Project control points, which may be lost or destroyed.

### 1.06 PROJECT LAYOUT REQUIREMENTS

- A. Establish a sufficient number of permanent benchmarks on Site, as may be required, referenced to data established by survey control points. Record locations of benchmarks with horizontal and vertical data on Project Record Documents, Section 01781.
- B. From established control points, layout all new construction Work by establishing all lines and grades at Site necessary to control Work. Contractor shall be responsible for all measurements that may be required for execution of Work.
- C. Furnish, at own expense, all such stakes, steel pins, equipment, tools and material and labor that may be required in laying out Work control points.
- D. Establish lines and levels, locate and layout by instrumentation and similar appropriate means:
  - 1. Site Improvements
    - a. Stakes for grading, fill, and topsoil placement.
    - b. Utility slopes and invert elevations for new utility construction.
    - c. Limits of pavement (pervious concrete and asphalt).
  - 2. Batter boards for structures.
  - 3. Building foundation column locations, piling and floor levels.
  - 4. Controlling lines and levels required for mechanical and electrical trades.
- E. Verify and coordinate in field all existing and proposed underground components including civil, structural, utilities and other components prior to initiation of the Work. Advise the Owner of any conflicts or discrepancies.

### 1.07 SUBMITTALS AND DOCUMENTS

- A. Submit name and address of Surveyor and Professional Engineer to the Owner
- B. On request of the Owner, submit documentation to certify accuracy of field engineering work and compliance with Contract Documents.

- C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.
- D. Standards and Availability: Data and other measurements shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings, and computation in establishing above horizontal and vertical control points shall be available at all times during progress of Work for ready examination by the Owner.
- E. Maintain complete and accurate record data on underground utilities and obstructions, new and existing, encountered in execution of Work. Record data on Project Record Documents in accordance with requirements of Section 01781, Project Record Documents.
- F. On completion of the major site improvements, prepare as-constructed drawings showing appropriate survey elevations of construction and dimensions, locations, and angles.
- G. Submit, upon request by the Owner, signed and sealed Engineering Calculations.

**PART 2 – PRODUCTS**

Not Used

**PART 3 – EXECUTION**

Not Used

**END OF SECTION 01700**

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**SECTION 01730**  
**OPERATING AND MAINTENANCE DATA**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

A. Scope of Work:

1. Compile product data and related information appropriate for Town's maintenance and operation of products furnished under Contract. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
2. Instruct Town's personnel in maintenance of products and in operation of equipment and systems.

**1.2 QUALITY ASSURANCE**

A. Preparation of Data Shall be done by Personnel:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of the Specification section.
3. Skilled as technical writer to the extent required to communicate essential data.
4. Skilled as draftsman competent to prepare required drawings.

**1.3 FORM OF SUBMITTALS**

A. Prepare Data in Form of an Instructional Manual for use by Town's Personnel.

B. Format:

1. Size: 8-1/2 inches by 11 inches.
2. Paper: 20 pound minimum, white, for typed pages.
3. Test: Manufacturer's printed data, or neatly type written.
4. Drawings:
  - a. Provide reinforced punched binder tab, bind in with text.
  - b. Reduce larger drawings and fold to size of text pages but not larger than 11 inches by 17 inches.
5. Provide flyleaf for each separate product, or each piece of operating equipment.
  - a. Provide typed description of products and major component parts of equipment.

- b. Provide identified tabs.
  - 6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
    - a. Title of Project.
    - b. Identity of separate structure as applicable.
    - c. Identity of general subject matter covered in the manual.
- C. Binders:
- 1. Commercial quality three-post binders with durable and cleanable plastic covers.
  - 2. Maximum post width: 2 inches.
  - 3. When multiple binders are used, correlate the data into related consistent groupings.

#### **1.4 CONTENT OF MANUAL**

- A. Neatly Typewritten Table of Contents for Each Volume, Arranged in Systematic Order.
- 1. Contractor information including name of responsible principal, address and telephone number.
  - 2. A list of each product required to be included, indexed to content of the volume.
  - 3. List, with each product, name, address and telephone number of:
    - a. Sub-Contractor or installer.
    - b. A list of each product required to be included, indexed to content of the volume.
    - c. Identify area of responsibility of each.
    - d. Local source of supply for parts and replacement.
  - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
- 1. Include only those sheets, which are pertinent to the specific product.
  - 2. Annotate each sheet to:
    - a. Clearly identify specific product or part installed.
    - b. Clearly identify data applicable to installation.
    - c. Delete references to inapplicable information
- C. Drawings:
- 1. Supplement product data with drawings as necessary to clearly illustrate:

- a. Relations of component parts of equipment and systems.
  - b. Control and flow diagrams.
- 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
- 3. Do not use Project Record Documents as maintenance drawings.
- D. Written Text, as required to supplement product data for the particular installation:
  - 1. Organize in consistent format under separate headings for different procedures.
  - 2. Provide logical sequence of instructions of each procedure.
  - 3. Copy of Each Warranty, Bond and Service Contract Issued.
  - 4. Provide information sheet for Town's personnel, give:
    - a. Proper procedures in event of failure.
    - b. Instances, which might affect validity of warranties or bonds.

## **1.5 MANUAL FOR MATERIALS AND FINISHES**

- A. Submit Four (4) Copies of Complete Manual in Final Form.
- B. Content: For Architectural Products, Applied Materials and Finishes:
  - 1. Manufacturer's data, giving full information on products.
    - a. Catalog number, size, and composition.
    - b. Color and texture designations.
    - c. Information required for reordering special manufacturing products.
  - 2. Instructions for care and maintenance.
    - a. Manufacturer's recommendation for types of cleaning agents and methods.
    - b. Cautions against cleaning agents and methods which are detrimental to product.
    - c. Recommended schedule for cleaning and maintenance.
- C. Content for Moisture Protection on Weather-Exposed Products:
  - 1. Manufacturer's data giving full information on products.
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Details of installation.
  - 2. Instructions for inspection, maintenance and repair.

- D. Additional Requirements for Maintenance Data: Respective Sections of Specifications.

## **1.6 MANUAL FOR EQUIPMENT AND SYSTEMS**

- A. Submit Four (4) Copies of Complete Manual in Final Form.
- B. Content, for each unit of equipment and system, as appropriate:
1. Description of unit and component parts.
    - a. Function - normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
  2. Operating Procedures:
    - a. Start-up, break-in, routine and normal operating instructions.
    - b. Regulation, control, stopping, shutdown and emergency instructions.
    - c. Summer and winter operating instructions.
    - d. Special operating instructions.
  3. Maintenance Procedures:
    - a. Routine operations.
    - b. Guide to "trouble-shooting".
    - c. Disassembly, repair and reassembly.
    - d. Alignment, adjusting and checking.
  4. Servicing and lubrication required.
  5. Manufacturer's printed operating and maintenance instructions.
  6. Description of sequence of operation by control manufacturer.
  7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
    - a. Predicted life of parts subject to wear.
    - b. Items recommended to be stocked as spare parts.
  8. As-installed control diagrams by controls manufacturer.
  9. Each Contractor's coordination drawings. As-installed color-coded piping diagrams.
  10. Charts of valve tag numbers, with location and function of each valve.
  11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.



12. Other data as required under pertinent sections of specifications.
- C. Content for Each Electric and Electronic Systems, as appropriate:
1. Description of system and component parts.
    - a. Function - normal operating characteristics, and limited conditions.
    - b. Performance curves, engineering data and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
  2. Circuit directories and panelboards.
    - a. Electrical service.
    - b. Controls.
    - c. Communications.
  3. As installed color-coded wiring diagrams.
  4. Operating procedures:
    - a. Routine and normal operating instructions.
    - b. Sequences required.
    - c. Special operating instructions.
  5. Maintenance procedures:
    - a. Routine operations.
    - b. Guide to "trouble-shooting".
    - c. Disassembly, repair and reassembly.
    - d. Adjustment and checking.
  6. Manufacturer's printed operating and maintenance instructions.
  7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  8. Other data as required under pertinent sections of specifications.
- D. Prepare and Include Additional Data When the Need for Such Data Becomes Apparent during Instruction of Town's Personnel.
- E. Additional Requirements for Operating and Maintenance Data: Respective Sections of Specifications.

## **1.7 SUBMITTAL SCHEDULE**

- A. Submit four (4) copies of preliminary draft of proposed formats and outlines of contents of Operating and Maintenance Manuals within 90 days after Notice to Proceed. The Engineer and Town will review the preliminary draft and return one (1) copy with comments.

- B. Submit four (4) copies of completed data in final form no later than 30 days following the Engineer's and Town's review of the last shop drawing and/or other submittal specified under Section 01340: Shop Drawings, Working Drawings and Samples. One (1) copy will be returned with comments to be incorporated into final copies.
- C. Submit four (4) copies of approved manual in final form directly to the offices of the Engineer, Four Waters Engineering, Inc., within 30 calendar days of product shipment to the project site and preferably within 30 days after the reviewed copy is received.
- D. Append four (4) copies of addendum to the operation and maintenance manuals as applicable and certificates as specified within 30 days after final inspection and start-up test.

#### **1.8 INSTRUCTION OF TOWN'S PERSONNEL**

- A. Prior to final inspection or acceptance, fully instruct Town's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Review contents of operating and maintenance manual with personnel in full detail to explain all aspects of operations and maintenance.

#### **PART 2 - PRODUCTS - (NOT USED)**

#### **PART 3 - EXECUTION - (NOT USED)**

**END OF SECTION 01730**

**SECTION 01740**  
**WARRANTIES AND BONDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
  - 1. Compile specified warranties and bonds, as in Article 5 and 13 of Section 00700: General Conditions and as specified in these Specifications.
  - 2. Co-execute submittals when so specified.
  - 3. Review submittals to verify compliance with Contract Documents.
  - 4. Submit to the Engineer for review and transmittal to Town.
- B. Related Work Described Elsewhere:
  - 1. Instruction to Bidders: Bid Bonds.
  - 2. Conditions of the Contract: Performance Bond and Payment Bond.
  - 3. CDBG Contract Special Provisions: Section 00506.

**1.2 SUBMITTAL REQUIREMENTS**

- A. Assemble warranties, bonds and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and subcontractors.
- B. Number of original signed copies required: Two (2) each.
- C. Table of Contents: Neatly typed in orderly sequence. Provide complete information for each item.
  - 1. Product of work item.
  - 2. Firm, with name of principal, address and telephone number.
  - 3. Scope.
  - 4. Date of beginning of warranty, bond or service and maintenance contract.
  - 5. Duration of warranty, bond or service maintenance contract.
  - 6. Provide information for Town's personnel:
    - a. Proper procedure in case of failure.
    - b. Instances which might affect the validity of warranty or bond.
  - 7. Contractor information including name of responsible principal, address and telephone number.

### **1.3 FORM OF SUBMITTALS**

- A. Prepare in duplicate packets.
- B. Format:
  - 1. Size 8-1/2 inches by 11 inches, punch sheets for standard three-post binder. Fold larger sheets to fit into binders.
  - 2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
    - a. Title of Project.
    - b. Name of Contractor.
- C. Binders: Commercial quality, three-post binder with durable and cleanable plastic covers and maximum post width of two (2) inches.

### **1.4 WARRANTY SUBMITTALS REQUIREMENTS**

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by the Town.
- B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Divisions 2: Site Construction; 11: Equipment; 15: Mechanical; and 16: Electrical, and which has at least a 1 Hp motor or which lists for more than \$1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.
- C. The Town shall incur no labor or equipment costs during the guarantee period.
- D. Guarantee shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by the manufacturer.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION 01740**

## **SECTION 01770 CLOSEOUT PROCEDURES**

### **PART 1 – GENERAL**

#### **1.01 REQUIREMENTS INCLUDED**

- A. The Contractor shall comply with and be responsible for all the requirements of the Project Manual, without exception.
- B. The Contractor shall comply with applicable requirements in this Section and more specific requirements in Division 1, Section 01100, Summary of Work.
- C. The Contractor shall comply with requirements stated in the Contract and in approved Specifications for the Work.

#### **1.02 RELATED REQUIREMENTS**

- A. Conditions of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.
- B. Division 1, General Requirements in the Project Manual.
- C. Closeout submittals required of trades in various sections of the approved Specifications.

#### **1.03 DAMAGES**

- A. If the contractor neglects, fails, or refuses to complete the work by the Substantial Completion Date, Final Completion Date, subject to any proper extension granted by the Owner, then the Contractor will pay, or cause the Contractor's Surety to pay damages to the Owner as defined in Division 0 – Bidding and Contract Documents.

#### **1.04 SUBSTANTIAL COMPLETION**

- A. When Contractor considers the Work is substantially complete, he shall submit to the Owner the following:
  - 1. A written certification that the Work, or designated portion thereof, is substantially complete. All items not complete shall be listed and deficient items noted.
  - 2. Owner will review the Contractor's certification and examine the Work for conformance to the Certification and the Contract Documents.
  - 3. Owner will inform the Contractor of non-compliance or incomplete items.

4. Contractor shall remedy the deficiencies in the Work within seventy-two (72) hours, and send a second written notice of substantial completion to the Owner.
  5. The Owner will re-examine the Work.
- B. When the Owner determines that the Work is substantially complete, the Owner will:
1. Prepare a Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected, as verified and amended.
  2. Send to Contractor for his/her written acceptance of the responsibilities assigned to them in the Certificate.
- C. After Work is substantially complete, Contractor shall:
1. Obtain and submit Certificate of Occupancy. Owner shall, in detail, list the status of the area affected by partial acceptance and occupancy to establish the existing conditions prior to such acceptance or occupancy.
  2. Complete Work listed for completion or correction within designated form.

#### 1.05 FINAL COMPLETION

- A. Within ten (10) calendar days after substantial completion, the Contractor shall submit to the Owner written certification that:
1. Contract Documents have been reviewed.
  2. Work has been examined for compliance with Contract Documents.
  3. Work has been completed in accordance with Contract Documents.
  4. Equipment and systems have been tested in the presence of the Owner and the appropriate Utility Operations and Maintenance personnel, and are operational.
  5. Work is completed and ready for final examination.
  6. Submittal of Closeout Documents as stipulated in paragraph 1.06 below.
- B. The Owner will make an examination to verify the status of completion within ten (10) calendar days after receipt of such certification.
- C. Should the Owner consider the Work incomplete or defective, or the Contractor has not demonstrated to the Owner that a "good faith" effort has been made within the time allotted in paragraph 1.05 A above, any Damages and/or Liquidated Damages, will be charged against the Contractor as defined and explained in Division 0 – Bidding and Contract Documents.
1. The Owner will promptly notify the Contractor in writing of all deficiencies listing the incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written Certification to the Owner that the Work is complete.
  3. The Owner will re-examine the Work.
- D. When the Owner concludes that the Work is complete, the Owner shall determine the number of days, if any, for which Liquidated Damages will be assessed and request the Contractor to prepare closeout submittals.
  - E. Acceptance of the entire project shall commence after all contract work is complete, final inspections are made, corrective actions completed, the Work re-inspected, and after final acceptance by the Owner.
  - F. The date established by the Owner as the Final Completion Date shall initiate the guarantee and the warranty periods for all system components and the construction of the Project. The Project shall not be considered Final Complete until all Close Out Documents are properly completed and transmitted to the Owner.
  - G. The Owner shall review the status of the Work and compare it to the request for final payment and compare it with the Project records for conformance to the final settlement requirements.
  - H. The Owner shall receive from the Contractor, and maintain, the permit drawings and specification package (as relevant), copy of all shop drawings and submittals, the “as-built” set of drawings and specifications, maintenance manuals as required by the contract and submitted by the Contractor. In addition, the Contractor shall provide spare parts and supplies, stored materials, special tools, filters, and other pertinent items as required under the Contract Documents to the Owner.

#### 1.06 CLOSEOUT SUBMITTALS

- A. Evidence of compliance with requirements of governing authorities:
  1. Certificate of Occupancy.
  2. Certificates of Inspection:
    - a. Mechanical and Electrical systems as required by the respective sections.
    - b. Building Department
    - c. Asphalt Pavement.
    - d. Concrete Pavement.
  3. All Closeout documents required by the Contract Documents.
- B. Project Record Documents, in accordance with Section 01781.
- C. Warranties and Bonds, in accordance with Section 01740.
- D. Certificate of Insurance for Products and Completed Operations.

#### 1.07 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Contractor’s Affidavit of release of Liens.

1. Consent of Surety to Final Payment. Use form acceptable to the Owner.
2. Contractor's Release or Waiver of Liens. Standard Form "Affidavit and Partial Lien Waiver". Use form acceptable to Owner.
3. Separate releases of waivers of liens from prime and subcontractors, suppliers and others with lien rights against property of the Owner together with a list of those parties, in accordance with Standard Form "Affidavit and Final Lien Waiver". Use form acceptable to Owner.

B. All submittals shall be duly executed before delivery to the Owner.

#### 1.08 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final Statement of accounting to the Owner.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.
2. Additions and deductions resulting from:
  - a. Previous Change Orders.
  - b. Allowances.
  - c. Unit Prices.
  - d. Deductions for uncorrected Work.
  - e. Deductions for liquidated damages.
  - f. Other adjustments.
3. Total Contract Sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

C. The Owner will prepare a final Change Order reflecting approved adjustments to the Contract Sum, which were not previously made by Change Orders.

#### 1.09 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final Application for Payment in accordance with procedures and requirements stated in Division 0 – Bidding and Contract Documents.

#### 1.10 ADDITIONAL ADJUSTMENT

A. No adjustments to the Contract requested by the Contractor will be allowed if asserted after execution of Final Payment of Contract.

#### 1.11 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of one (1) year from the Date of Final Completion, the Owner, or its designated representative, will make visual inspection of the Project Work in the



company of the Contractor to determine whether further correction of Work is required in accordance with the provisions of the Contract. The Contractor shall be responsible for contacting the Owner and scheduling and coordinating the one (1) year inspection.

- B. The Owner will notify the Contractor, in writing, of any observed deficiencies.
- C. Contractor shall contact the Owner to arrange convenient time and establish schedule for correction of deficiencies.

## **PART 2 – PRODUCTS**

Not Used

## **PART 3 – EXECUTION**

Not Used

**END OF SECTION 01770**

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**SECTION 01781**  
**PROJECT RECORD DOCUMENTS**

**PART 1 – GENERAL**

**1.01 REQUIRED INCLUDED**

- A. Contractor shall comply with and be responsible for all requirements of the Project Manual, without exception.
- B. Contractor shall comply with the applicable requirements in this section and more specific requirements in: Section 01100, Summary of Work; and Section 01770, Close Out Procedures.
- C. Contractor shall conform to the requirements of the Owner, Town of Ridgeland, and such other federal, state agencies having jurisdiction.

**1.02 RELATED REQUIREMENTS**

- A. Division 0, Bidding and Contract Documents, in the Project Manual.
- B. Division 1, General Requirements in the Project Manual.

**1.03 MAINTENACE OF DOCUMENTS AND SAMPLES**

- A. For duration of Project, maintain at job Site the following:
  - 1. One copy of the Drawings, Specifications, Addenda, shop drawings, products data, miscellaneous requested submittal data, Change Orders and other modifications to Contract, field orders, field test or written instructions.
  - 2. One copy of transmittal letters.
  - 3. One set of construction photographs.
  - 4. One set of samples.
  - 5. One copy of Permit Drawings or documents as may be required by the appropriate governing agency.
- B. Store documents and samples in Contractor's field office, or at an alternate location within thirty (30) minutes travel time, apart from documents used for construction.
  - 1. Provide files and racks for storage of documents.
  - 2. Provide locked cabinets or secure storage space for storage of samples.
- C. File documents and samples in accordance with CSI 16-division format.
- D. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- E. Make documents and samples available at all times for inspection by the Owner.

- F. Incomplete or out of order documents and samples will be grounds for not approving the Contractor's Application for Payment.
- G. Provide felt tip marking pens for recording information in color code designated by the Owner.
- H. Label each document "PROJECT RECORD" in neat large printed letters. Keep record documents current. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
  - 1. Drawings: Legibly mark to record actual construction.
  - 2. All underground piping with elevations and dimensions.
    - a. Changes to piping location.
    - b. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
    - c. Actual installed pipe material, class, etc.
    - d. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
  - 3. Field changes of dimension and detail.
  - 4. Changes made by Change Order.
  - 5. Details not on original Contract Drawings.
  - 6. Equipment and piping relocations.
  - 7. Specifications and Addenda: Legibly mark each section to record.
  - 8. Manufacturer, trade name, catalog number of Supplier of each product and item of equipment actually installed.
  - 9. Changes made by Change Order.

#### 1.04 RECORD DRAWINGS

- A. Permanent and accurate As-built Record Drawings shall be created at Contractor's expense from the approved, original drawings.
  - 1. The record as-built drawings shall be submitted to the Engineer on Auto-CAD, Release 2016 or latest version, two (2) CD's with signed and sealed digital pdf copies, and two (2) signed and sealed original full size (24"x36") paper copies.
  - 2. Accompany submittal with transmittal letter in duplicate, containing:
    - a. Date.
    - b. Project title and number.
    - c. Contractor's name and address.
    - d. Title and number of each Record Document.
    - e. Signature of Contractor or his authorized representative.
- B. Legibly mark actual construction on designated As-built Record Drawing:
  - 1. Depths of various elements of structure(s).
  - 2. Horizontal and vertical locations of underground utilities and appurtenances referenced to permanent surface improvements.
  - 3. Dimensional locations, vertical and horizontal, of site work, including utilities, and structures.

4. Dimensional location of expanded building corners.
- C. Indicate the following installed conditions:
1. Field modifications with dimensions and details.
  2. Modifications made by addenda, clarifications, Field Orders or Change Orders.
  3. Details not on original, approved contract drawings.
  4. Record information on a daily basis, or as often as necessary.
  5. Include references to related shop drawings and modifications.
- D. Record data shall be gathered by a Registered Surveyor licensed to conduct work in South Carolina. Reference section 01700 Execution Requirements.
- E. Contractor shall submit As-built Record Documents drawings to the Engineer and Owner for review and acceptance thirty (30) days prior to final closeout.
- F. Make revisions and additions as may be indicated by the Engineer and Owner.
- G. Do not use these Drawings for reference or construction, nor allow them to leave the field office.

#### 1.05 RECORD SPECIFICATIONS AND ADDENDA

- A. Legibly mark up in color code designated by the Owner each Specification Section to record the following:
1. Manufacturer, trade name, catalog name and supplier (with address and phone number) of each product and item of equipment actually installed.
  2. Modifications made by Change Order.
  3. Other matters not originally specified.

#### 1.06 RECORD SAMPLES

- A. Record in transmittal, if not indicated, manufacturer, trade name, catalog number.

#### 1.07 SUBMITTALS

- A. Provide submittals as outlined in the Section 01340 Shop Drawings, Working Drawings, and Samples and in Section 01770 Closeout Procedures. section 4.3 Project Closeout Requirements.

#### 1.08 BURDEN OF ACCURACY

- A. Contractor shall bear all costs of damages of any nature incurred by the Owner due to inaccuracies or incompleteness of the submitted Project Record Documents.

**PART 2 – PRODUCTS**

Not Used

**PART 3 – EXECUTION**

Not Used

**END OF SECTION 01781**

## **SECTION 02140 DEWATERING**

### **PART 1 – GENERAL**

#### **1.01 DESCRIPTION**

- A. Scope of Work: The work to be performed under this section shall include furnishing all equipment and labor necessary to remove storm or subsurface waters from excavation areas in accordance with the requirements set forth as shown on the Drawings.
- B. Related Work Described Elsewhere
  - 1. SCDOT Standard Specifications for Highway Construction: Division 200 Earthwork.

#### **1.02 QUALITY ASSURANCE**

The dewatering of any excavation area and the disposal of the water shall be in strict accordance with the South Carolina Department of Health and Environmental Control and the latest revision of all local and state government rules and regulations.

### **PART 2 – PRODUCTS (NOT USED)**

### **PART 3 – EXECUTION**

#### **3.01 DEWATERING**

- A. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavation. The water table should be maintained at least 2 feet below the required depth of excavation.
- B. If subsurface water is encountered, the Contractor shall utilize suitable equipment to adequately dewater the excavation so that it will be dry for work and pipe laying. A wellpoint system or other Engineer approved dewatering method shall be utilized if necessary to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. The Contractor shall provide a Dewatering Plan prepared by an engineer licensed in the State of South Carolina for submittal and review in accordance with Section 01340.
- C. Dewatering by trench pumping will not be permitted if migration of fine grained natural material from bottom, side walls, or bedding material will occur.
- D. In the event that satisfactory dewatering cannot be accomplished due to subsurface conditions or where dewatering could damage existing structures, the Contractor shall

obtain the Engineer's approval of wet trench construction or procedure before commencing construction.

### 3.02 DISPOSAL

- A. Water pumped from the trench or other excavation shall be disposed of in storm sewers having adequate capacity, canals, or suitable disposal pits.
- B. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation.
- C. In areas where adequate disposal sites are not available, partially backfilled trenches may be used for water disposal only when the Contractor's plan for trench disposal is approved in writing by the Engineer. The Contractor's plan shall include temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons.
- D. No flooding of streets, roadways, driveways, or private property will be permitted. Engines driving dewatering pumps shall be equipped with residential type mufflers. Where practical and feasible, electric "drops" should be used in lieu of portable generators.

**END OF SECTION 02140**



**SECTION 02200**  
**EXCAVATING, BACKFILLING AND COMPACTING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: The work included under this Section consists of clearing, excavating, removal and replacement of unsuitable materials with suitable fill materials, grading and backfilling as required for the construction of the structures, piping and appurtenances as shown on the Drawings and specified herein.
- B. Related Work Described Elsewhere:
1. Dewatering: Section 02140
  2. Pavement Removal and Replacement: Section 02300
  3. Loaming, Seeding and Mulching: Section 02922
- C. Plan For Earthwork: The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this Contract. Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations to the Engineer for review. The Contractor shall consider, and his plan for excavation shall reflect, the equipment and methods to be employed in the excavation. No claims for extras based on substrata or groundwater table conditions will be allowed.
- C. Reference Standards
- SCDOT Standard Specifications for Highway Construction, latest edition:
- Section 203 Roadway and Drainage Excavation
  - Section 204 Structure Excavation
  - Section 205 Embankment Construction
  - Section 208 Subgrade
  - Section 210 Flowable Fill
  - Section 302 Soil-Aggregate Subbase
  - Section 305 Graded Aggregate Base

**1.2 QUALITY ASSURANCE**

A Testing Laboratory employed by the Contractor will make such tests as are specified. The Contractor shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. Costs for all testing shall be paid by the Contractor, including any and all tests, which have to be repeated because of the failure of the tested material to meet specifications. Testing Laboratory or Contractor shall provide a map of all test locations. All testing shall be done in the presence of the Engineer or the Town Representative. The Contractor shall also employ the services of a Geotechnical Engineer. In the event should unsuitable materials be encountered during excavation, the Geotechnical Engineer shall perform all required testing necessary to determine the extent of the unsuitable materials and recommend what remedies shall be necessary including the removal and replacement of

unsuitable materials with suitable fill materials. The removal and replacement of unsuitable materials with suitable fill materials shall be paid for at the unit prices established in the Bid Form.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

#### **A. General:**

1. All fill and backfill material shall be subject to the approval of the Engineer.
2. All fill and backfill material shall be free of organic material, trash, or other objectionable material. The Contractor, shall remove excess or unsuitable material from the job site.
3. Unsuitable materials are soils which are unsuitable to support structures, piping, or other materials. Unsuitable material shall be soils containing muck, clay, excessive amount of organic material, stumps, brush, roots, rubbish and building material rubble or other deleterious materials.

- #### **B. Common Fill Material:** Common fill shall be A-3 sand and shall not contain stones, rock, concrete or other rubble larger than 2 inches in diameter. It shall have physical properties, which allow it to be easily spread and compacted.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- #### **A. General:** To the maximum extent possible, preserve existing trees and structures within the limits of construction. Any structure that must be disturbed due to Contractor operations shall be returned to its original condition.

### **3.2 EXCAVATION**

#### **A. Excavating for Utilities:**

1. Immediately document the location, elevation, size, material type and function of all new subsurface installations and utilities encountered during the course of construction.
2. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and located in the field and should anticipate the encounter of unknown obstructions during the course of work.
3. Encounters with subsurface obstructions shall be hand excavated.
4. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of the suborder soils. Suborder soils which become soft, loose, "quick" or otherwise unsatisfactory for support of structures as a result of inadequate dewatering or other construction methods, shall be removed and replaced by crushed stone as required by the Engineer at the Contractor's expense.
5. All pavements shall be cut for removal with saws and approved power tools.

6. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered.
7. All locations and elevations as required herein must be permanently documented by the Contractor on the As-Built/Record Drawings prior to the Engineer's approval of the Application for Payment for that work.

### **3.3 DRAINAGE**

- A. The Contractor shall at all times during construction provide ample means and devices with which to promptly remove and dispose of all water entering trench and structure excavations and shall keep said excavations acceptably dry, until the structures to be built therein are completed. All water pumped or drained from the Work shall be disposed of in a suitable manner without damage to storm sewer, pavement, pipes, electrical conduits, or any other work and without damage to surrounding property and in accordance with pertinent rules and regulations.
- B. Drainage Shall Be Adequate: No pipe shall be laid in water and no water shall be allowed to rise above the bottom of any pipe while it is being jointed, except as otherwise permitted in writing. No masonry shall be placed in water and no water shall be allowed to rise over masonry until the concrete or mortar has attained its initial set. Nor shall water be allowed to run over the completed masonry for four days. In no event shall water be allowed to rise so as to set up unequal pressures in the structures until the concrete or mortar has set at least 24 hours and also, until any danger of flotation has been removed.
- C. Dewatering, if required, shall be continued during construction to keep the ground water below the level of the backfill at all times until the backfill is completed.

### **3.4 FILL AND COMPACTION**

- A. All pipe trenches shall be backfilled with suitable material compacted to 95% (98% under all pavement) of ASTM D1557 in 6 inch lifts. The material should exhibit moisture content within  $\pm 2$  percent of the Modified Proctor optimum moisture content (AASHTO T-180) during the compaction operations. Special care shall be taken on each side of the pipes and to 12 inches above pipe.
- B. Field density tests shall be determined in each layer of backfill at the following locations:
  1. Every 200 feet.
  2. Every street crossing.
  3. Every structure location
  4. Every foundation location
  5. Other locations as determined by the Town's Representative.
- C. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. Backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

### **3.5 SHEETING, SHORING, AND BRACING**

- A. The Contractor shall provide and install such sheeting and shoring as may be required to support the sides of any excavation to prevent earth movement that could endanger the work or workmen, or any existing structures, or to confine the construction within a specified area such as an easement or street right-of-way. It shall be the Contractor's responsibility to place this sheeting and shoring for such protective purposes without the Engineer's instructions. Pipeline sheeting shall extend a minimum of three (3) feet below pipe or structure. In the process of extraction of sheeting, the use of vibratory type pile drivers (as

opposed to impact type) shall be limited to that sheeting driven no greater than five (5) feet below the pipe invert.

1. Contractor shall hire a specialty professional engineer licensed in the State of South Carolina to design the stabilization system. Design shall be signed and sealed and submitted to the Town and Engineer for review.
- B. For excavations less than ten (10) feet in depth, the Contractor shall provide and install such sheeting and shoring as he may deem necessary. Such sheeting and shoring will be considered as being for the Contractor's convenience and benefit and all costs of furnishing, driving, and removing same shall be borne by him. Sheeting for excavations less than ten (10) feet in depth may be timber or steel at the Contractor's option, unless specified on the Contract Drawings and Documents, or specified by the Engineer.
- C. Unless otherwise directed by the Engineer, all timber sheeting shall be cut off a minimum of 30 inches below grade and left in place, with proper bracing to provide lateral support. Timber sheeting, bracing and shoring above the cut-off elevation shall be removed by careful extraction so as not to endanger other structures or property. All voids left shall be immediately backfilled with approved materials and compacted.
- D. Steel sheeting shall be required for all excavations ten (10) feet or more in depth and at such other locations as may be indicated on the Drawings. Steel sheeting may be completely removed when sufficient backfill has been placed to prevent damage to the work and/or existing structures. Care shall be exercised to prevent the opening of voids during the extraction process.
- E. Steel sheeting shall be left in place when so authorized by the Engineer. The top of steel sheeting left in place shall be no less than 30 inches below grade unless otherwise shown on the Drawings, or directed by the Engineer.
- F. Steel drag shields or trench boxes may be used, location, fabrication and operation subject to written approval of the Engineer, and shall be Steel Safety Shield manufactured by Safety Shoring Shields, Inc., 155 North Dean Street, Englewood, New Jersey, 07861; Efficiency Trench Box manufactured by Efficiency Production, Inc. 2360 East Jolly Road, Okemos, Michigan 48864; or approved equal. Voids left by the advancement of the shield shall be carefully backfilled and compacted in accordance with trench backfill requirements.

#### **END OF SECTION 02200**

## **SECTION 02300**

### **PAVEMENT REMOVAL AND REPLACEMENT**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION**

- A. Scope of Work: Work included under this Section consists of cutting, removing, protecting and replacing existing pavements of the various types encountered.
- B. Protection of Existing Improvements: The Contractor shall be responsible for the protection of all pavements, sidewalks and other improvements within the work area. All damage to such improvements, as a result of the Contractor's operations, beyond the limits of the work of pavement replacement as described herein shall be repaired by the Contractor at his expense.
- C. All paving removal and restoration for this project shall be in accordance with the contract drawings and details, the standards of the South Carolina Department of Transportation (SCDOT), and the project SCDOT Encroachment Permit (as relevant).

#### **PART 2 – PRODUCTS (NOT USED)**

#### **PART 3 – EXECUTION (NOT USED)**

##### **3.01 TESTING**

- A. All compaction density testing shall be conducted by a Geotechnical Professional Engineer licensed in the State of South Carolina. All results shall be submitted to the Owner for review and shall be submitted directly from the testing laboratory to SCDOT (contact information to be provided by Engineer) for construction in SCDOT rights-of-way. Approval must be received from Owner and SCDOT (for construction in SCDOT rights-of-way) prior to paving.

**END OF SECTION 02300**

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## **SECTION 02660 WATER DISTRIBUTION SYSTEM**

### **PART 1 - GENERAL**

#### **1.1 SCOPE OF WORK**

- A. The Contractor shall furnish and install a potable water piping system, complete, tested and ready for operation. The work shall also include such connections, reconnections, temporary service and all other provisions in regard to the existing operation and modification as is required to perform the new work. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the Town of Ridgeland Standard Water and Sewer Specifications, details and testing shall be installed. All materials shall be new unless specifically called for otherwise.
- B. Shop Drawing Submittals

Complete shop drawings, actual catalog data, brochures and descriptive literature will be required and shall meet the requirements of the Town of Ridgeland Water and Sewer Standards. Submittals shall be in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which may, in the Engineer's opinion, not be in compliance with the Town of Ridgeland Water and Sewer Standards.

  - 1. The Contractor shall submit for the approval of the Engineer four (4) copies, plus as many additional copies as he may need for his files of all shop and setting drawings and schedules required for the work.
  - 2. The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking; no claim by the Contractor for delays arising from his failure in this respect shall be allowed.
  - 3. All shop drawings submitted must bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings without this stamp of approval shall not be considered and will be returned to the Contractor for resubmission. If documents vary from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make mention in such letter of variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor shall not be relieved of the responsibility of executing the work in accordance with the Contract Documents even though such shop drawings have been approved.
  - 4. Where a shop drawing is submitted by the Contractor indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Town and which does not involve a change in Contract Price or extension of time, the Engineer will approve the drawings.
  - 5. The approval by the Engineer of shop drawings will be general and shall not relieve the Contractor from the responsibility for inherent error which may exist.

### **PART 2 – PRODUCTS**

#### **2.1 MATERIALS**

- A. All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, and shall have structural properties sufficient to safely

sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

B. Pipe

Pipe for potable water lines in sizes up to and including 48 inches shall be ductile iron, or polyvinyl chloride (PVC) as shown on the drawings and as herein specified. Pipe for potable water lines larger than 48 inches shall be ductile iron. Pipe to be used as a casing in sizes 4 inches and larger shall be welded steel pipe as shown on the drawings and as herein specified. Pipe to be installed underground shall be push-on joint type. Pipe installed on bridges, piles or other above ground installations shall be restrained joint ductile iron pipe or flanged ductile iron pipe as described in these specifications. PVC pipe shall not be used in above ground applications. Underground pipe shall be furnished in nominal 18 or 20-foot laying lengths unless indicated otherwise on the drawings. Pipe shall be cut to length as required to fit installation conditions. Pipe sizes and applications shall conform to the following chart.

PIPE	PIPE SIZE	JOINT TYPE	APPLICATION
Ductile Iron	3 inches and larger	Mechanical joint, push-on joint, flanged joint, ball joint, etc.	water mains and services-3 inches & 4 inches for services only
PVC DR 14, DR 18	14 inches thru 48 inches	Push-on joint	water mains and services-4 inches for services only
PVC, DR 14, DR 18 (C900)	4 inches thru 12 inches	Mechanical joint, restrained	Water fire mains / lines
SDR 21 PVC	2 inches only	Push-on joint	water mains only
Polyethylene	2 inches and smaller	No joints in pipe	services only
Galvanized	smaller than 3 inches	I.P.T.	flushing valves and contaminated soil sites
Steel	4 inches and larger	Welded	casing only

1. Ductile Iron Pipe

Ductile iron pipe wall thickness and pressure class shall conform to ANSI Specification ANSI A21.50 (AWWA C150) and ANSI A21.51 (AWWA C151) with pressure class 150 as a minimum. Pipe shall also be certified by ISO 9000 by an accredited registrar. Each length shall be clearly marked with the name of the manufacturer, location of the foundry, pressure rating, thickness or pressure class, nominal pipe diameter, weight of pipe without lining and length. All pipe furnished by the manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. All ductile iron pipes shall be externally coated and internally lined as specified in this section. All ductile iron pipe shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

2. Polyvinyl Chloride Pressure Pipe

- a. Water mains 4" and larger shall be constructed of Polyvinyl Chloride (PVC) pipe with a dimension ratio (DR) of 18 or 14 suitable for a working pressure of 150 PSI at 73.4 F. Pipe shall conform to AWWA Standard C900 for Polyvinyl Chloride Pressure Pipe, 4", latest edition or revision.



- b. Water mains and fittings smaller than 4" shall be Polyvinyl Chloride (PVC) pipe SDR 21 PR 200 and shall conform to ASTM D2241, latest revision. The pipe shall have a gasketed bell with rubber ring conforming to ASTM F477. Fittings for 2" water mains shall be compatible with the type of pipe specified except for flushing connections which shall use solvent weld fittings. Pipe for flushing connections shall be Polyvinyl Chloride (PVC) pipe, Schedule 40 and shall conform to ASTM D1785.
- c. Fittings for four inch (4") and larger pipe shall be ductile iron and shall conform to the type of pipe being installed. The fittings shall have a minimum working pressure of 150 psi. Fittings shall be cement lined in accordance with AWWA C104/ANSI A21.4 American National standard for Cement- Mortar Lining for Ductile-Iron pipe and Fittings for Water and shall be furnished with an external asphaltic coating.
- d. Buried Warning and Identification Tape: Polyethylene plastic and metallic core or metallic-faced, acid and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, three inch (3") minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar working. Color and printing shall be permanent, unaffected by moisture or soil.
  - i. Warning Tape Color Codes: Blue (Water Systems)
  - ii. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to three feet (3') deep.
- e. Locate Wire: All water mains shall be provided with 12 gauge continuous wire on top of water main. All 12-gauge wiring shall be terminated inside valve boxes or at a maximum of 475' intervals with a minimum of 36 inches excess wiring rolled up inside the valve box.

3. Steel Casing Pipe (N/A THIS PROJECT)

C. Service Lines

1. Polyethylene Tubing

All services 2 inches and smaller shall be polyethylene tubing. Tubing shall be manufactured of PE 3408, High Density Polyethylene (HDPE), in accordance with AWWA C901, ASTM D1248, ASTM D2239, ASTM D2737 and ASTM D302660. The tubing shall have a minimum working pressure of 200 psi. Polyethylene tubing shall be copper tube size SDR9 and shall be colored blue. HDPE pipe shall have ultraviolet (UV) inhibitors for protection against direct sunlight for 4 years. Inserts for polyethylene tubing shall be 316 stainless steel. Tubing shall be approved for use with potable water by the National Sanitation Foundation (NSF-14) and shall be continuously marked at intervals of not more than two feet with the following:

- a. Nominal size
- b. Pressure rating
- c. NSF seal
- d. Manufacturer's name or trademark
- e. Standard dimension ratio

f ASTM specification

D. Fittings

Fittings shall have joints that match the type of pipe furnished except as follows or as otherwise specified. Fittings on 2-inch PVC pipe may be PVC with push-on bell type joint or solvent weld. Fittings 3-inches and larger on push-on joint pipe installed underground shall be ductile iron with mechanical joint ends or PVC with restrained push-on bell type joint. Fittings 3 inches and larger installed above ground shall be ductile iron with flanged ends or restrained joints unless shown otherwise on the drawings. Fittings for fire hydrant laterals shall be ductile iron, including tee to lateral.

FITTING MATERIAL	FITTING SIZE	JOINT TYPE
Ductile Iron	3 inches and larger	mechanical joint, flanged joint, ball joint
PVC DR18	4 inch through 12 inch	push on joint; restrained joint
SCH 40	2 inches only	solvent weld
SCH 80	2 inches only	solvent weld, threaded
SDR 21	2 inches only	push on joint
Polyethylene	2 inches only	butt fused, compression joint
Galvanized	2 inches only	I.P.T.

1. Ductile Iron Fittings

Ductile iron fittings shall have a minimum working pressure of 150 psi. Fittings shall conform to ANSI Specification A21.10 (AWWA C110), A21.11 (AWWA C111), A21.15 (AWWA C115) and/or A21.53 (AWWA C153). Fittings shall also be certified by ISO 9000 by an accredited registrar. Compact fittings shall normally be installed. Long body fittings shall be used where the drawings specifically call for long body fittings, where compact fittings are not available, or at the option of the Contractor when the laying length is not controlled by compact fitting patterns. All fittings shall be UL/FM approved and shall conform to NSF Standard 61 as applicable. All fittings furnished by the approved manufacturer shall be cast and machined at one foundry location to assure quality control and provide satisfactory test data. Fittings shall have cast on them the pressure ratings, nominal diameter of openings, manufacturer's name, foundry location, plant code and degrees or fraction of the circle. Cast letters and figures shall be on the outside body of the fitting. The Town may require random ductile testing of manufacturer's fittings. All ductile iron fittings shall be externally coated and internally lined as specified in this section.

a Ductile iron Integral Restraint Joint (IRJ) fittings in sizes 4" through 12" shall meet or exceed the applicable standards cited in this specification. Fittings shall be manufactured of ductile iron (65.45.12) and shall conform to the material and performance requirements of ANSI/AWWA C153/A21.53. Fittings shall be designed for use on ductile iron pipe conforming to ANSI/AWWA C151/A21.51 and PVC pipe conforming to AWWA C900. All fittings shall be provided with integral restraint joints and have seals conforming to ASTM F 477 and the physical testing requirements of AWWA C111. All fittings shall be internally and externally coated as described in paragraph 2.1F. Assembly of fitting joints shall not require beveling of the plain end of a cut pipe and shall not require the use of jacks or power equipment to force the pipe end past the gasket. Fittings shall be manufactured by (Ebba Iron Restrainers, Uni-flange, or Mega-lugs.), or engineer approved equal.

2. Polyvinyl Chloride Fittings

Fittings that are 2-inch may be PVC with push-on bell type joint or PVC with solvent weld joints as outlined in chart of Section 2.1D. Fittings that are 4 inch and larger shall be restrained push on bell joint. Restraints shall be in accordance with this specification regarding installation and material. The fittings shall conform to the appropriate sections of these specifications for PVC pipe and PVC pipe joints.

a. PVC 1120, Class 150, DR18 Fittings

Fittings shall be PVC injection molded, made from materials meeting or exceeding the requirements of cell class 12454-B material as defined in ASTM D1784. All PVC fittings must comply with, or exceed, AWWA C907. All fittings must be designed to the pressure class of DR18, with a pressure rating of 150 psi and a 2.5 to 1 factor of safety. Virgin materials only shall be used in the manufacture of PVC pressure fittings. These fittings must have UL-FM approval and shall comply with or exceed all ASTM Standards for PVC fittings. All fittings must have NSF-61 approval. The elastomeric gasket shall comply with the requirements specified in ASTM F477 and shall be attached to the bell utilizing glue (AWWA and manufacturer approved type) or rieber ring.

b. PVC 1120, SDR 21, Fittings

SDR 21 fittings shall be injection molded, push on bell type with electrometric rubber seals in accordance with ASTM D3139. Seals shall conform to ASTM F477.

c. PVC 1120, Schedule 40 And Schedule 80 Fittings

Schedule 40 and schedule 80 fittings shall have solvent weld joints and shall be in accordance with ASTM D2672.

d. Polyethylene Fittings

All polyethylene fittings shall comply with NSF-14 requirements. All fittings and couplings shall be thermoplastic nylon 6/6 material suitable for working pressure of 200 psi. Joints on all thermoplastic fittings shall be compression type with 360-degree restraint or threaded as required for a complete installation.

3. Nonstandard Fittings and Wall Castings (N/A THIS PROJECT)

4. Tapping Sleeves

a. Stainless Steel

Stainless steel tapping sleeves shall be used on 4 inch pipe and larger. Stainless steel tapping sleeves shall be all 304 stainless steel, including flanges, bolts and nuts and shall be rated for 150 psi minimum operating pressure and 200 psi minimum test pressure. The tapping sleeve shall have a pilot flange recessed for tapping per MSS SP-60. The pilot flange shall be pressure rated Class D according to AWWA C207 with 125 pound drilling conforming to ANSI B16. Each sleeve shall be supplied with a flange gasket bonded to the flange. The body gasket shall be a full circle, grid pattern, covering the entire length of the sleeve, cloth reinforced, with attached stainless steel bridge to support the gasket at the lugs. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases and sewage. The sleeve shall have a 3/4 inch NPT bronze or stainless steel test plug. All welds shall conform to ASTM A380 and shall be fully passivated.

- E Joints: Type of joint used shall be approved by the Engineer prior to installation. Joints shall be made in accordance with approved printed instructions of the manufacturer, and shall be absolutely watertight.
1. Mechanical Joints

All jointing materials for mechanical joints shall be provided by the pipe and/or fitting manufacturer. Material assembly and bolting shall be in accordance with ANSI Specification A21.11 (AWWA C111). All glands shall be made of ductile iron only.
  2. Push-On Joints
    - a Ductile Iron

Push-on joints shall be in accordance with ANSI Specification A21.11 (AWWA C111). All joint material shall be provided by the pipe manufacturer and installation shall be in accordance with the manufacturer's recommended practice.
    - b Polyvinyl Chloride (PVC)

PVC pipe joints shall be the manufacturer's standard push-on bell type with rubber sealing ring in accordance with ASTM D3139. Electrometric gaskets shall conform to ASTM F477.
  3. Ball and Socket Joints (N/A THIS PROJECT)
  4. Flanged Joints

Ductile iron flanged joints shall conform to ANSI A21.10 (AWWA C110) and ANSI A21.15 (AWWA C115). Flanges shall be in accordance with ANSI Specification B16.1, Class 125 with any special drilling and tapping as required to insure correct alignment and bolting. Screwed flanges shall be screwed in tight at the foundry by machine before they are faced and drilled. Flanges for flanged joints and flanged specials shall be integrally cast at right angles to the axis, accurately faced, and drilled smooth and true. Gaskets shall be rubber ring type, cloth inserted, minimum thickness of 1/8 inch and shall be used on all flanges. The entire gasket, including the retainer and sealing ring, shall be one continuous piece. Retainers glued together will not be accepted. Flanged joints shall be made with bolts, bolt studs with a nut on each end, or studs with nuts where the flange is tapped. The number and size of bolts shall conform to the same ANSI standard as the flanges. All flange bolts and nuts shall be 316 stainless steel. Bolt studs shall be of the same quality as machine bolts. Bolts shall be tightened so as to distribute evenly the stress in the bolts and bring the pipe in alignment. The Contractor shall provide suitable filling rings where the layout of the flange piping is such as to necessitate their use. In materials, workmanship, facing and drilling, such rings shall conform to ANSI B16.1 Class 125.
  5. Machined Surfaces

Machined surfaces shall be cleaned and coated with a suitable rust preventive coating at the shop immediately after being machined.
  6. Steel Casing Pipe Joints (N/A THISPROJECT)

Steel casing pipe joints shall be electric fusion (arc) welded by operators whose qualifications meet the requirements of the American Welding Society Standard procedures and in conformance with AWWA C206.
  7. Polyvinyl Chloride Solvent Weld Joints

Pipe joints for schedule 40 or schedule 80 pipe shall be solvent weld joints. The solvent cement shall comply with ASTM D2564. The joint shall be made in accordance with ASTM D2855. The joint shall conform to ASTM D2672.
  8. Polyethylene Joints

Polyethylene joints shall be butt-fused, done with polyethylene fittings or brass compression fittings.

9. Restrained Joints

a. Restrainers

The restrainer shall be manufactured of ductile iron and shall meet or exceed all the requirements of ANSI A21.11 (AWWA C111) and ASTM A536. The restrainer system shall provide anchoring of PVC pipe to mechanical joint fittings or bell to spigot PVC pipe joints. Restraints shall provide a full 360 degree contact with sufficient gripping action to secure the clamp to the pipe and be designed so that restraint action is increased as a result of increases in line pressure. The restrainer shall accommodate the full working pressure rating of the pipe plus surge allowance.

b. Retainer Glands

Retainer glands shall be manufactured of ductile iron grade 64-42-10, ASTM A536 or the pre-approved equal and shall be designed to fit standard mechanical joint bells conforming to applicable sections of ANSI A21.10 (AWWA C110), ANSI A21.11 (AWWA C111) and ANSI A21.53 (AWWAC153). The restraining device shall be rated for the full working pressure of the pipe type used including surge allowance and a 2:1 safety factor. Mechanical restraints shall include a restraining mechanism which, when actuated, imparts a wedging action against the pipe, increasing its resistance as the pressure increases. The restraint shall be compatible with the type of joint being installed. The joint deflection shall not exceed 80% of the pipe manufacturer's recommended maximum deflection. Deflection, if necessary shall be made before tightening the set screws. Bolts and set screws shall be tightened alternately, 180 degrees apart, to the torque recommended by the manufacturer. Retainer glands having set screws that make point contact with the pipe without using a pad to disperse point loading shall not be used on PVC pipe. The restraining device shall not damage or lower the working pressure of the pipe installed. Retainer glands shall be either EBBA Iron or Uni-flange.

10. Flange Adapters

Flange adapters shall be ductile iron manufactured to ASTM A536 standards. Bolt circles and bolt holes shall meet ANSI B16.1 for 125 pounds. Adapter flanges shall meet or exceed all test requirements of AWWA C900, ASTM D2241 and ASTM D1599.

11. Pipe Couplings

The Contractor shall furnish and install pipe couplings as required to complete the work. Pipe couplings used to join two pieces of ductile iron pipe or PVC pipe shall be sized to match the outside diameter of the pipeline. Transition couplings shall be used to join pipes of different outside diameters. The coupling sleeve shall be manufactured of ductile iron conforming to ASTM A536 and be coated with 14 mils of epoxy. The bolts shall be manufactured of a metal of high corrosion resistance and shall conform to ANSI 21.11 (AWWA C111). Gaskets shall be wedge-type and manufactured of virgin SBR for water and sewer service. The installation of all couplings shall be in accordance with manufacturer's recommendations. After installation, all coupling surfaces including bolts and nuts shall be coated with an approved coating as specified in this section of these specifications. Couplers and adapters for polyethylene pipe shall be brass conforming to AWWA C800 and shall be female IPT, pack joint or compression nut.

12. Full Circle Repair Clamps

Full circle repair clamps shall have type 304 stainless steel shells, lugs, bolts, nuts and washers as per ASTM A193, A194, A240, or shall have type 304 stainless steel shells per ASTM A240, ductile iron lugs as per ASTM A536, and 304 stainless steel bolts, washers and nuts. Gaskets

for both types shall be virgin SBR as per ASTM D2000 for water and sewer service.

F. Corrosion Protection for Ductile Iron Pipe Interior Lining

The interior of all ductile iron pipe, fittings and specials shall be thin cement lined. The lining shall comply with ANSI Standard A21.4 (AWWA C104).

1. Exterior Coating

All ductile iron pipe and fittings except on bridges or as otherwise noted, shall receive an exterior bituminous coating as specified in ANSI A21.51. The finished coating shall be continuous smooth, neither brittle when cold nor sticky when exposed to the sun, and be strongly adherent to the fitting. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling. Pipes crossing under ditches, culverts, rivers, creeks, etc., shall be considered as buried pipe. All ductile iron pipe shall be color coded blue by field painting a blue stripe, 3 inches wide, along the crown of the pipe barrel.

2. Polyethylene Wrap (N/A THISPROJECT)

a. Material

The polyethylene material shall meet or exceed the requirements of AWWA C105 in all respects. The wrap shall be virgin, high density polyethylene, 4 mils thick minimum. The polyethylene wrap shall be white with 2 each, 6 inch wide, continuous blue tapes located at the 2:00 and 10:00 o'clock position on the pipe.

b. Installation

Although not intended to be a water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill. Installation shall be done according to one of the methods described in AWWA C105, subject to approval by the Engineer and the manufacturer.

G. Material Warranty

The manufacturer of materials furnished on the project shall supply to the Town of Ridgeland, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

H. Material Testing

The Town of Ridgeland requires all materials furnished to conform to the following standards. The entire product of any manufacturer or of any one part may be rejected when, in the opinion of the Town of Ridgeland, the methods of manufacture fail to secure uniform results acceptable to the requirements of these specifications. Pipe and materials shall be tested in, and for conformity with, the latest editions of the following:

<u>Item</u>	<u>Specifications</u>
Ductile Iron Pipe and Fittings	ANSI A21.50 (AWWA C150) ANSI A21.51 (AWWA C151) ANSI A21.53 (AWWA C153)
Polyvinyl Chloride	ASTM D1598

Pipe and Fittings	ASTM D1599
	ASTM D1784
	ASTM D1785
	ASTM D2122
	ASTM D2241
	ASTM D2564
	ASTM D2672
	ASTM D2837
	ASTM D2855
	ASTM D3139
	ASTM F477
	AWWA C900
	AWWA C905
	AWWA C907
Polyethylene Tubing	ASTM D1248
	ASTM D2239
	ASTM D2737
	ASTM D302660
	AWWA C901

**I Water Meter Boxes:**

Water meter boxes shall adhere to the Town of Ridgeland requirements. For applications where water meter box is to be placed in the sidewalk or grassed areas Load Rating to be TIER 8. For applications where water meter box is to be placed in a parking area Load Rating to be TIER 15.

### **PART 3 - EXECUTION**

#### **3.1 REFERENCE POINTS AND LAYOUT**

- A. The Contractor shall be responsible for setting all grade, lines and levels. The Contractor or Contractor's Surveyor will provide centerline of construction; the engineer will provide a reference benchmark. Any reference points, points of intersection, property corners, or bench marks, which are disturbed during construction, shall be restored by a Land Surveyor registered to practice in the State of South Carolina, and all costs thereof shall be borne by the Contractor. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes.

#### **3.2 HANDLING AND CUTTING PIPE**

- A. Every care shall be taken in handling and laying pipe and fittings to avoid damaging the pipe, scratching or marring machined surfaces, and abrasion of the pipe coating. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. In any pipe showing a distinct crack in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portion, if so approved by the Town of Ridgeland, may be cut off before the pipe is laid so that the pipe used shall be perfectly sound. The cut shall be made in the sound barrel at a point at least 12 inches from the visible limits of the crack. Except as otherwise approved, all cutting shall be done with a power driven cut off saw. All cut ends shall be examined for possible cracks caused by cutting.

### 3.3 PIPE INSTALLATION

#### A. General Requirements

Water mains shall be constructed of the materials specified and as shown on the drawings. All PVC C900 pipe shall be laid in accordance with AWWA C605. Pipe and fittings shall be carefully handled to avoid damage, and if feasible, while they are suspended over the trench before lowering, they shall be inspected for defects and to detect cracks. Defective, damaged or unsound pipe or fittings shall be rejected. Each section of the pipe shall rest upon the pipe bed for the full length of its barrel, with recesses excavated to accommodate bells and joints. Any pipe which has its grade or joint disturbed after laying shall be taken up and re-laid. All precautions shall be taken to prevent sand or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any time the pipe installation is not in progress, the open ends of pipe shall be closed by a watertight plug or other method approved by the Engineer. Plugs shall remain in pipe ends until all water is removed from the trench. Any sand or foreign material that enters the pipe shall be removed from the pipe immediately. No pipe shall be installed when trench conditions (standing water, excess mud, etc.) or the weather (rain, etc.) is unsuitable for such work, except by permission of the Engineer. Any section of pipe already laid which is found to be defective or damaged shall be replaced with new pipe.

#### B. Pipe Cover

The cover over all piping shall be a minimum of 30 inches in unpaved areas and 36 inches in paved areas with a maximum of 60 inches unless specifically approved otherwise. Cover for pipe under pavement shall be measured from the finished grade. Any reduction in pipe cover will require approval from the Town of Ridgeland and the Engineer. Greater depths will be permitted where required to miss obstructions only. Lines shall be located as shown on the drawings. The Contractor shall investigate well in advance of pipe laying any conflicts which may require readjustments in planned locations and advise the Engineer of the results of these investigations so that the Engineer may give instructions as to the modifications required. Refer to Section 02200 for backfill and compaction requirements.

#### C. Installation of Iron Piping

All iron pipe and fittings shall be laid in accordance with the pipe manufacturer's recommendations and the American Water Works Association Specification AWWA C600.

#### D. Thrust Restraint

1. All non-flanged fittings and valves shall be restrained using one of the following methods:

- a. Mechanical restraint at fittings and valves and mechanical restraint along adjacent joints of pipe to a length as specified in the following table.

All Mechanical Joint Fittings must be restrained using either EBBA Iron Restrainers, Uni-flange, or Mega-lugs. Rod restraints will be approved on an individual basis only.

No thrust blocks will be used without prior approval of Town of Ridgeland Water and Sewer Department.



**CHART "F"**

<b>MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)</b>									
<b>NOMINAL PIPE SIZE (INCHES)</b>	<b>11 1/4° Horizontal Elbow</b>	<b>22 1/2° Horizontal Elbow</b>	<b>45° Horizontal Elbow</b>	<b>90° Horizontal Elbow</b>	<b>Horizontal Tees</b>	<b>Horizontal Plugs and Valves</b>	<b>45° Vertical Offset Upper length/low per length</b>	<b>22½° Vertical Offset Upper length/lower length</b>	<b>Reducer (to 1 size smaller) Length on Larger Size Side</b>
4	2	4	8	20	20 - run 1 - branch	50	20/3	8 / 1	n/a
6	2	5	10	28	20 - run 1 - branch	70	28/4	11 / 2	28
8	3	6	14	36	20 - run 1 - branch	90	36/5	14 / 3	30
10	4	8	18	40	20 - run 1 - branch	110	45/6	17 / 3	29
12	4	9	20	50	20 - run 1 - branch	120	52/8	20 / 4	50
14	5	10	23	56	20 - run 10 - branch	140	60/9	23 / 4	30
16	6	11	26	60	20 - run 26 - branch	160	67/10	26 / 5	30
18	6	12	29	69	20 - run 41 - branch	180	74/12	29 / 5	29
20	7	13	32	75	20 - run 55 - branch	195	80/13	36 / 6	29
24	7	15	33	76	20 - run 58 - branch	200	81/14	37 / 7	55
30	9	18	36	88	20 - run 77 - branch	235	97/16	44 / 8	77
36	10	20	40	100	20 - run 115 - branch	270	110/20	51 / 10	77

NOTE: Table assumptions: PVC pipe, Safety Factor = 1.5, Soil = GM or SM, 3 ft. bury depth to top of pipe, trench type 3, branch on tee is one size smaller than run of tee size and 20 feet of pipe is installed past the tee on the run side (smaller branch sizes must be calculated by the engineer). Vertical offsets are 3 feet deep on top and 8 feet deep on bottom. Reducers are calculated for one size reduction. Test pressure of 150 psi.

The use of thrust blocks shall be limited to situations such as point repair where exposing several joints of pipe is not feasible due to existing ground conditions and also must be used with mechanical

joint restraining devices when, in the judgment of the Engineer, the nature and criticality of an installation is such as to require positive assurance of stability. Concrete collars with tie rods shall be used on dead end lines as indicated on plans.

Concrete used for this purpose shall be 2,500 psi minimum. When applicable, schedule and details for the required thrust blocks are included on the drawings. The use of thrust blocks will only be approved by the Town of Ridgeland for special conditions or as noted on the plans.

2. Joint Restraints within Carrier Pipe (N/A THIS PROJECT)

3. Casing Spacer Installation (N/A THISPROJECT)

E. Water Main and Non-Water Main Separation Requirements

1. Separation of Water Mains and Sewers shall conform to the requirements of South Carolina DHEC State Primary Drinking Water Regulations 61-58, Finished Water Pumping, Storage and Distribution Facilities section D. Distribution Systems (12).

(a) Parallel installation - Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the Department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least eighteen (18) inches above the top of the sewer.

(b) Crossings - Water mains crossing sewers shall be laid to provide a minimum vertical separation of eighteen (18) inches between the outside of the water main and the outside of the sewer. This shall be the case whether the water main is either above or below the sewer line. Whenever possible, the water main shall be located above the sewer line. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer line and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing and each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main.

(c) Special Conditions - When it is impossible to obtain the distances specified in R.61-58.4(D)(12)(a) and (b) the Department may allow an alternative design. Any alternative design shall:

(i) maximize the distances between the water main and sewer line and the joints of each;

(ii) use materials which meet the requirements R.61-58.4(D)(1) for the sewer line; and,

(iii) allow enough distance to make repairs to one of the lines without damaging the other.

(d) Force mains - There shall be at least a ten (10) foot horizontal separation between water mains and sanitary sewer force mains. There shall be an eighteen (18) inch vertical separation at crossing as required in R.61-58.4(D)(12)(a) and (b).

- (e) Sewer manholes - No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provided that ductile iron is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.
- (f) Drain-fields and Spray-fields - Potable water lines shall not be laid less than twenty-five (25) feet horizontally from any portion of a waste-water tile-field or spray- field, or shall be otherwise protected by the method approved by the Department.

F. System Connections

All connections and ties to the Town of Ridgeland Water System and transfer of services will be performed by the Contractor under supervision of the Town of Ridgeland's representative.

1. Water Main Connections

Tapped connections in the barrel of a pipe shall be less than the diameter of pipe being tapped except 4 inch pipe which may be tapped with a 4 inch tapping sleeve and valve. No taps shall be made within 5 feet of a joint. When making 2 inch PVC water main connections to water mains, a flexible connection shall be made using 2 inch polyethylene pipe one foot long (minimum). The polyethylene pipe shall tie to the existing water main and then tie to the new 2 inch PVC water main. There shall be a stainless steel nipple between saddle and valve on 2 inch water main connections.

2. Water Service Connections

Water services to be Polyethylene – Orangeburg #4-05110, 3406 or Drisco pipe 3408, 5100 ultra-line. All long and short side water services are to be one inch (1").

G. Field Testing

1. Disinfection Tests

- a. All water pipe and fittings of whatever size and wherever installed on potable water lines shall be thoroughly disinfected prior to being placed in service. Disinfection shall follow the applicable provisions of the procedure established for the disinfection of water mains as set forth in AWWA Standard C651 entitled "AWWA Standard for Disinfecting Water Mains".

Temporary blow-offs, shall be installed for the purpose of clearing the water main. Blow-offs installed on water mains up to and including 12 inches shall be the same diameter as the water main. Blow-offs installed on 16 inch water mains and larger shall be the next smaller size, in diameter, than the water main being tested. Temporary blow-offs shall be removed and plugged after the main is cleared. The Town of Ridgeland Representative shall be present prior to and during the operation of blow- offs. The main shall be flushed prior to disinfection.

The new water main shall be connected to the existing water main at one point only for flushing purposes (no looping). The new main MUST have a blow off on the end as required previously. After the new main is thoroughly flushed, the open end shall be sealed and restrained and the main shall be thoroughly disinfected as specified.

The contractor may use a separate source of water for flushing purposes. Upon completion of the flushing, the contractor shall proceed with disinfection as specified.

Anytime the new line is reopened (to repair defective joints or pipe, defective fitting or valve) the complete disinfection process shall be repeated.

Once bacteriological clearance (on 2 days of samples) has been approved, the main may be pressure tested against an existing system valve.

No new water main may be put in service until a Certification of Completion has been approved by the South Carolina Department of Health and Environmental Controls (SCDHEC). The contractor must supply to the Engineer SCDHEC acceptable record drawings or As-Built, accurately depicting installed conditions for the Certification of Completion. The Contractor shall allow time for this process to be completed.

2. Leakage and Pressure Tests

See Section 15045 Pressure Testing

3. Locate Wiring Testing

Installed locate wiring shall be tested by the contractor with an approved testing company using approved equipment. Locate wire testing company must be provided a copy of the As-Built.

H. Inspection

All pipe and fittings shall be subject to inspection at time of delivery and also in the field just prior to installation. All pipe and fittings which in the opinion of the Engineer do not conform to these specifications will be rejected and shall be removed by the Contractor at the Contractor's expense. An authorized Town of Ridgeland representative must be present for all pressure and leakage testing, connections to the Town's existing lines and the collection of water samples. The Town of Ridgeland representative will pull the water samples and deliver them to the lab.

I. State Highway Crossings

Permits for all work within the right-of-way of a State Highway will be obtained by the Engineer. The Contractor shall, however, verify the existence of the permit before commencing work in this area. All work related to the State Highway crossing shall be in full compliance with the requirements of the South Carolina Department of Transportation permit and in accordance with the South Carolina Department of Transportation Utility Accommodation Guide and standard specifications. Unless otherwise shown on the drawings or specified herein, State Highway crossings shall be made by jacking a steel pipe casing, of the size shown on the drawings and shown in the Town of Ridgeland Standard Details, under the highway at the elevations and locations shown. The water main shall then be placed in the casing with approved casing spacers as specified in this section. All joints within carrier pipe shall be mechanically restrained joints. After inspection, the ends of the casing shall be filled with 2500 psi concrete not less than 8 inches thick.

J. Railroad Crossings (N/A THIS PROJECT)

K. Locate Wiring

Contractor shall furnish and install #12 copper locate wiring and warning tape on all PVC water mains and polyethylene and PVC water services installed. Locate wire on services shall be limited to a continuous loop of wire extending 3 feet along the service from the main. Locate wire must be attached to water mains and services with plastic zipper type ties at each side of bell joint or fitting and at 10-foot intervals along pipeline. Locate wire shall be brought to within 8 inches of grade within a valve box or water meter box flush with finished surface with 36 inches of locate wire rolled up inside box at 475 foot intervals. Locate wire shall be installed in box and along pipeline as detailed in the Town of Ridgeland Standard Details. Locate wire shall be installed in either the 1:00 or 11:00 position on the pipe. Locate wire shall be attached to intersecting ductile iron or galvanized pipeline using a three way splice and brass split ground clamp with wire installed around brass nipple. Locate wiring must have the ability to conduct an electrical current; therefore, the wiring must be continuous without any breaks in the line spliced as per the Town of Ridgeland Standard Details. Locate wire shall be spliced with the Town of Ridgeland approved wire connectors.

L. New Water Services

New water services shall be furnished and installed in the sizes and locations indicated on the Contract documents. Short services shall be services installed on the same side of the road as the water main. Long services shall be services installed on the opposite side of the road as the water main. Typically water services for Town of Ridgeland projects will be installed by the jack & boring or underground piercing tool method. No open cutting of roadway will be allowed for water services.

M. Renewal and Transfer of Water Service

1. General

Where a new water main is installed or where an existing water main is relocated or replaced, as shown on the drawings or where necessary due to a direct conflict with proposed construction and when approved by the Engineer, the Contractor shall install new piping from the water main to each existing water meter.

2. Service Line Size

Service lines and component parts thereof shall be sized based on the existing meter size as follows:

SINGLE METER SERVICES		
Meter Size	Service & Tap Size	Curb Stop Size
3/4"	1"	1"
1"	1"	1"
1-1/2"	1-1/2"	1-1/2"
2"	2"	2"

N. Contractor Warranty

The Contractor shall supply to the Town of Ridgeland a one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

**END OF SECTION 02660**

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**SECTION 02661**  
**WATER VALVES & APPURTENANCES**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

- A. The Contractor shall furnish, install, joint, and test all gate valves, butterfly valves, check valves and other special valves and appurtenances as shown on the drawings and herein specified. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in the Town of Ridgeland Water and Sewer Standards, Details and Materials Manual shall be installed. All materials shall be new unless specifically called for otherwise.

**1.2 ROTATION OF OPENING**

- A. All valves larger than two inches installed within a water system to be the Town of Ridgeland owned shall open by turning to the left or counter-clockwise, when viewed from the stem.

**1.3 EXTENSION STEMS**

- A. Where extension stems are required substantial, adjustable wall brackets and extension stems shall be furnished and located as directed. Extension stems shall be provided on all buried valves when the operating nut is deeper than 30 inches below the final grade. Sufficient stem extension shall be provided so that the nut will be no more than 30 inches below finished grade.

**1.4 PAINTING OF VALVES AND VALVE BOX LIDS**

- A. The top side of all water valve box covers shall be painted blue except for gate valves at fire hydrants. Top of valve box covers at fire hydrants shall be painted yellow. Oil based, traffic-rated paint shall be used.

**1.5 HYDROSTATIC AND LEAKAGE TEST**

- A. The Contractor shall be required to perform a separate hydrostatic/leakage field test on each valve installed to insure it is bubble tight. The duration of this test shall be 15 minutes at 150 psi and conform to AWWA C504. The method of performing this test shall be left up to Contractor with the Engineer's approval. The failure of the valve to perform will result in its removal from the job site and replacement by the Contractor at the contractor's expense.

**1.6 LOCATING MARKERS FOR VALVES**

- A. A 'V' cut shall be carved in the curb closest/adjacent to a below grade valve. This 'V' cut shall be painted blue.

**PART 2 - PRODUCTS**

**2.1 GATE VALVES**

- A. General

Gate valves 3 to 12 inches in diameter shall be designed for 200 psi minimum working pressure. Valves over 12 inches in diameter shall be designed for 150 psi minimum working pressure. When full open,

gate valves shall have a clear waterway equal to the nominal diameter of the pipe. The operating nut or wheel shall have an arrow cast in the metal indicating the direction of opening. Each valve shall have the manufacturer's distinctive marking, pressure rating and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydraulic pressure equal to twice the specified working pressure.

**B. Buried Valves**

Buried gate valves shall be iron body bronze mounted, rubber encapsulated, resilient seat, solid wedge, non-rising stem type with operating nuts and adjustable valve boxes and covers. Operating nuts shall be two inches square. Resilient seat gate valves shall conform to applicable sections of AWWA Standards C509 resilient seat. All gate valves 20 inches or larger must be bevel geared for both horizontal and vertical installations. All valves shall be installed vertically unless additional depth of bury is impossible due to physical obstructions. Gate valves shall open counterclockwise.

**C. Above Ground Valves**

Gate valves located above ground or inside structures shall be hand wheel operated, non-rising stem type with flanged ends and be of the same general construction as buried valves.

**D. Valve Joints**

All gate valves shall have mechanical joint ends, flanged ends, or screw joints to fit the pipe run in which they are used, except valves installed on push-on joint pipe shall have mechanical joint ends unless otherwise specified.

## **2.2 MISCELLANEOUS VALVES AND APPURTENANCES**

**A. Tapping Valves**

**1. General**

Tapping valves shall be iron body, bronze mounted gate valves, non-rising stem, open left, resilient seat, 2 inch square operating nut, for vertical mounting in approximately level setting on buried water lines. The valve ends shall be mechanical joint for use with ductile iron pipe on one side and standard flanged (Class 125) on the other. Valves shall conform to the applicable section of these specifications.

**2. Disinfection of Tapping or Drilling Machine**

Prior to tapping a potable water main, the drilling machine's pilot drill, shell cutter and cutter hub shall be sterilized in accordance with the following procedure:

Four gallons of potable water shall be combined with 8 oz. of sodium hypochlorite (household bleach); the pilot drill, shell cutter and cutter hub shall be swabbed until clean or totally immersed in the sterilizing solution and allowed to remain wet at least five minutes before tapping operation commences. It is not necessary to rinse the sterilizing solution from tapping components prior to use.

**3. Hydrostatic and Leakage Test**

After installing a tapping sleeve and valve, and prior to tapping of a pressurized water main, a hydrostatic and leakage test shall be performed. The test will be conducted by introducing water into tap or test hole located at the neck of the outlet half of the sleeve, on sleeves furnished with



said tap, and with the tapping valve in the closed position. Sleeves shall be provided with a test plug. The sleeve and valve shall be capable of maintaining a test pressure of 150 psi for 30 minutes duration, with no sign of visible leaks. All leaks shall be repaired by removing and replacing defective items with items free of defects, after which the sleeve and valve shall be re-tested. Such repair and re-testing shall be done until the installation passes the specified test. The Contractor shall furnish and install any necessary temporary restraints, gauges, pumps and other incidental and appurtenant items necessary to complete this work, and shall remove same upon completion of the test. A watertight plug shall then be inserted into the testhole.

B. Corporation Stops

All corporation stops to be Ford ball corp. FB 1600 AWWA/cc taper thread inlet by female iron pipe thread outlet or FB1000 ball corp with grip joint, McDonald 4701BT. Corporation stops shall be required on all services regardless of service size.

C. Curb Stop

Curb stops must be either Ford B41-343W-G (3/4' x 1") and B41-344W-G (1") both with grip joints or McDonald 6102 W.T.

Adapters can be Ford C84 series with grip joint or Mueller H-15428.

Separate services to be terminated with a curb stop in meter box one foot (1') off property line and minimum of two feet (2') off side property line. Either Brook #37 with 37H lid, for one inch (1"), Brook #38 with 38H lid for 1½", Brook #65 with 65H for 2", or DPW Model D-1200 for one inch (1") services. When performing pressure tests, curb stops must be capped or plugged and tested in the open position.

D. Ball Valves

Ball valves shall be limited to 3/4 inch through 2 inches in size and shall have cast bronze body, bronze tee head, stem with check, full roundway opening and provisions for locking in a closed position. Ball valves for use with copper services shall have an inlet connection with a flare nut fitting for Type K copper tubing and an outlet connection with female iron pipe thread, or shall have an inlet connection with a compression joint (insert stiffener will be used with plastic service connections) and an outlet connection with female iron pipe thread. Ball valves for use with Schedule 40 PVC pipe shall have an outlet connection with female iron pipe threads and an inlet connection with either a compression joint or female iron pipe threads. The latter will require the use of an approved Schedule 40 PVC Adapter (MIPT X SLIP). Compression joints will require insert stiffeners. Below grade ball valves on water mains must have two inch (2") operating nuts and be installed in standard valve boxes.

E. Service or Tapping Saddle

Water services to be made with service saddle for C.I. or AC to be double strapped JCM 402, Mueller H- 10500, Smith-Blair 313, or Ford 202 and must be CC threads (AWWA) unless otherwise indicated in the contract plans.

Service saddles for PVC C-900 water pipe are Mueller (H-134—series or Ford S90). Taps to existing water mains will be made with an approved stainless steel tapping sleeve and resilient seat tapping valve.

Taps to existing water mains will be made with an approved stainless steel tapping sleeve and resilient seat tapping valve.

## **2.3 FIRE HYDRANTS**

### **A. General**

Fire hydrants shall be 4 ½ inch ductile iron body, fully bronze mounted, for 150 psi working pressure, complying with AWWA Standard C502. Fire hydrants to be Mueller #A421 or #A423, Clow Medallion, or M&H AWWA C-502 style 129 Traffic Model, 4½" main valve size. Unless otherwise stated, all drain holes must be rocked with 57 stone. The inlet connection shall be mechanical joint type, with accessories, for 6 inch ductile iron pipe. The hydrant foot shall be epoxy coated and have integral cast tie-back lugs. The integral shut-off valve shall be compression type opening against water pressure, right hand openings. Valve diameter and general interior design shall be sufficient to provide head loss/flow quantity ratios less than specified in the above cited Standard. The main valve seat and the threaded portion of the hydrant into which it screws shall be bronze. The hydrant barrel drain valve and port shall be bronze. The hydrant barrel drain shall be actuated by operation of the main valve stem. The stem operating threads and thrust bearing shall be sealed by "O" rings, from exposure to moisture and shall be provided with means for lubrication. The hose nozzles shall be bronze with National Standard fire hose coupling screw threads, one 4 inch pumper nozzle and two 2 ½ inch hose nozzles. The hydrant operating nut and nozzle cap nuts shall be 1¼" square. Pipe used for fire hydrant laterals shall be ductile iron Pressure Class 350, or Class 150 DR18 PVC. Tees and bends leading to fire hydrants shall be ductile iron only. The nozzle caps shall be securely chained to the hydrant barrel. The chains shall be free from rust or corrosion and painted to match the color of the hydrant. The hydrants shall be "Traffic" type with a frangible flange or lugs and operating stem section at the ground line. The hydrant shall be painted with the above ground finish color "Traffic Yellow".

### **B. Installation**

Fire hydrants shall be installed at the locations shown on the drawings in accordance with the Town of Ridgeland Standard Details.

### **C. Independent Valve**

Independent valve furnished with each hydrant shall be 6 inch, non-rising stem gate valve with mechanical joint ends in conformance with the sub-section entitled "Gate Valves" of these specifications. Independent valves shall be provided with a cast iron valve box in conformance with the sub-section entitled "Valve Boxes".

### **D. Hydrostatic and Leakage Test**

Hydrostatic and leakage tests shall be conducted in accordance with AWWA C502, Section 5.

## **2.4 VALVE BOXES**

### **A. General**

The Contractor shall furnish, assemble and install a valve box for each buried valve. Each valve box installed in non-paved areas shall be installed with a 24 inch round, 6 inch thick concrete collar with #4 reinforcing bars, poured around the top of the valve box cover. The concrete shall have a minimum strength of 3000 psi. Provide brass identification tag with "Water", valve size and valve type epoxyed or riveted to interior of valve box. Tag shall be 2 inch diameter, 1/8 inch thick brass, located a maximum of 2 inches below the top of the valve box.

### **B. Valve Boxes**

Adjustable valve boxes of suitable length shall be used. Cover shall be marked "Water". The top section

shall be adjustable for elevation and shall be set to allow equal movement above and below finished grade. The base shall be centered over the valve and shall be on line with nut at top of valve stem and the entire assembly shall be plumb. Boxes for paved areas shall be cast iron. Boxes for non-paved areas may be PVC. Cast iron castings shall be manufactured of clean, even grain, gray cast iron conforming to ASTM Designation A48, Class 20B, Gray Iron Castings; and shall be smooth, true to pattern, free from blow holes, sand holes, projections, or other harmful defects and shall be coated with a single thin coat of coal tar epoxy. The cover will not rock after it has been seated in any position in its associated jacket.

C. Debris Cap

Debris caps shall be required in all valve boxes. The debris cap shall be comprised of a hollow member having a cylindrical outer surface, a closure for one end and three point resilient contact pads projecting from the outer surface. One contact pad shall be movable by means of a cam having a low angle of advance whereby external forces applied to the cam via the movable contact pad will not cause rotation of said cam. The cap shall have a flexible skirt providing an outward seal preventing debris from getting past the cap. The cap must withstand without slippage, a minimum vertical force of 50 lbs. at a loading rate of 1.0 inches/minute. The cap shall have retaining prongs to retain a standard locating coil, and shall be capable of installing a standard fitting for "Lock-out/Tag-out" in compliance to all standards and requirements of State and Federal OSHA guidelines.

## 2.5 METER BOXES

A. Concrete

Where called for on the drawings, concrete meter boxes shall be the type as listed in the Town of Ridgeland Water and Sewer Standards, Details and Materials and shall be installed in accordance with the Town of Ridgeland Water and Sewer Standard Details. Concrete meter boxes will only be allowed in driveway and sidewalk areas.

B. Copolymer

Where called for on the drawings, copolymer meter boxes shall be the type as listed in the Town of Ridgeland Water and Sewer Standards, Details and Materials and shall be installed in accordance with the Town of Ridgeland Water and Sewer Standard Details. Copolymer meter boxes will be used in all grass areas.

## 2.6 BACKFLOW PREVENTION DEVICES

A. Backflow Preventers for Water Service

1. General: Backflow preventers shall work on the reduced pressure principle. The backflow preventer assembly shall consist of two (2) spring-loaded check valves, automatic differential pressure relief valve, drain valves and shut-off valves. The body material shall be bronze or cast iron for a working pressure of not less than 150 psi, with bronze or stainless steel trim. Drain lines with air gaps shall be provided. Rock type hot box enclosure shall be provided to enclose backflow preventer assembly.
2. Manufacturers:
  - a. Febco, Fresno, CA.
  - b. Hersey, Cleveland, NC.
  - c. Ames, Woodland, CA.
  - d. Watts Regulator Co., N. Andover, MA.

- e. Wilkins, Paso Robles, CA.
- f. Conbraco, Matthews, NC.

## **2.7 WATER METERS**

### **A. Compound Water Meter**

Where called for on the drawings, compound water meters shall be the type as listed in the Town of Ridgeland Water and Sewer Standards, Details and Materials and shall be installed in accordance with the Town of Ridgeland Water and Sewer Standard Details.

### **B. Turbine Water Meter**

Where called for on the drawings, turbine water meters shall be the type as listed in the Town of Ridgeland/ Water and Sewer Standards, Details and Materials and shall be installed in accordance with the Town of Ridgeland Water and Sewer Standard Details.

### **C. Compact Fireline Water Meters**

Where called for on the drawings, compact fireline water meters shall be the type as listed in the Town of Ridgeland Water and Sewer Standards, Details and Materials and shall be installed in accordance with the Town of Ridgeland Water and Sewer Standard Details.

## **PART 3 - WARRANTY**

### **3.1 MATERIAL WARRANTY**

The manufacturer of materials furnished on the project shall supply to the Town of Ridgeland, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

### **3.2 CONTRACTOR WARRANTY**

The Contractor shall supply to the Town of Ridgeland one (1) year unconditional warranty. The warranty shall include materials and installation and shall constitute complete replacement and delivery to the site of materials and installation of same to replace defective materials or defective workmanship with new materials/workmanship conforming to the specifications.

**END OF SECTION 02661**

**SECTION 02662**  
**WATER TREATMENT CHEMICAL SYSTEM**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

- A. The Contractor shall furnish and install water treatment chemical system equipment systems, complete, tested and ready for operation. The work shall also include such connections, reconnections, temporary service and all other provisions in regard to the existing operation and modification as is required to perform the new work. All references to Industry Standards (ASTM, ANSI, AWWA, etc.) shall be to the latest revision unless otherwise stated. Only those materials included in these specifications and drawings and the Town of Ridgeland Standard Water and Sewer Specifications, details and testing shall be installed. All materials shall be new unless specifically called for otherwise.
- B. Shop Drawing Submittals
- Complete shop drawings, actual catalog data, brochures and descriptive literature will be required and shall meet the requirements of these specifications and the Town of Ridgeland Water and Sewer Standards. Submittals shall be in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples. The Engineer may at any time require the Contractor to provide a complete detailed shop drawing submittal for any material which may, in the Engineer's opinion, not be in compliance with these specifications and the Town of Ridgeland Water and Sewer Standards.
1. The Contractor shall submit for the approval of the Engineer four (4) copies, plus as many additional copies as he may need for his files of all shop and setting drawings and schedules required for the work.
  2. The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, resubmitting, and rechecking; no claim by the Contractor for delays arising from his failure in this respect shall be allowed.
  3. All shop drawings submitted must bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings without this stamp of approval shall not be considered and will be returned to the Contractor for resubmission. If documents vary from the requirements of the Contract Documents because of standard shop practice or other reason, the Contractor shall make mention in such letter of variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor shall not be relieved of the responsibility of executing the work in accordance with the Contract Documents even though such shop drawings have been approved.
  4. Where a shop drawing is submitted by the Contractor indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Town and which does not involve a change in Contract Price or extension of time, the Engineer will approve the drawings.
  5. The approval by the Engineer of shop drawings will be general and shall not relieve the Contractor from the responsibility for inherent error which may exist.

**PART 2 – PRODUCTS**

**2.1 MATERIALS**

- A. All material shall be free from defects impairing strength and durability, shall be of the best commercial quality for the purpose specified, and shall have structural properties sufficient to safely

sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

- B. All equipment and systems shall adhere to the SCDHEC Regulation 61-58 State Primary Drinking Water Regulations and the associated project SCDHEC permit. All materials and coatings in contact with water shall be National Sanitation Foundation NSF 61 and shall have no measurable lead content, all drinking water chemicals shall be NSF 60 certified.

C. Metering Pumps

1. Sodium Hypochlorite: Metering pump and motor shall be provided for sodium hypochlorite dosing system at Well Site #3. Metering pump system shall have 0 – 4.0 GPH at 100 PSI capacity minimum and shall be LMI Electronic Metering Pump Series C, C12 1-D60HI with 0.375" tubing & connections. System shall have adjustable capacity with a turn-down ratio of 10:1. Pump shall have internal relief valve, ball check valve on both suction and discharge side of pump. Pump shall be epoxy painted, completely assembled on a base plate and have been fully tested. Materials liquid end shall be suitable for use with sodium hypochlorite and shall allow gas in the head to be automatically relieved thus eliminating air binding.
2. Phosphate: Metering pump and motor shall be provided for phosphate (long chain linear phosphate (corrosion control)/orthophosphate) dosing system at Well Site #3. System shall have adjustable capacity with a turn-down ratio of 10:1. Pump shall have internal relief valve, ball check valve on both suction and discharge side of pump. Pump shall be epoxy painted, completely assembled on a base plate and have been fully tested. Materials liquid end shall be suitable for use with phosphate. Pump shall be LMI Chemical Metering Pump PD Series, PD751-938NI with Enhanced Controls or approved equal with capacity of 0 – 1.1 GPH at 110 psi.
3. Each chemical feed system shall include the following items: Clear PVC calibration column with vent and vented ball valve, pressure relief valve with vented ball for isolation (pressure relief valve shall discharge to pump suction piping), diaphragm protected discharge pressure gauge with vented ball for isolation, pulsation dampener with vented ball valve for isolation, back pressure valve, unions on each side of pump, vented ball valves for suction and discharge piping, wye strainer for suction piping, flushing line with quick connect on suction piping.

- D. Injection quill shall be corrosion resistant retractable injection quill. Length shall be adequately sized based on the potable water pipe. Unions and isolation valves shall be provided to ensure isolation and quill removal. The injection quill shall be easily accessible and fully removable.

E. Material Warranty

The manufacturer of materials furnished on the project shall supply to the Town of Ridgeland, a one (1) year unconditional warranty. The warranty shall be limited to the material which shall constitute complete replacement and delivery to the site of materials only to replace defective materials with new materials conforming to the specifications. This warranty is contingent upon determination of failure by a private independent testing laboratory. The testing shall prove that the failure was caused by failure of the material. The testing laboratory shall be selected by and agreed upon by both parties involved. This warranty is in addition to any warranty required for pipe linings herein before specified.

## **PART 3 – EXECUTION**

### **3.1 INSTALLATION**

- A. All materials and equipment shall be installed as shown on the Drawings and as recommended by the manufacturer.

### **3.2 INSPECTION AND TESTING**

- A. Field Tests: A qualified representative of the equipment system supplier shall inspect the installation and supervise start-up performed by the Contractor's personnel. All components of the system shall be tested for proper operation prior to and during the start-up operation. Representatives shall provide a written report to the Engineer verifying that all their equipment is properly installed and ready to start-up, prior to system start-up.
- B. Maintenance Procedures: After the equipment has been placed into operation, the qualified representative of the equipment system supplier shall instruct the Owner's personnel in proper operating and maintenance procedures without additional cost to the Owner.

**END OF SECTION 02662**

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**SECTION 02922**  
**LOAMING, SEEDING AND MULCHING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: The Contractor shall furnish all labor, materials, equipment, and incidentals necessary and place loam finish grade, seed, and maintain all seeded areas as specified herein including all areas disturbed by the Contractor's operations where solid sodding is not specifically required.

**1.2 GUARANTEE**

- A. All restoration and revegetation work shall be subject to the one (1) year guarantee period of the Contract as specified in the General Conditions of the Contract herein.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Loam (topsoil) shall be fertile, natural soil, typical of the locality, free from large stones, roots, sticks, peat, weeds and sod and obtained from naturally well-drained areas. It shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth. Topsoil stockpiled under other Sections of this Division may be used, but the Contractor shall furnish additional loam at his own expense, if required. All areas disturbed by the Contractor's operations, which are not identified to be sodded shall be seeded as specified herein, in addition to those areas delineated on the plans for seeding.
- B. Fertilizer shall be complete commercial fertilizer, 5-10-10 grade. It shall be delivered to the site in the original unopened containers each showing the manufacturer's guaranteed analysis. Store fertilizer so that when used it shall be dry and free flowing.
- C. Lime shall be ground limestone.
- D. Seed shall be from the same or previous year's crop; each variety of seed shall have a percentage of germination not less than 90, a percentage of purity not less than 85, and shall have not more than one percent weed content.
- E. Seed shall be a Scarified Argentine Bahia applied at a rate of 400 pounds per acre.
- F. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis.
- G. Mulch shall be clean small-grain straw.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Loam shall be placed to a minimum depth of 4 inches.
- B. Lime shall be applied at the rate necessary to achieve a pH of 6 to 7.
- C. Fertilizer shall be applied at the rate of 800 pounds per acre.
- D. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots, and stones larger than 2-inches shall be removed. Loam shall be spread and lightly compacted to finished grade. Compacted loam shall not be less than the depth specified. No loam shall be spread in water or while frozen or muddy.
- E. After the loam is placed and before it is raked to true lines and rolled, limestone shall be spread evenly over loam surface and thoroughly incorporated with loam. Lime shall be added in sufficient quantity to provide a soil pH of 6 to 7.
- F. Fertilizer shall be uniformly spread and immediately mixed with the upper 2-inches of topsoil.
- G. Immediately following this presentation the seed shall be uniformly applied and lightly raked into the surface. Lightly roll the surface and water with fine spray.
- H. All seeded areas shall be mulched with clean small-grain straw at a rate of 1-1/2 to 2 tons per acre. Asphalt emulsion shall be applied uniformly at a rate of 300 gallons per acre to tack the mulch, unless otherwise shown on the plans. Mechanical tacking will be considered on a case-by-case basis as approved by the Engineer.
- I. The Contractor shall keep all seeded areas watered and in good condition, reseeding if and when necessary, until a good, healthy, uniform growth is established over the entire area seeded, and shall maintain these areas in an approved condition until final acceptance of the Contract.
- J. On slopes, the Contractor shall provide against washouts by an approved method. Any washout, which occurs shall be regraded and reseeded at the Contractor's expense until good sod is established.
- K. The Contractor shall maintain the areas in grass in a neat manner by watering, mowing, raking clippings and leaves, and appurtenances until the project is completed.

**END OF SECTION 02922**

**SECTION 03100**  
**CONCRETE FORMWORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The work included in this section consists of providing all labor, materials and equipment necessary for providing and installing formwork for concrete and applies only to the Civil components of the project.
- B. Related Work Described Elsewhere:
  - 1. Concrete Reinforcement: Section 03200.
  - 2. Concrete Joints and Waterstops: Section 03262.
  - 3. Cast-in-Place Concrete: Section 03300.
  - 4. Concrete Finishing and Curing: Section 03345.
- C. General Design: The Contractor shall be responsible for the design of all formwork and for safety in its construction and removal.

**1.2 QUALITY ASSURANCE**

- A. Qualifications: Formwork shall be constructed in accordance with the specified standards, as well as all pertinent codes and regulations. Where provisions of pertinent codes conflict with the requirements of this section of these specifications, the more stringent provisions shall govern.
- B. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:
  - 1. Standard Building Code.
  - 2. ACI 347 "Recommended Practice for Concrete Formwork".
  - 3. Local Codes and Regulations.
- C. Preplacement checklist. The Contractor, as part of his Quality Control Plan, shall develop and submit for approval a Preplacement Checklist form to cover the following items:
  - 1. Reference Drawings covering the placement for all trades and disciplines.
  - 2. Date and time scheduled for placement and the actual date and time of placement.
  - 3. Foreman name, placement number, number of truckloads and number of cylinders.
  - 4. Checklist items such as embeds (list each), subgrade, rebar, forms, alignment, plumbness, etc.
  - 5. Signoff's for foreman, Contractor's Quality Control representative, each subcontractor foreman (major subs, mechanical, electrical, plumbing, etc.) and Resident Project Representative.
- D. Tolerances: Formwork shall be constructed to insure that finished concrete surfaces will be in accordance with the tolerances listed in A.C.I. 347. Camber shall be provided as necessary to compensate for anticipated deflection in formwork and concrete due to weight and pressure of fresh concrete and other construction loads.

## **SECTION 03100 CONCRETE FORMWORK**

- E. No concrete may be placed until the checklist is properly and completely signed off. Failure to comply with this provision can be grounds for rejecting the work. The checklist shall be weather protected and located with the foreman or at the foreman's station.

### **1.3 SUBMITTALS**

Materials: Submit manufacturer's literature on form ties, spreaders, corner formers, form coatings and bond breakers.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Form Lumber: Use form lumber when in contact with exposed concrete, conforming to one of the following, a combination thereof, or equivalent as approved by the Engineer.
  - 1. Lumber: Douglas Fir-Larch No. 2 grade, seasoned, surfaced on four sides.
  - 2. Plywood: "Plyform", Class I or II, bearing the label of the Douglas Plywood Association. (Minimum 3/4-inch thickness).
- B. Fiber Forms: Column forms for round columns shall be seamless fiber forms intended for this purpose. The three plies nearest to the interior surface of the form shall be deckled or scarfed and overlapped to minimize the spiral gaps or seams on the column surface.
- C. Form Ties: Use form ties which do not leave an open hole through the concrete and which permit neat and solid patching at every hole. Use embedded rods with integral waterstops and cones to provide a 1-inch breakback. Wire ties and wood spreaders will not be permitted.
- D. Form Coatings: Form release coating shall be a paraffin base oil or mineral oil coating which effectively prevents absorption of moisture, prevents bonding with concrete, is non-staining to concrete and leaves the concrete with a paintable surface.
- E. Chamfer Strips: Chamfer strips shall be polyvinyl strips or approved equal, designed to be nailed in the forms to provide a 3/4 inch chamfer (unless indicated otherwise) at exposed edges of concrete members.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Construction of Formwork: Forms shall be sufficiently strong to withstand the pressure resulting from the placement and vibration of concrete and shall be sufficiently rigid to maintain specified tolerances. Forms shall be sufficiently tight to prevent loss of mortar, and shall be adequately braced against lateral, upward or downward movement.
- B. Coating of Forms: Apply form coating to board forms prior to placing reinforcing. Keep form coatings off steel reinforcing, items to be embedded and previously placed concrete.
- C. Form Erection:
  - 1. Provide a means of holding adjacent edges and ends of panels and sections tightly together and in

## SECTION 03100 CONCRETE FORMWORK

accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects of the finished concrete. Ensure that forms may be removed without injury to the surface of the finished concrete.

2. Provide a positive means of adjustment of shores and struts. Ensure that all settlement is taken up during concrete placing.
  3. Temporary openings shall be provided in wall forms to limit the free fall of concrete to a maximum of 6 feet unless an elephant trunk is used. Such openings shall be located to facilitate placing and consolidation and shall be spaced no more than 8 feet apart. Temporary openings shall also be provided in the bottom of wall and column forms and elsewhere as necessary to facilitate cleaning and observation immediately prior to placing.
  4. Do not embed any form-tying device or part thereof other than metal in concrete.
  5. Form surfaces of concrete members except where placement of the concrete against the ground is shown on the drawings. The dimensions of concrete members shown on the drawings apply to formed surfaces, except where otherwise indicated.
- D. Formwork Reuse: Reuse only forms which maintain a uniform surface texture on exposed concrete surfaces. Apply light sanding between uses to obtain such a uniform texture. Plug unused tie rod holes with corks, shave flush, and sandpaper on the concrete surface side.
- E. Removal of Forms:
1. Forms and shoring for elevated structural slabs, girders, and/or beams shall remain in place until the concrete has reached a compressive strength equal to the specified 28-day compressive strength as determined by test cylinders. The following table indicates the minimum allowable time after the last concrete is placed before forms, shoring, and/or bracing may be removed.

<u>Structural Item</u>	<u>Minimum Allowable Time</u>
1. Bottom side of slabs girders, beams beams	When concrete reaches specified 28-day compressive strength and minimum 4-days
2. Vertical sides of girders, beams	48 hours
3. Walls not supporting vertical or horizontal loads	48 hours
4. Walls supporting vertical or horizontal loads	When concrete reaches specified 28-day compressive strength and minimum 4 days
5. Footing, pipe encasements, Pipe supports	24 hours

2. Do not remove forms from concrete, which have been placed with outside air temperature below 50 degrees Fahrenheit (°F) without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired and finished as specified.

**SECTION 03100**  
**CONCRETE FORMWORK**

- F. Formed Openings: Openings shall be of sufficient size to permit final alignment of the items within it without deflection or offsets of any kind and to allow space for packing where the items pass through the wall to ensure water tightness around openings so formed. Provide openings with continuous keyways with waterstops where required, and provide a slight flare to facilitate grouting and the escape of entrained air during grouting. Provide formed openings with reinforcement as indicated and specified. Reinforcing steel shall be at least 2 inches clear from the opening.
- G. Embedded Items: Set anchor bolts and other embedded items accurately and hold securely in position in the forms until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting. Check all nailing, blocks, plugs and strips necessary for the attachment of trim, finish and similar work prior to concreting.
- H. Pipes and Wall Spools Cast in Concrete:
1. Install wall spools, wall flanges and wall anchors before placing concrete. Do not weld, tie or otherwise connect the wall spools to the reinforcing steel.
  2. Support pipe and fabricated fittings to be encased in concrete on concrete piers or pedestals. Carry concrete supports to firm foundations so that no settlement will be possible during construction.
- I. Form Tolerances:
1. Failure of the forms to produce the specified concrete surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no cost to the Town. Comply with A.C.I. 347 if more stringent than listed herein.
  2. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	Maximum Tolerance (inches per 10 feet length)
Sleeves and Inserts	+1/3 to -1/4
Projected ends of anchors	+1/4 to -0.0
Anchor bolt setting	+1/4 to -1/4
Finished concrete, all locations	+1/4 to -1/4 in Class B +1/8 to -1/8 in Class A per Section 03300: Cast-in-Place Concrete

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and Inserts	Centerline of sleeve or insert
Projected ends of anchors	Plane perpendicular to the end of the anchor as located on the drawings
Anchor bolt setting	Centerline of anchor bolt
Finish Concrete	The concrete surface as located on the drawings.

3. Where equipment is to be installed, comply with manufacturer's tolerances if more severe than above.

END OF SECTION 03100

03100-4

Town of Ridgeland  
Well Site No. 3 Improvements

**SECTION 03200**  
**CONCRETE REINFORCEMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: This section consists of providing all labor, materials, equipment and incidentals required to install all steel bars, steel wire and wire fabric required for the reinforcement of concrete, as shown on the Drawings, and as specified herein. This section applies only to the Civil components of the project.
- B. Related Work Described Elsewhere:
  - 1. Concrete Formwork: Section 03100.
  - 2. Concrete Joints and Waterstops: Section 03262.
  - 3. Cast-in-Place Concrete: Section 03300.
  - 4. Concrete Finishing and Curing: Section 03345.
  - 5. Shop Drawings, Working Drawings, and Samples: Section 01340.

**1.2 QUALITY ASSURANCE**

Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:

- 1. Standard Building Code.
- 2. ACI 315 "Details and Detailing of Concrete Reinforcement", latest edition.
- 3. CRSI Manual of Standard Practices.
- 4. Local codes and regulations.

**1.3 SUBMITTALS**

Materials and Shop Drawings:

- 1. Submit mill test certificates identifying chemical and physical analyses for each load of reinforcing steel delivered.
- 2. Submit Shop Drawings for review in accordance with Section 01340: Shop Drawings, Working Drawings and Samples. Submit reinforcing bending lists and placing drawings for all reinforcing. Placing drawings shall indicate all openings (mechanical, electrical, equipment), including additional reinforcing at openings and intersecting wall, beam and footing arrangements as indicated on the structural drawings and specified herein. Placing drawings shall be coordinated with the concrete placing schedule. Each bending list and placing drawing submitted shall be complete for each major element of a structure (grade slabs, footings, walls, floor or beams), including all dowels and other bars as required. Furnishing such lists shall not be construed that the list will be reviewed for accuracy. The contractor shall be wholly and completely responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown on the plans and as specified.

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**CONCRETE REINFORCEMENT**

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Reinforcement shall be shipped to the work with bars of the same size and shape fastened in bundles with metal identification tags giving size and mark securely wired on. The identification tags shall be labeled with the same designation as shown on the submitted bar lists and shop drawings.
- B. All bars shall be stored off the ground and shall be protected from moisture and be kept free from dirt, oil, or injurious contaminants.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Concrete reinforcement in sizes No. 3 (3/8-inch) and larger shall be deformed steel bars of the same sizes and shapes indicated on the Drawings. The steel shall be newly rolled stock of domestic manufacture, substantially free from mill scale rust, dirt, grease, or other foreign matter. Bars shall be of intermediate grade, deformed billet steel conforming to ASTM Specification A615, Grade 60, including all supplementary requirements.
- B. Rail-steel bars will not be allowed in the work.
- C. Reinforcement shall be accurately fabricated to the dimensions indicated on the Drawings. Particular care shall be exercised not to have stirrups oversized in order to maintain proper coverage of concrete. Stirrups and tie bars shall be made around a pin having a diameter not less than two (2) times the maximum thickness of the bar. Bends for other bars shall be made around a pin having a diameter not less than five (5) times the minimum thickness of the bar except for bars larger than 1 inch, in which case the bends shall be made around a pin of eight (8) bar diameters. All bars shall be bent cold. Bars reduced in section or with kinks or bends not shown on the Drawings will not be accepted.
- D. Wire fabric shall not be allowed. Commercial grade fiber-mesh shall be used in lieu of wire fabric in all concrete sidewalks, driveways and slabs as noted on the construction drawings.
- E. Wire tie shall be 16-gauge minimum, zinc coated annealed.
- F. Bar supports in beams and slabs exposed to view after form stripping shall be galvanized or epoxy coated. Use concrete supports for reinforcing in concrete placed in grade.
- G. Coupler Splice Devices: Croweled, tension couplers capable of developing the ultimate strength of the bar as manufactured by Erico Products, Inc., Solon, Ohio, or equal and where approved by the Engineer.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. No reinforcing bars shall be welded either during fabrication or erection without prior written approval from the Engineer. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work.
- B. Unless otherwise shown on the Drawings, splices in reinforcement shall be lapped not less than 36 bar diameters. Splice all horizontal bars in circular structures with Class "C" tension splices. All bar splices shall be staggered wherever possible. When splicing bars of different diameters, the length of the lap is based on the larger bar. Unless indicated on the Drawings or where conventional lap splices cannot be achieved, full positive tension connection shall be provided. Such coupler devices shall be installed in



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accordance with the recommendations of the manufacturer.

- C. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill and rust scale, dirt, and other coatings that reduce or destroy bond. Where there is delay in depositing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.
- D. Reinforcement shall be accurately positioned as indicated on the Drawings, and secured against displacement by using zinc coated annealed iron wire ties of not less than No. 16 gauge, or suitable clips at intersections.
- E. All accessories such as chairs, chair bars, and the like are an integral part of the reinforcement and shall be furnished and installed in sufficient quantity to satisfactorily position all steel, in accordance with the latest (ACI 315) Manual of Standard Practice for Detailing Reinforced Concrete Reinforcement.
- F. Except as otherwise indicated on the Drawings, bars in slabs, beams and girders shall be spliced as per requirements in ACI 315. Splices and laps in columns, piers and struts shall be sufficient to transfer full stress by bond. Splices in adjacent bars shall be staggered if required.
- G. Except as otherwise indicated on the Drawings, reinforcement shall be installed with clearance for concrete coverage as follows:
  - 1. Footing bottoms: 3 inch.
  - 2. All other surfaces: 2 inch
- H. All slab reinforcing shall be supported on concrete cubes or wafers of the correct height. Wafers shall contain soft steel wires embedded therein for fastening to reinforcing. Wafers shall have a minimum compressive strength of 3,500 psi and shall have been cured as specified for concrete. Masonry units will not be permitted for supporting steel in bottom mats or elsewhere. For supporting the top steel in slabs, the Contractor shall furnish extra steel supports, such as channels if required, and shall construct blocks of concrete having the same quality as specified for the structure for use in supporting both top and bottom mat steel. Wood blocks, stones, brick chips, etc., cinder blocks, or concrete building blocks will not be allowed. Alternative methods for supporting top steel in slabs, such as vertical reinforcing fastened to bottom and top mats, may be used if approved by the Engineer.
- I. Alternate methods of supporting bottom reinforcement for slabs and beams not exposed to the weather (such as plastic chairs, but not plastic-tipped bolsters) may be used only if specifically approved by the Engineer.
- J. Reinforcement for vertical surfaces (beams, columns, walls) shall be properly and firmly positioned from the forms at all points by means of stainless steel (tipped) bolsters or equal, subject to Engineer's approval.
- K. Reinforcement, which is to be exposed for a considerable length of time after being placed shall be painted with a heavy coat of neat cement slurry.
- L. In no case shall any reinforcing steel be covered with concrete until the amount and position of the reinforcement has been checked by the Engineer or Town's Representative and has permission given to proceed with the concreting. The Engineer or Town's Representative shall be given a minimum of 24 hours notice of the availability of set reinforcement for checking.
- M. Do not straighten or rebend reinforcing steel in a manner that will injure the material. Do not use bars with bends not shown on the Drawings.

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- N. Place reinforcement a minimum of 2-inches clear of any metal pipe or fittings.
- O. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

**END OF SECTION**

**SECTION 03262**  
**CONCRETE JOINTS AND WATERSTOPS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: The work included in this section consists of providing all labor, materials and equipment necessary to install expansion joints, construction joints, and waterstops. This section shall apply to Civil components only.
- B. Related Work Described Elsewhere:
  - 1. Shop Drawings, Working Drawings and Samples: Section 01340.
  - 2. Concrete Formwork: Section 03100.
  - 3. Concrete Reinforcement: Section 03200.
  - 4. Cast-in-place concrete: Section 03300.
  - 5. Concrete Finishing and Curing: Section 03345.

**1.2 SUBMITTALS**

Materials:

- 1. Submit manufacturer's literature, including a statement of compliance with ASTM and U.S. Federal Specifications.
- 2. Submit materials and samples of waterstops.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Preformed expansion joint filler shall be ¾-inch thick, or as shown on the drawings, and shall be a self-expanding cork, Servicized Products, W.R. Grace and Company, Code No. 4314, or approved equal.
- B. Joint sealant for continuous immersion shall be a multi-part, gray, polyurethane sealant meeting U.S. Federal Specification TT-S-00227E (3) Type I, Class A for horizontal joints and Type II, Class A for vertical joints. Additionally, the sealant must be recommended by the manufacturer for continuous immersion in water. Products meeting this specification include PRC 270 of Products Research and Chemical Corporation and Vulkem 227 of Mameco International.
- C. Waterstops shall be extruded from a PVC compound and shall be 9-inch by 3/8-inch flat dumbbell and/or center bulb type as shown on the Drawings. Center bulb waterstops shall be used at expansion joints. Waterstops shall comply with Corps of Engineers Specification CRD-C-572. All material shall be virgin material. The uses of reworked PVC or other substitute will not be permitted.
- D. Tongue and groove joint forms: Tongue and groove joint forms shall be 24 gauge steel forms complete with steel stakes and splice plates. Forms shall be designed for joints not to receive a poured seal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

#### **A. Construction Joints:**

1. Provide construction joints where shown on the Drawings, or as recommended by the Contractor and approved by the Engineer. In case of emergency, place additional construction joints. (An interval of 45 minutes between two consecutive batches of concrete shall constitute cause for an emergency construction joint.)
2. Construction joints shall be keyed, unless otherwise detailed. Form keyways by beveled strips or boards placed at right angles to the direction of shear. Except where otherwise shown on the Drawings or specified, keyways shall be at least 1-1/2 inches in depth over at least 25 percent of the area of the section.
3. When it is necessary to make a joint because of an emergency, furnish and place reinforcing dowels across the joint. Embed dowels 48 bar diameters each side of the joint. Size and number of dowels shall match reinforcing in the member. Furnishing and placing such reinforcing steel shall be at the Contractor's expenses.
4. After the pour has been completed to the construction joint and the concrete has hardened, thoroughly clean the entire surface of the joint of surface laitance, loose or defective concrete, and foreign material, and expose clean aggregate by sandblasting the surface of construction joints before placing the new concrete. Cover horizontal construction joints with mortar. Spread uniformly and work thoroughly into all irregularities of the surface. The mortar shall be flowable and shall consist of sand, water, and a minimum of 12 sacks of cement per cubic yard. Provide positive measuring device, such as a bucket, or other device that will contain only enough mortar for depositing in one place in the wall or column to ensure that portion of the form does not receive too much mortar. Do not deposit mortar from pump hoses or large concrete buckets unless inspection windows close to the joint are available to allow visual measurement of mortar thickness and means for mortar removal are available for removal of excess grout. The water-cement ratio of the mortar in place shall not exceed that of the concrete to be placed upon it, and the consistency of the mortar shall be suitable for placing and working.

#### **B. Expansion Joints:**

1. Provide expansion joints of sizes and at locations as shown on the Drawing.
2. Place expansion joint fillers every 30 feet in straight runs of walkways, at right angle turns and wherever concrete butts into vertical services.

- C. Bonding at Construction Joints: Before depositing new concrete on or against concrete that has set, thoroughly clean the surfaces of the set concrete so as to expose the coarse aggregate and remove laitance coatings, foreign matter and loose particles. Retighten forms. Dampen, but do not saturate the hardened concrete of joints and then thoroughly cover with a coat of cement grout of similar proportions to the mortar in the concrete. Place the fresh concrete before the grout has attained its initial set.

- D. Time Between Pours: At least two (2) hours shall elapse after depositing concrete in columns or walls before depositing in beams, girders or slabs supported thereon. Place beams, girders, brackets, column capitals and haunches monolithically as part of the floor or roof system.

- E. Joint Sealants: Joint sealants shall be required where indicated on the Drawings. Preparation of surfaces,

priming and the handling and preparation of materials shall be in complete compliance with the manufacturer's instructions as approved.

F. Waterstops:

1. Waterstops shall be properly heat spliced at ends and intersections to ensure continuity. Construct forms for construction joints in such a manner as to prevent injury to waterstops. Hold waterstops securely in position in the construction joints by wire ties, continuous bars, and rings as required. Install waterstops in construction joints in hydraulic structures, which will contain liquid or resist the entry of groundwater.
2. Make field splices with a thermostatically controlled heating iron in conformance with the manufacturer's current recommendations. Allow at least 10 minutes before pulling or straining the new splice in any way. The finished splices shall provide a cross section that is dense and free of porosity with tensile strength of not less than 80 percent of the unspliced materials. Where prefabricated intersections such as tees, crosses, and elbows are available, provide them in lieu of field-fabricated intersections.

**END OF SECTION 03263**

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**SECTION 03300**  
**CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: The work included in this Section consists of providing cast-in-place concrete and applies to Civil components only.
- B. Related Work Described Elsewhere:
  - 1. Shop Drawings, Working Drawings and Samples: Section 01340.
  - 2. Concrete Formwork: Section 03100.
  - 3. Concrete Reinforcement: Section 03200.
  - 4. Concrete Joints and Waterstops: Section 03262.
  - 5. Concrete Finishing and Curing: Section 03345.

**1.2 QUALITY ASSURANCE**

- A. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the requirements of the following standards:
  - 1. Standard B.
  - 2. Local Codes and Regulations.
  - 3. ACI 318-83, Building Code Requirements for Reinforced Concrete.
- B. Plant Qualification: Plant equipment and facilities shall meet all requirements of the Check List for Certification of Ready Mixed Concrete Production Facilities of the National Ready Mixed Concrete Association and ASTM C-94.
- C. Evaluation and Acceptance of Concrete: Evaluation and acceptance of concrete will be in accordance with ACI-318, Chapter 4.

**1.3 SUBMITTALS**

Materials and Shop Drawings: The following information shall be submitted for approval. No concrete shall be furnished until submittal has been approved.

- 1. Plant Qualification: Satisfactory evidence shall be submitted indicating compliance with the specified qualification requirements.
- 2. Materials: Satisfactory evidence shall be submitted indicating that materials to be used, including cement, aggregates and admixtures meet the specified requirements.
- 3. Design Mix: The design mix to be used shall be prepared by qualified persons and submitted for approval. The design of the mix is the responsibility of the Contractor subject to the limitations of the Specifications. Approval of this submission will be required only as minimum requirements of the Specifications have been met. Such approval will in no way alter the responsibility of the Contractor

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**CAST-IN-PLACE CONCRETE**

to furnish concrete meeting the requirements of the Specifications relative to strength and slump.

4. Ready Mix Concrete: Provide delivery tickets or weigh-masters certificate per ASTM C-94, including weights of cement and each size aggregate, amount of water in the aggregate, and amount of water added at the plant. Write in the amount of water added on the job.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

A. Cement

1. Cement for all concrete shall be domestic Portland cement that conforms to the requirements of ASTM Designation C-150 Type I, Type II or Type III. All storm sewer manholes, inlets, wet wells, pumping stations, tanks and structures exposed to stormwater shall be constructed with Type II cement. Type III cement for high early strength concrete shall be used only for special locations and only with the approval of the Engineer. Type I cement may be used for buildings and tremie concrete.
2. Only one brand of cement shall be used in any individual structure unless approved by the Engineer. Cement, which has become damaged, partially set, lumpy or caked, shall not be used and the entire contents of the sack or container, which contains such cement, will be rejected. No salvaged or reclaimed cement shall be used.

B. Aggregates

1. ASTM C-33. Coarse aggregates shall be size No. 67 (3/4-inch). Block cell fill shall be size #8.
2. In addition to requirements of ASTM C-33 for structures exposed to stormwater the following shall apply:
  - a. Soft particles: 2.0 percent.
  - b. Chert as a soft impurity (defined in Table 3 of ASTM C-33): 1.0 percent.
  - c. Total of soft particles and chert as a soft impurity: 2.0 percent.
  - d. Flat and elongated particles (long dimension greater than 5 times short dimension): 15.0 percent.

C. Water: Clean and free from injurious amounts of deleterious materials.

D. Air Entraining Admixture: ASTM C-260.

E. Water Reducing and Retarding Admixtures:

1. For concrete without superplasticizer: ASTM C-494, Type D, and shall not contain more than 1 percent calcium chloride by weight of cement.
2. For concrete with superplasticizer (all Type II cement mixes):
  - a. ASTM C-494, Type F or G. The admixture shall be a second-generation type, free of chlorides and alkalis (except for those attributable to water) and composed of a synthesized sulfonated complex polymer. The concrete shall be capable of maintaining its rheoplastic state in excess of two (2) hours if necessary. Superplasticizers admix shall be induced at the batch plant only, job



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site redosage shall not be permitted without prior approval from the Engineer.

b. Approved Materials:

- (1) Rheobuild 716 as manufactured by MAC-USA, Inc., Boca Raton, Florida, telephone: (407) 368-0121 or Rheobuild 716 as manufactured by Master Builders Technologies, Cleveland, Ohio, 44122 (216) 831-5500.
- (2) Daracen 100 as manufactured by W.R. Grace & Co. Construction Products Division, Pompano Beach, Florida, telephone: (305) 974-6700.

- c. Manufacturer's job site representative: A competent field service representative from the manufacturer of each of the admixtures (superplasticizer) selected for use shall be available at the job site to provide advice and consultation on the use of the admixture materials, including the effect on the concrete in place. The representative shall be available on short call at any time requested by the Town, Contractor, or concrete producer.
- d. Manufacturer's representative will be responsible to recommend maximum discharge time for superplasticizer and to recommend method and procedure to induce superplasticizer into mixer.
- e. Manufacturer's representative will be responsible to recommend quantities of admixtures to be used if variations are required because of temperature/humidity, wind, or other environmental considerations.

F. Curing Compound: ASTM C-309, Type 2, Class B. The compound shall contain no ingredient, which will adversely affect the bond of coatings or toppings.

1. Curing compound for exposed concrete not to receive special finishes, protective coatings and/or concrete toppings shall be "Super Rez-Seal", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.
2. Curing compound for exposed concrete to receive special finishes, protective coatings and/or concrete toppings shall be "Kurez-DR", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.

G. Mortar for Repair of Concrete: Mortar used for repair of concrete shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one (1) part cement to two and one-half (2-1/2) parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

H. Burlap Mats: Conform to AASHTO Specification M182.

I. Epoxy Bonding Agent: Sikastix 370, Sikadur 32 Hi Mod, Concrecive 1001-LPL or equal.

**2.2 MIXES**

A. General Requirements:

1. Mix Design: Proportioning shall be on the basis of field experience and/or trial mixtures as specified in ACI-318, Section 4.3. Data on consecutive compression tests and standard deviation shall be submitted. Proportioning for small structures may be by the water/cement ratio under special approval by the Engineer. Concrete mix design shall comply with the Standard Building Code requirements.

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2. Air Content: 6 percent plus or minus 1 percent (Class A and B).
  3. Slump: 4 inches plus or minus 1 inch (Class A and B) without superplasticizer.  
8 inches plus or minus 1 inch for concrete with superplasticizer.  
6 inches plus or minus 1 inch for tremie concrete.
  4. Water cement ratio = 0.45 (Class A Concrete) without superplasticizer.  
= 0.55 (Class B Concrete) without superplasticizer.  
= 0.37 Concrete with superplasticizer.
  5. Minimum Compressive Strength at 28 days:
    - a. Class A, 4,000 psi Stormwater structures inclusive of tanks, ditches, pumping station, tremie concrete and other structures in contact with stormwater, building structures.
    - b. Class B, 3,000 psi Slab on grade, encasements, thrust blocks, and pipe supports, concrete curbs, concrete driveways, fills and sidewalks, etc. not in contact with storm waters.
- B. Production of Concrete:
1. General: Concrete shall be ready mixed and shall be batched, mixed and transported in accordance with ASTM C-94, except as otherwise indicated.
  2. Air Entraining Admixture: Air entraining admixture shall be charged into the mixture as a solution and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water.
  3. Water Reducing and Retarding Admixture: Water reducing and retarding admixture shall be added and measured as recommended by the manufacturer. The addition of the admixture shall be separate from the air-entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Admixtures shall be stored, handled and batched in accordance with the recommendation of ACI-68.
- C. Delivery Tickets: In addition to the information required by ASTM C-94, delivery tickets shall indicate the cement content and the water/cement ratio.
- D. Temperatures: The temperature of the concrete upon delivery from the truck shall not exceed 90 degrees Fahrenheit (°F); otherwise ice shall be used to reduce the temperature of the concrete as recommended by ACI.
- E. Modifications to the Mix: No modifications to the mix shall be made in the plant or on the job which will decrease the cement content or increase the water-cement ratio beyond that specified. No modifications of any kind shall be made except by a qualified and responsible representative of the concrete producer.

**PART 3 - EXECUTION**

**3.1 PREPARATION**

- A. Preparations Before Placing: No concrete shall be placed until the approval of the Engineer has been received. Approval will not be granted until forms are thoroughly clean and reinforcing and all other items required to be set in concrete have been placed and thoroughly secured. The Engineer shall be notified a minimum of 24 hours before concrete is placed.

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**B. Conveying:**

1. General: Concrete shall be handled from the truck to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients to maintain the quality of the concrete. No concrete shall be placed more than 90 minutes after mixing has begun for that particular batch.
2. Buckets and Hoppers: Buckets and hoppers shall have discharge gates with a clear opening equal to no less than one-third (1/3) of the maximum interior horizontal area, or five times the maximum aggregate size being used. Side slopes shall be no less than 60 degrees. Controls on gates shall permit opening and closing during the discharge cycle.
3. Runways: Extreme care shall be exercised to avoid displacement of reinforcing during the placing of concrete.
4. Elephant Trunks: Hoppers and elephant trunks shall be used to prevent the free fall of concrete for more than 6 feet.
5. Chutes: Chutes shall be metal or metal lined, and shall have a slope not exceeding one vertical to two horizontal, and not less than one vertical to three horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used only if they discharge into a hopper before distribution.
6. Pumping Equipment: Pumping equipment and procedures, if used, shall conform to the recommendations contained in the report of ACI Committee 304 on "Placing Concrete by Pumping Methods", ACI 304.2R-71. The specified slump shall be measured at the point of discharge. The loss of slump in pumping shall not exceed 1-1/2 inches.
7. Conveying Equipment Construction: Aluminum or aluminum alloy pipe for tremies or pump lines and chutes, except for short lengths at the truck mixer shall not be permitted.
8. Cleaning: Conveying equipment shall be cleaned at the end of each concrete operation.

**3.2 APPLICATION**

**A. Placing:**

1. General: Concrete shall be deposited continuously, or in layer of such thickness (not exceeding 2 feet in depth) that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams and planes of weakness.
2. Supported Elements: At least two (2) hours shall elapse after depositing concrete in columns or walls before depositing in beams, girders, or slabs supported thereon.
3. Segregation: Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not be subjected to procedures, which will cause segregation, e.g., excessive vibration, pouring concrete into standing water, etc.
4. Concrete Under Water: All concrete, except that indicated on the Drawings as Tremie concrete, shall be placed in the dry.
5. Concrete Fill and Tank Bottom Slab: Concrete fill for tank bottoms, where shown on Drawings, shall

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be placed within the tolerances described in this Section and as per equipment manufacturer's recommendations.

**B. Seals and Tremie Concrete:**

1. General:
  - a. Wherever practicable, all foundation excavations shall be dewatered and the concrete deposited in the dry. Where conditions are encountered which render it impracticable to dewater the foundation before placing concrete, a concrete foundation seal shall be placed. The foundation shall then be dewatered, and the balance of the concrete placed in the dry.
  - b. When seal concrete is required to be placed, the satisfactory performance of the seal in providing a watertight excavation for placing structural concrete shall be the responsibility of the Contractor. Seal concrete placed by the Contractor, which subsequently fails to perform properly, shall be repaired as necessary to perform its required function, at the expense of the Contractor.
2. Method of Placing: Concrete deposited under water shall be carefully placed in the space in which it is to remain by means of a tremie, a closed-bottom dump bucket of not less than one cubic yard capacity, or other approved method, and shall not be disturbed after it is deposited. All seal concrete shall be deposited in one continuous pour. No concrete shall be placed in running water. All formwork designed to retain concrete under water shall be watertight, and the design of the form work and excavation sheeting shall be by a Professional Engineer, registered in the State of South Carolina.
3. Use of Tremie: The tremie shall consist of a tube having a minimum inside diameter of 10 inches, and shall be constructed in sections having tight joints. No aluminum parts which have contact with the concrete will be permitted. The discharge end shall be entirely seated at all times and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper the tremie shall be slightly raised (but not out of the concrete at the bottom) until the batch discharges to the bottom of the hopper, after which the flow shall be stopped by lowering the tremie. The means of supporting the tremie shall be such as to permit the free movement of the discharge end over the entire top surface of the work, and shall permit it being lowered rapidly when necessary to choke off or retard the flow. The flow shall preferably be continuous and in no case shall be interrupted until the work is completed. Special care shall be exercised to maintain still water at the point of deposit.
4. Use of Bottom-dump Bucket: When the concrete is placed by means of a bottom-dump bucket, the bucket shall be lowered gradually and carefully until it rests upon the concrete already placed. The bucket shall then be raised very slowly during the discharge travel; the intent being to maintain, as nearly as possible, still water at the point of discharge and to avoid agitating the mixture. Aluminum buckets will not be permitted.
5. Time of Beginning Pumping: Pumping to dewater a sealed cofferdam shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure, and in no case earlier than 72 hours after placement of the concrete.

**C. Consolidating Concrete:**

1. General: Concrete shall be consolidated by means of internal vibrators operated by competent workmen.
2. Vibrators: Vibrators shall have a minimum head diameter of at least 2 inches, a minimum centrifugal force of 700 and a minimum frequency of 8,000 vibrations per seconds.

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3. Vibrators for Confined Areas: In confined areas, the specified vibrators shall be supplemented by others having a minimum head diameter of 1-1/2 inches, a minimum centrifugal force of 300 pounds and a minimum frequency of 9,000 vibrations per second.
  4. Space Vibrator: One space vibrator for each three in use shall be kept on the site during all concrete placing operations.
  5. Use of Vibrators: Vibrators shall be inserted and withdrawn at points approximately 18 inches apart. The duration of each insertion shall be from 5 to 15 seconds. Concrete shall not be transported in the forms by means of vibrators.
- D. Protection: Rainwater shall not be allowed to increase the mixing water, or to damage the surface finish. Concrete shall be protected from construction overloads. Design loads shall not be applied until the specified strength has been attained, as indicated by test cylinders.
- E. Construction Joints: Except as otherwise indicated on the Drawings, horizontal construction joints shall be provided at top of foundation members and slabs on grade and at the soffit of supported slabs and beams. Other horizontal and vertical construction joints shall be located as indicated on the Drawings. Joints will not be permitted except in the locations shown, unless recommended by the Contractor and approved by the Engineer.
- F. Bonding: Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coating, foreign matter and loose particles. Forms shall be retightened. The hardened concrete of joints shall be dampened, but not saturated, and then thoroughly covered with a coat of cement grout of similar proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 1/2-inch thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained its initial set.
- G. Embedded Items: In addition to steel reinforcement, pipes, inserts and other metal objects as shown, specified or ordered shall be built into, set in or attached to the concrete. All necessary precautions shall be taken to prevent these objects from being displaced, broken or deformed. Before concrete is placed, care shall be taken to determine that all embedded parts are firmly and securely fastened in place as indicated. They shall be thoroughly clean and free from paint or other coating, rust, scale, oil or any foreign matter. No wood shall be embedded in concrete. The concrete shall be packed tightly around pipes and other metal work to prevent leakage and to secure proper adhesion. Drains shall be adequately protected from intrusion of concrete.
- H. Bonding to Existing Surfaces: Existing concrete surfaces that are to have new concrete bonded thereto shall be cleaned of all grease, oil, dust, dirt and loose particles and coated with an epoxy bonding agent just prior to placing of the new concrete. Application of the bonding agent shall be as recommended by the manufacturer and the bonding agent shall be permitted to become tacky before the new concrete is placed. The bonding agent shall not be permitted to overlap or spill on the surfaces to be exposed after the work is completed.
- I. Repair of Surface Defects:
1. General: Surface defects, including tie holes shall be repaired immediately after form removal. The areas to be patched and an area at least 6 inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. The Engineer shall be notified prior to commencing operations.
  2. Removal of Defective Concrete: All honeycombed and other defective concrete shall be removed down to sound concrete. Edges shall be cut perpendicular to the surface or slightly under cut. Sand

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blast surfaces to receive repair.

3. Bonding Grout: Surfaces to be patched shall be thoroughly dampened and shall receive a coat of bonding grout brushed into the surface. Grout shall consist of one part cement to one part fine sand passing a No. 30 sieve. Grout shall be the consistency of thick cream.
4. Placing Patching Mortar: After the bonding grout begins to lose its water sheen, a premixed patching mortar shall be applied. Patching mortar shall be thoroughly consolidated into place and stuck off so as to leave the patch slightly higher than the surrounding surface. It shall be left undisturbed for one hour to permit initial shrinkage and then finally finished.
5. Tie Holes: After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching mortar.

- J. 1. Concrete Finishes: Complete concrete surfaces in accordance with the following schedule:

Finish

Designation

Area Applied

- |     |  |
|-----|--|
| F-1 | Exterior walls below grade not exposed to water. Repair defective concrete, fill depressions deeper than 1/2 inch and fill tie holes.  |
| F-2 | Exterior and interior walls of all structures. Repair defective concrete, remove fins, fill depressions and fill tie holes.  |
| F-3 | Walls of all structures or building exposed to public view and underside of formed floors or slabs. In addition to Finish F-2, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry within 72 hours of removing forms consisting of one part cement and one and one-half (1-1/2) parts sand by volume on the surface with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap. Apply a compatible water repellent coating. |
| S-1 | Slabs and floors not water bearing. Smooth steel trowel finish.  |
| S-2 | Slabs and floors which are water bearing. Slab surfaces on which mechanical equipment moves. Steel trowel finish free from trowel marks and all irregularities.  |
| S-3 | Slabs and floors of structures or building exposed to view. Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.   |
| S-4 | Slabs and floors at slopes greater than 10 percent. Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines perpendicular to the direction of slope drainage.  |
| S-5 | Concrete driveway slab finish shall be a smooth float surface with the light broom finish.   |
| E-1 | Exposed edges of slabs, floors and tops of walls. Finish with a 1/4-inch radius edge if a chamfer is not indicated.  |
| E-2 | Tops of walls, beams and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of formed surfaces.   |

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2. General: As soon as forms can safely be removed, all irregular projections shall be chipped off flush with the concrete surfaces. All voids produced by spacers or any honeycombing shall be pointed up with grout and troweled flush with the concrete surface immediately after removal of forms and water cured to prevent shrinkage. Honeycombing shall be cut out to expose a sound concrete surface prior to pointing. The use of mortar pointing or patching shall be confined to the repair of small defects in relatively green concrete. Where in the opinion of the Engineer substantial repairs are required, the defective concrete shall be cut out to sound concrete and repaired with gunite or the concrete shall be removed and reconstructed as directed.
  3. All concrete slabs to be troweled shall receive a floated finish. After floating, all concrete slabs except as otherwise indicated and in areas to receive roofing, insulation, tile or topping shall be troweled and immediately light broom finished. Stair treads shall receive a light broomed finish.
  4. Floated Finish: After concrete has been placed, consolidated, struck off and leveled, it shall not be worked further until water sheen has disappeared and the surface has hardened sufficiently to permit floating, the planeness of the slab shall be checked with a 10 foot straightedge applied at no less than two (2) angles. All high spots shall be cut down and all low spots shall be filled to produce a surface having a Class B Tolerance throughout. The slab shall then be refloated to a uniform sandy texture.
  5. Light Broomed Finish: After floating, slabs to receive a light broomed finish shall be power troweled and finished struck with a soft broom rag. The troweling shall produce a smooth surface, relatively free of defects and a Class A Tolerance. Before the surface sets, the soft broom drag shall be passed over the surface to produce a surface uniform in texture and appearance.
  6. Troweled Finish: After floating, slabs to receive a troweled finish shall be power troweled and finally hand troweled. The first troweling after power floating shall produce a smooth surface, relatively free of defects. Surfaces shall be hand troweled after the surface has hardened sufficiently. The final troweling shall be done by hand when a ringing sound is produced as the trowel is moved over the surfaces. Hand troweling shall produce a surface, which is thoroughly consolidated, free from trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
  7. Finishing Tolerance: Surfaces shall be true planes within the following limits:
    - a. Class A: 1/8-inch in 10-feet as determined by a 1-foot straightedge placed anywhere on the slab in any direction.
    - b. Class B: 1/4-inch in 10-feet is determined by a 10-foot straightedge placed anywhere on the slab in any direction.
- K. Saw Cut Joints: Joints that are to be saw cut shall be cut not sooner than 2 hours after the concrete is poured and not later than 8 hours after the pour.

**3.3 PROTECTING**

- A. Curing:
1. Immediately after surface defects have been repaired, all exposed surfaces, including slabs, walls, beams and columns shall receive a spray coat of curing compound applied in accordance with the manufacturer's recommendations. Exposed steel keyways and other embedded items shall be protected from the curing compound. Concrete surfaces to be exposed to stormwater and are to be coated with an epoxy system, shall be cured by the wet burlap method. Structures that are to be partially exposed to stormwater and concrete floors requiring a bond for special finishes shall also be

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cured by the wet burlap method. Curing compounds shall not be used on surfaces to be exposed to stormwater.

2. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.
  3. Curing compound shall be applied in accordance with manufacturer's instructions. Should the film become damaged from any cause within the required curing period, the damaged portions shall be repaired immediately with additional compound. Upon removal of forms, the newly exposed surfaces shall immediately be coated to provide a curing treatment equal to that provided for the surface.
- B. Wet Burlap Curing Method: All concrete, for stormwater/water retaining structures to be cured by the wet burlap method. All concrete shall be covered with a double thickness of burlap, cotton mats, or other approved material kept thoroughly saturated with water. The forms shall be kept wet until removed and upon removal, the curing specified herein shall be started immediately. Concrete shall be cured for a period of 7 days for normal Portland cement or 4 days for high early strength cement. Concrete poured in the dry shall not be submerged until it has attained sufficient strength to adequately sustain the stress involved nor shall it be subjected to flowing water across its surface until it has cured 4 days. Curing the gunite shall be started as soon as possible without damaging surface and not later than 2 hours after placing.

**3.4 TESTING**

- A. A testing laboratory employed by the Contractor and approved by the Town will make such tests required. The Contractor shall pay for all tests.
- B. Standard laboratory compressive test cylinders will be obtained by the laboratory when concrete is discharged at the point placing (i.e., discharge end of pumping equipment), and cylinders will be made and cured in accordance with the requirements of ASTM Designation C-31. A set of five (5) cylinders will be obtained for each 50 cubic yards, or fraction thereof placed each day, for each type of concrete. The cylinders will be cured under laboratory conditions and will be tested in two groups of two (2) at 7 and 28 days of age, with one (1) group held until released by the Engineer in accordance with the requirements of ASTM Designation C-39.
- C. The laboratory will conduct tests of Class A and Class B concrete as it is discharged from the mixer at the point of placing. Slump tests will be made for each truckload of concrete. Slump tests may be made on any batch, and failure to meet specified slump requirements will be sufficient cause for rejection of the batch. If water is added after initial test then the "load" shall be tested.
- D. Air content of the concrete mixture will be tested on every other truck in accordance with AASHTO T199.
- E. Historical strength/break data may be submitted with mix design and may be used in the approval process provided the mix design is otherwise acceptable. If the mix design requires modifications, a test batch may still be required.

**END OF SECTION 03300**



**SECTION 03345**  
**CONCRETE FINISHING AND CURING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: This section describes materials and methods of concrete finishes, curing, repair of defects and surface protection and applies to the Civil components only.
- B. Related Work Described Elsewhere:
  - 1. Concrete Formwork: Section 03100.
  - 2. Concrete Reinforcement: Section 03200.
  - 3. Concrete Joints and Waterstops: Section 03262.
  - 4. Cast-In-Place Concrete: Section 03300.

**1.2 SUBMITTALS**

Curing Compound: Submit manufacturer's statement of compliance with these specifications and recommend coverage to meet or exceed the specified tests. Submit manufacturer's application instructions.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. See Section 03300: Cast-In-Place Concrete.
- B. Curing Compound:
  - 1. Curing compound shall conform to ASTM C 309, Type 2, Class BN.
  - 2. Curing compound shall be compatible with required finishes and coatings.
  - 3. Curing compound for exposed concrete not to receive special finishes, protective coatings and/or concrete toppings shall be "Super Rez-Seal", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.
  - 4. Curing compound for exposed concrete to receive special finishes, protective coatings and/or concrete toppings shall be "Kurez-DR", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.
- C. Mortar for Repair of Concrete: Mortar used for repair of concrete shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one (1) part cement to two and one-half (2-1/2) parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.
- D. Burlap Mats: Conform to AASHTO Specification M182.
- E. Sisal-Kraft Paper and Polyethylene Sheets for Curing: Conform to ASTM C 171.

## PART 3 - EXECUTION

### 3.1 CONCRETE FINISHES

- A. Complete concrete surfaces in accordance with the following schedule:

<u>Finish Designation</u>	<u>Area Applied</u>
F-1	Exterior walls below grade not exposed to water.
F-2	Exterior and interior walls exposed to water.
F-3	Walls of structures or buildings exposed to view. Underside of formed floors or slabs.
S-2	Slabs and floors not water bearing.
S-3	Slabs and floors, which are water bearing. Slab surfaces on which mechanical equipment moves.
S-4	Slabs, beams, girders, columns, and floors of structures.
S-5	Slabs and floors at slopes greater than 10 percent.
E-1	Exposed edges of slabs, floors, and walls tops.

- B. Concrete surface repair.

1. Finish F-1: Repair defective concrete, fill depressions deeper than ½-inch, and fill tie holes.
2. Finish F-2: Repair defective concrete, remove fins, fill depressions ¼-inch or deeper, and fill tie holes.
3. Finish F-3: In addition to Finish F-2, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one (1) part cement and one-half (1/2) parts sand by damp loose volume, over the surface of clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap.
4. Finish S-2: Smooth steel trowel finish.
5. Finish S-3: Steel trowel finish free from trowel marks and all irregularities.
6. Finish S-4: Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.
7. Finish S-5: Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines parallel to the direction of slope drainage.
8. Finish E-1: Exposed edges of slabs, floors, and tops of walls, finish with a ¼-inch radius edge if a chamfer is not indicated.

### **3.2 FINISHING OF FORMED SURFACES**

- A. Water cure surfaces until finishing and repairing are completed.
- B. As soon as possible after forms are removed, remove fins and irregularities by grinding or rubbing, fill depressions deeper than specified with mortar, and fill tie holes.
- C. Ream tie holes with toothed reamers until surface of hole is rough and clean. Coat surface with epoxy bonding compound and fill with mortar.
- D. Finish tapered tie holes as follows:
  - 1. Sandblast tie rod hole and blow clean prior to filling.
  - 2. Drive rubber plug, with one end open, to the center of the hole. Plug size shall be larger in diameter than the diameter of the hole at the center of the wall.
  - 3. Coat entire annular surface of the hole with epoxy prior to filling with mortar. Apply epoxy in accordance with manufacturer's instructions.
  - 4. Fill each side of hole with mortar. Apply mortar to the "wet" side of the wall first. Consolidate mortar solidly into the hole.
  - 5. Notify Town's Representative of tie rod filling schedule.

### **3.3 REPAIR OF SURFACE DEFECTS**

- A. Remove honeycombed and other defective concrete down to sound concrete. Edges shall be perpendicular to surface. Sandblast surfaces to receive repair.
- B. Coat sandblasted surface with epoxy bonding compound.
- C. Place mortar in layers having a compacted thickness of 3/8-inch. Scratch surface of each layer to promote bonding with next layer.
- D. Finish repair shall match adjacent concrete and cure as specified.
- E. Repair defective areas of more than 1-foot square and deeper than the reinforcing steel as above, except fill the area with pneumatically applied concrete.

### **3.4 REPAIR OF CRACKED CONCRETE (REFER TO STRUCTURAL STANDARDS DETAILS)**

- A. Alternate methods of crack repair may be submitted by the Contractor for review by the Engineer and Town Project Representative.

### **3.5 CURING AND PROTECTION**

- A. Cure concrete surfaces in accordance with the following schedule:

<u>Curing Method</u>	<u>Area Permitted</u>
1.	All surfaces

2. All surfaces
3. Slabs and floors
4. All surfaces when maximum ambient temperature will not exceed 80 degrees Fahrenheit (°F) and humidity will not drop below 40 percent on the day of concrete placement and for the three days following.

Where wooden forms are used, wet them immediately before concreting and keep moist by sprinkling until removed. Keep all exposed surfaces of formed concrete moist until curing method is applied.

B. Cure concrete for not less than 14 days after placing in accordance with one of the following appropriate methods:

1. Method 1 - Water Spray Method: Tightly close off concrete surfaces to be cured by bulkheads or other means or entirely surround by tight enclosures, and keep the concrete surfaces moist by sprinkling, spraying or other means.
2. Method 2 - Wet-Burlap-Mat Method: Thoroughly wet and cover concrete surfaces to be cured with wet burlap mats as soon as the forms have been stripped or as soon as the concrete has set sufficiently to avoid marring the surface. Keep entire concrete surface and burlap continuously and completely wet during the entire curing period.
3. Method 3 - Curing Blanket Method: Thoroughly wet concrete surfaces to be cured and cover with curing blankets as soon as the concrete has set sufficiently to avoid marring the surface. The curing blankets shall be weighted to maintain close contact with the concrete surface during entire curing period. Should the curing blankets become torn or otherwise ineffective, keep surfaces moist and replace damaged sections. The curing blankets shall consist of one (1) of the following two (2) types:
  - a. Sheets of heavy waterproof sisal-kraft paper laid with the edges butted together and with the joints between strips sealed with 2-inch wide strips of sealing tape or with the edges lapped not less than three inches and fastened together with waterproof cement to form continuous watertight joints; or
  - b. Sheets of clean polyethylene, having a minimum thickness of four mils, laid with edges butted together and with the joints between sheets sealed with 1-inch wide strips of acetate tape.
  - c. During the curing period, do not permit traffic of any nature or depositing of objects, temporary or otherwise, on the curing blankets.
4. Method 4 - Curing Compound Method: Spray the surface with two (2) coats of liquid curing compound. Apply in accordance with the manufacturer's instructions to cover the surface with a uniform film, which will seal thoroughly. Apply second coat at 90 degrees of the first coat.
  - a. Apply curing compound immediately after completion of the finish on unformed surfaces and within two (2) hours after removal of forms on formed surfaces. Repair formed surfaces within the said 2 hour period; provided, however, that any such repairs which cannot be made within the said 2 hour period shall be delayed until after Method 1, 2, or 3 has been applied. When repairs are to be made to an area on which curing compound has been applied, first sandblast the area to remove the curing compound, and then repair.
  - b. Wherever curing compound may have been applied to surfaces against which concrete subsequently is to be placed and to which it is to adhere, remove the curing compound entirely by sandblasting prior to the placing of new concrete.

- c. Where the curing compound method is used, exercise care to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, repair the damaged portions immediately by the application of additional curing compound.

### **3.6 CONCRETE SURFACES TO BE COATED**

Concrete surfaces on which paints or coatings are to be applied shall be of even color, gray or gray-white. The surface shall have no pits, pockets, holes or sharp changes of surface elevation. Scrubbing with a stiff bristle fiber brush shall produce no dusting or dislodging of cement or sand.

**END OF SECTION 03345**

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## **SECTION 03600 GROUT**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. Scope of Work: The work included in this Section consists of grouting various items such as pumps and equipment baseplates and as indicated on the Drawings.
- B. Related Requirements Described Elsewhere:
  - 1. Contract Drawings.

#### **1.2 SUBMITTALS**

- A. See Section 01340 - Shop Drawings, Working Drawings, and Samples for submittal requirements.
- B. Materials and Shop Drawings: Manufacturer's literature shall be submitted for review of grout. Data shall include grout properties, mixing, surface preparation and installation instructions.

#### **1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

Grouting materials shall be delivered and stored in unbroken containers with seals and labels intact as packaged by the manufacturer.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Non-shrinking Portland cement grout mixture:
  - 1. 5.5 to 6 gallons per 94 lb. sack of Portland cement, or
  - 2. 6.5 gallons of water per 94 lb. sack of Portland Cement with 3 to 5 pounds of Bentonite, not to exceed 5% by weight.
  - 3. All adjustments to the amount of water or the use of concrete admixtures shall be approved by the Engineer and Town prior to use.
- B. Epoxy Grout.
  - 1. Adhesive: Sika "Sikadur Hi-Mod" or "Sikadur Hi-Mod Gel" or approved equal.
  - 2. Aggregate: Suitable for application as recommended by the epoxy grout manufacturer.
- C. Grout for Concrete Fill. Portland Type 1 Cement and Aggregate according to ASTM C-476.
- D. Water. Clean and free from all deleterious substances.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. All bonding surfaces shall be clean and dust and oil free.

### **3.2 NONSHRINKING GROUT**

- A. Nonshrinking grout shall be provided at all baseplates and in locations indicated on the drawings.
- B. Nonshrinking grout shall be furnished factory premixed so only water is added at the jobsite.
- C. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout.
  - 1. Preparation. The concrete foundation to receive nonshrinking grout shall be saturated with water for 24-hours prior to grouting.
  - 2. Placement. Grout shall be placed in strict accordance with the directions of the manufacturer so all spaces and cavities below the top of baseplates are completely filled without voids. Forms shall be provided where structural components of baseplates will not confine the grout.
  - 3. Edge Finishing. The grout shall be finished smooth in all locations where the edge of the grout will be exposed to view after it has reached its initial set. Edges of grout shall be cut flush at the baseplate of structural member or piece of equipment unless drawings indicate otherwise.
  - 4. Curing. Nonshrinking grout shall be protected against rapid loss of moisture by covering with wet rags or polyethylene sheets. After edge finishing is completed, the grout shall be wet cured for at least seven (7) days.

### **3.1 EPOXY GROUT**

- A. Epoxy grout shall be provided for all anchor bolts and reinforcing bars installed in hardened concrete.
- B. Epoxy resin, 50% hardener and 50% resin by volume, shall be provided in equal parts containers. Contractor shall not exceed manufacturer's recommendation for pot life.
  - 1. Preparation. Where indicated on the drawings, anchor bolts and reinforcing bars shall be epoxy grouted in holes drilled into hardened concrete. Diameters of holes shall be ¼-inch (¼") larger than the maximum dimension of the bolt head, and ½-inch (½") larger than the bar diameter. The embedment depth for epoxy grouted anchor bolts and reinforcing bars shall not be less than 10 bolt or bar diameters unless indicated otherwise on the drawings. Holes shall be prepared for grouting as recommended by the grout manufacturer.
  - 2. Installation. Anchor bolts and reinforcing bars shall be clean, dry and free of grease and other foreign matter at time of installation. The bolts and bars shall be set and positioned, and the epoxy grout shall be placed and finished in accordance with the recommendations of the grout manufacturer. Particular care shall be taken to ensure that all spaces and cavities are filled with epoxy grout, without voids.

### **3.2 INSTALLATION**

- A. Grout shall be mixed and placed as recommended by the manufacturer.
- B. All grout should be of fluid consistency; the desired slump is eight-inches (8").
- C. Whenever possible, grout should be batched, mixed, and delivered in accordance with ASTM C-94, requirements for transit mixed concrete.
- D. Grout shall be mixed as close to the work area as possible and transported quickly to its final position in a manner which will not permit segregation of materials.
- E. When a batch mixer is used on the job site, all materials should be mixed thoroughly for at least five (5) minutes.
- F. Grout which has not been placed 1½ hours after water is first added should be discarded.

**END OF SECTION 03600**



**SECTION 005500**  
**MISCELLANEOUS METALS**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required and install all miscellaneous metal complete as specified herein.

**1.2 SUBMITTALS**

- A. Submit to the Engineer, in accordance with Division 01 – General Requirements and Section 01340 - Submittals showing materials of construction and details of installation for:
  - 1. Shop drawings, showing sizes of members, method of assembly, anchorage and connection to other members.
  - 2. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement, procedure, and instructions for safe handling of anchoring systems.
- B. Samples
  - 1. Submit samples as requested by the Engineer during the course of construction.
- C. Design Data
  - 1. Submit calculations or test data demonstrating that any railings will resist the loads specified in the South Carolina Building Code at the post spacing provided.
  - 2. Submit manufacturer's load and deflection tables for grating.
- D. Test Reports
  - 1. Current test data or ICC Evaluation Report for concrete and masonry drilled anchors.
  - 2. Passivation method for stainless steel members.
- E. Certificates
  - 1. Submit certification that any railing systems are in compliance with OSHA requirements and the South Carolina Building Code.
  - 2. Submit certificates that welders have been qualified under AWS, within the previous 12 months, to perform the welds required under this Section.

**1.3 REFERENCE STANDARDS**

- A. Aluminum Association (AA)
  - 1. AA M31C22A41
    - a. M31: Mechanical Finish, Fine Satin

- b. C22: Finish, Medium Matte
- c. A41: Clear Anodic Coating, Class I

B. American Society for Testing and Materials (ASTM)

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A48 - Standard Specification for Gray Iron Castings.
3. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
4. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality.
5. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
6. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
7. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
8. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
9. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
10. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
11. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
13. ASTM A536 - Standard Specification for Ductile Iron Castings.
14. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
15. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
16. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
17. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
18. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

- C. American Iron and Steel Institute (AISI).
  - 1. Specification for Structural Steel Buildings.
- D. American Welding Society (AWS)
  - 1. AWS D1.1 - Structural Welding Code Steel.
  - 2. AWS D1.2 - Structural Welding Code – Aluminum
  - 3. AWS D1.6 - Structural Welding Code - Stainless Steel
- E. Federal Specifications
  - 1. FS-FF-B-575C - Bolts, Hexagonal and Square
- F. Occupational Safety and Health Administration (OSHA)
- G. South Carolina Building Code. (FBC)
- H. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### **1.4 QUALITY ASSURANCE**

- A. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.
- B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.
- C. All welding shall be performed by AWS certified welders. Welding of steel shall conform to AWS D1.1, welding of aluminum shall conform to AWS D1.2, and welding of stainless steel shall conform to AWS D1.6.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.
- B. Repair items which have become damaged or corroded to the satisfaction of the Engineer prior to incorporating them into the work.

#### **1.6 PROJECT/SITE REQUIREMENTS**

- A. Field measurements shall be taken at the site, prior to fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

- B. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

## 2.2 MATERIALS

- A. Unless otherwise noted, materials for miscellaneous metals shall conform to the following standards:

- |     |   |   |  |
|-----|---|---|--|
| 1.  | Structural Steel                                      | ASTM A36  |  |
| 2.  | Structural Steel Tubing                               | ASTM A500, Grade B  |  |
| 3.  | Welded and Seamless Steel Pipe                        | ASTM A501 or ASTM A53, Type E or S, Grade B Schedule 40. Use standard malleable iron fittings, galvanized for exterior work |  |
| 4.  | Steel Sheets  | ASTM A366   |  |
| 5.  | Gray Iron Castings                                    | ASTM A48, Class 35  |  |
| 6.  | Ductile Iron Castings                                 | ASTM A536, Grade 65-45-12   |  |
| 7.  | Aluminum Extruded Pipe                                | ASTM B429, Alloy 6063 T6  |  |
| 8.  | Aluminum Extruded Shapes                              | ASTM B221, Alloy 6061 T6  |  |
| 9.  | Aluminum Sheet and Plate                              | ASTM B209, Alloy 6061 T6  |  |
| 10. | Stainless Steel Plates, Sheets, and Structural Shapes |   |  |
|     | a. Exterior, Submerged or Industrial Use              | ASTM A167, Type 316 (Type 316L for welded)  |  |
|     | b. Interior and Architectural Use                     | ASTM A167, Type 316   |  |
| 11. | Stainless Steel Bolts, Nuts, and Washers              | ASTM A276, Type 316   |  |
| 12. | Carbon Steel Bolts and Studs                          | ASTM A307, Grade A (hot dip galvanized nuts and washers where noted)  |  |
| 13. | High Strength Steel Bolts, Nuts and washers           | ASTM A325 (mechanically galvanized per ASTM B695, Class 50, where noted)  |  |
|     | a. Elevated Temperature Exposure                      | Type I  |  |
|     | b. General Application                                | Type I or Type II   |  |
| 14. | Galvanizing   | ASTM A123, Zn w/0.5% minimum Ni   |  |
| 15. | Galvanizing, hardware                                 | ASTM A153, Zn w/0.5% minimum Ni   |  |

## 2.3 MISCELLANEOUS ALUMINUM

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Welding shall be on the unexposed side as much as possible in order to prevent pitting or discoloration of the aluminum exposed surface. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous aluminum items shall include: beams, angles, closure angles, grates, hatches, floor plates, stop plates, stair nosings, and any other miscellaneous aluminum called for (Engineer coordinate with Designer) and not otherwise specified.
- D. Angle frames for hatches, beams, grates, etc, shall be complete with welded strap anchors attached.
- E. Aluminum diamond plate and floor plate shall have a minimum thickness of 3/8-in. Frames and supports shall be of aluminum construction. Fastening devices and hardware shall be Type 316 stainless steel. Plates shall have a mill finish.
- F. Stair treads for aluminum stairs shall have abrasive non-slip nosing as approved.
- G. Aluminum nosing at concrete stairs shall be Wooster Products, Inc.; Alumogrit Treads, Type 116; similar by Barry Pattern & Foundry Co.; Andco or equivalent. Furnish with wing type anchors and flat head stainless steel machine screws, 12-in on center. Nosing shall also be used at concrete ladder openings. Nosing shall a single piece for each step extending to within 3-in at each side of stair or full ladder width. Set nosing flush with stair tread finish at concrete stairs. Furnish treads with heavy duty protective tape cover.
- H. Miscellaneous aluminum items shall have a cleaned and degreased Class I anodized finish.

## 2.4 MISCELLANEOUS STEEL

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous steel items shall include: beams, angles, lintels, metal stairs, support brackets, base

plates for other than structural steel or equipment, closure angles, bridge crane rails, monorail hoist beams, hold down straps and lugs, door frames, splice plates, subframing at roof openings and any other miscellaneous steel called for and not otherwise specified.

- D. Structural steel angle and channel door frames shall be shop coated with primer. Frames shall be fabricated with not less than three anchors on each jamb.
- E. Steel pipe pieces for sleeves, lifting attachments and other functions shall be Schedule 40 pipe unless otherwise specified. Wall and floor sleeves, of steel pipe, shall have welded circumferential steel waterstops at mid-length.
- F. Lintels, relief angles or other steel supporting masonry or embedded in masonry shall be shop coated with primer.
- G. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust and foreign matter and shall be given one shop coat of primer compatible with the finish coat after fabrication but before shipment. Paint shall be omitted within 3-in of proposed field welds. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces.
- H. Galvanizing shall be the hot-dip zinc process after fabrication. Coating shall be not less than 2 oz/sq ft of surface.
- I. Interior Metal Stud Wall Framing;  
Minimum 16 gauge metal studs for load bearing walls.  
Minimum 20 gauge metal studs for non-load bearing walls.  
Minimum 16 gauge metal studs for any exterior framed walls.
- J. All free standing walls must be braced at the top every 6 foot max. and every 4 foot min.
- K. Metal furring shall be fastened maximum of 24-inch O.C. vertically while maintaining 16-inch O.C. spacing.
- L. All framing will maintain 16-inch O.C. spacing.

## **2.5 MISCELLANEOUS STAINLESS STEEL (TYPE 316)**

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.
- B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Grind smooth continuous welds that will be exposed. Provide holes for temporary field connections and for attachment of the work of other trades.
- C. Miscellaneous stainless steel items shall include: beams, angles, bar racks and any other miscellaneous stainless steel called for and not otherwise specified.
- D. If so noted in the Drawings, miscellaneous stainless steel items shall receive two coats of an exterior coating of "moisture cured aluminized urethane" or epoxy paint as specified. Moisture

cured (aluminum and primers, grey or silver color), Sherwin Williams or "Wasser MC-Aluminum" or approved equal. Surface preparation shall be in accordance with paint manufacturer's recommendation and Section 09900 Protective Coatings.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install all items except those to be embedded in concrete which shall be installed per the requirements of the Structural Drawings. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted.
- B. Abrasions in the shop primer shall be touched up immediately after erection. Areas left unprimed for welding shall be painted with primer after welding.
- C. Zinc coating which has been burned by welding, abraded, or otherwise damaged shall be cleaned and repaired after installation. The damaged area shall be thoroughly cleaned by wire brushing and all traces of welding flux and loose or cracked zinc coating removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint conforming to the requirements of Military Specifications MIL-P-15145. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.
- D. Specialty products shall be installed in accordance with the manufacturer's recommendations.
- E. Expansion bolts shall be checked for tightness a minimum of 24 hours after initial installation.
- F. Install adhesive capsule anchors using manufacture's recommended drive units and adapters and in compliance with the manufacturer's recommendations.
- G. Headed anchor studs shall be welded in accordance with manufacturer's recommendations.
- H. All railings shall be erected to line and plumb.
- I. All steel surfaces that come into contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.
- J. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.
- K. Where aluminum contacts masonry or concrete, apply a heavy coat of approved alkali resistant paint to the masonry or concrete.
- L. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.
- M. Between aluminum grating, aluminum stair treads, or aluminum handrail brackets and steel supports, insert 1/4-in thick neoprene isolator pads, 85 plus or minus 5 Shore A durometer, sized for full width and length of bracket or support.
- N. Stainless Steel:
  - 1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.

2. After installation, visually inspect stainless steel surfaces for evidence for iron rust, oil, paint, and other forms of contamination.
3. Remove contamination using cleaning and passivation methods in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

**END OF SECTION 05500**



## **SECTION 09900 PROTECTIVE COATINGS**

### **PART 1 - GENERAL**

#### **1.1 SCOPE OF WORK**

- A. This specification defines the methods of surface preparation, coating systems, and methods of application for painting as outlined herein.
- B. The work includes painting/coating and finishing of interior and exterior exposed items above and below grade surfaces, such as structural steel, interior and exterior block walls miscellaneous metals, ceilings, walls, floors, doors, frames, pipe, fittings, valves, pumps, tanks, equipment, and all other work obviously required to be painted/coated unless otherwise specified herein. The omission of minor items in the schedule of work shall not relieve the contractor of his obligation to include such items where they come within the general intent of the specification as stated herein.
- C. The Contractor shall furnish all supervision, labor, tools, materials, equipment, scaffolding or other structures, and supervision required for the transportation, unloading, storage, and application of the paint/coating and associated products covered by this specification.
- D. The Contractor or subcontractor shall be certified and licensed for painting/coating and shall have a minimum of five (5) years of experience of similar projects in the State of South Carolina.
- E. The Contractor shall perform surface preparation and application of the painting/coating strictly as specified herein or recommended by the Painting/Coating Manufacturer or the Manufacturer's Representative for each item as specified herein or elsewhere.
- F. The following items will not be painted/coated:
  - 1. Any code requiring labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
  - 2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.
  - 3. Aluminum handrails, walkways, windows, louvers, and grating unless otherwise specified herein or elsewhere.
  - 4. Stainless steel work.
  - 5. Signs and nameplates.
  - 6. Finish hardware.
  - 7. Products with polished chrome or nickel finish.
  - 8. Plastic switch plates and receptacle plates.
  - 9. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
  - 10. Sprinkler heads.
- G. All work shall be done in strict accordance with this specification, Contract Documents, and the painting package, including manufacturer's printed instructions.
- H. The Contractor will obtain, at its own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules, and regulations promulgated by authorities having jurisdiction, which may bear on the work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970."

- I Surfaces to be painted: (Refer to Section 3.11 Coating Systems Schedule for description of surfaces to be painted/coated, preparation, and their specified coating systems and colors).

## **1.2 DEFINITIONS**

- A Field Painting: is the painting of new or rebuilt items at the job site. Field painting shall be the responsibility of the Contractor.
- B Shop Painting: is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.
- C Abbreviations and Terms:
  - 1. SSPC - Society for Protective Coatings
  - 2. ASTM - American Society of Testing Materials
  - 3. NACE - National Association of Corrosion Engineers
  - 4. NSF - National Sanitation Foundation (Standard 61)
  - 5. AWWA - American Water Works Associates (AWWA D102-97)
  - 6. ICRI - International Concrete Repair Institute
  - 7. CSP - Concrete Surface Profile (1-9)
  - 8. Exterior - outside, exposed to weather
  - 9. Interior Dry - inside, not subject to immersion service
  - 10. Interior Wet - inside, subject to immersion service

## **1.3 RESOLUTION OF CONFLICTS**

- A It shall be the responsibility of the General Contractor to arrange a meeting prior to the start of painting/coating between the Contractors, the Painting/Coating Manufacturer, whose products are to be used, Owner, and Owner's Representative. All aspects of surface preparation, application and coating systems as specified herein will be reviewed at this meeting.
- B Clarification shall be requested promptly from the Owner's Representative when instructions are lacking, conflicts occur in the specification, or the procedure seems improper or inappropriate for any reason.
- C It shall be the responsibility of the Painting/Coating Manufacturer to have their factory representative meet in person with the Contractor and Owner's Representative a minimum of three (3) times during the job as a consultant on surface preparation, mil thickness of coating and proper application of coating unless meeting is determined to be unnecessary by the Owner's Representative.

## **1.4 INSPECTION OF SURFACES**

- A Before application of the prime coat and each succeeding coat, all surfaces to be coated shall be subject to inspection by the Owner's Representative or the coating manufacturer. Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.
- B Samples of surface preparation and of painting systems shall be furnished by the Contractor to be used as a standard throughout the job, unless omitted by the Owner's Representative.
- C When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the Painting/Coating Manufacturer or their factory representative, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of manufacturer's printed instructions shall be followed.
- D Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" "Positest" Coating Thickness Gauge (or equal) for ferrous metal or an OG232 "Tooke" Paint Inspection gauge (or equal) for non-ferrous and cementitious surfaces. Please note that use of the "Tooke" gauge is classified as a destructive test and repairs due to testing shall be performed by

the Contractor. Thickness testing shall be performed in the presence of the owner's representative.

- E. Prior to coating and if more than two days has elapsed between coats, the surface shall be testing for chloride contamination. See section 3.09 for testing requirements.

## **1.5 EQUIPMENT**

- A. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practical from the compressor.
- B. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in first-class condition and shall comply with recommendations of the painting/coating manufacturer.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Tnemec Company, Inc. - 6800 Corporate Drive, Kansas City, MO 64120
- B. Carboline Company - 2150 Schuetz Road, St. Louis, MO 63146
- C. Corrocoat - 6525 Greenland Road, Jacksonville, FL 32258
- D. Sherwin Williams - [Water & Wastewater System Guide](#)

### **2.2 MATERIALS**

- A. All materials specified herein shall be manufactured by one of the suppliers listed in section 2.1. These products are specified to establish standards of quality and are approved for use on this project. No alternatives will be acceptable.
- B. All new piping, appurtenances and equipment shall be purchased shop lined and/or coated with touch up kits provided for damage caused during installation.
- C. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 2.91 lbs/gallon (350 gms/Liter) after thinning.
- D. Colors, where not specified, shall match as close as possible to the existing color of the existing facilities or as selected by the Owner or Owner's Representative.
- E. All coatings in contact with potable water need to be NSF Tested and Certified in accordance with ANSI/NSF Standard 61.
- F. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint. Shop paint shall be of the same type and manufacturer as used for field painting by the Contractor.
- G. Emulsion and alkyd paints shall contain a mildewcide and both the paint and mildewcide shall conform to OSHA and Federal requirements, including Federal specification TT-P-19.
- H. Finish coats containing lead shall not be allowed. Oil shall be pure boiled linseed oil.
- I. Rags shall be clean painter's rags, completely sterilized.

## **PART 3 - EXECUTION**

### **3.1 SURFACE PREPARATION**

The surface shall be cleaned as specified for the paint system being used. All cleaning shall be as outlined

in the Steel Structures Painting Council's Surface Preparation Specification, unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation. Surfaces close to the coast shall be checked for chloride contamination.

- A. All surface preparation done on site shall use surface preparation in accordance SSPC-SP1, SP2 and/or SP3 as to avoid blasting on-site.
- B. Standards for Surface Preparation:
- SSPC-SP1 Chemical and/or Solvent Cleaning  
Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter, and contaminants, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.
  - SSPC-SP2 Hand Tool Cleaning  
Removal of loose rust, loose mill scale, and loose paint to a clean sound substrate by hand chipping, scraping, sanding, and wire brushing.
  - SSPC-SP3 Power Tool Cleaning  
Removal of loose rust, loose mill scale, and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing, and grinding.
  - SSPC-SP4 Flame Cleaning  
Dehydrating and removal of rust, loose mill scale, and some light mill scale by use of flame, followed by wire brushing.
  - SSPC-SP5 (NACE-1) White Metal Blast Cleaning  
Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.
  - SSPC-SP6 (NACE-3) Commercial Grade Blast Cleaning  
Complete removal of all dirt, rust scale, mill scale, foreign matter, and previous coatings, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.
  - SSPC-SP7 (NACE-4) Brush-Off Blast Cleaning  
Removal of rust scale, loose mill scale, loose rust, and loose coatings, leaving tightly bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils, and solid contaminants. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bug holes, air pockets, and other subsurface irregularities, but so as not to expose underlying aggregate.
  - SSPC-SP8 Pickling  
Complete removal of rust and mill scale by acid pickling, duplex pickling or electrolytic pickling (may reduce the resistance of the surface to corrosion, if not to be primed immediately).
  - SSPC-SP10 (NACE-2) Near-White Blast Cleaning  
Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale, and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.
  - SSPC-SP11 Power Tool Cleaning to Bare Metal  
Complete removal of rust, rust scale, mill scale, foreign matter, and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.
  - SSPC-SP12 (NACE-2) Surface Preparation by Water Jetting  
Surface preparation of steel and other substrates by ultra-high pressure water jetting.
  - SSPC-SP13 (NACE-6) Surface Preparation of Concrete  
Surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
  - SSPC-SP14 (NACE-8) Industrial Blast Cleaning  
Surface preparation standards for industrial blast cleaning allowing for traces of tightly

- adherent mill scale, rust, & coating residues on 10% of the surface.
  - SSPC-SP15 Commercial Grade Power Tool Cleaning  
Commercial grade power tool cleaning a steel surface to produce a 1.0-mil surface profile. This method of cleaning falls between SP3 & SP11.
  - SSPC-SP 16 Brush-Off Blast Cleaning of Non-Ferrous Metals  
Brush-off blast cleaning of coated or uncoated metal surfaces other than carbon steel prior to the application of a protective coating system. Roughen and clean coated and uncoated non-ferrous metal substrates, including, but not limited to, galvanized surfaces, stainless steel, copper, aluminum, and brass.
- C. Ductile Iron Surface Preparation shall conform to NAPF Section 500 "Coatings and Linings".
- D. Visual standards – SSPC-VIS-1 (Swedish SIS OS 5900), "Pictorial Surface Preparation Standards for Painting Steel Surfaces," and the National Association of Corrosion Engineers, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.
- E. Visual standards from International Concrete Repair Institute CSP1-9 for degree of roughness and surface profile of concrete.
- F. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC-SP1 Solvent Cleaning.
- G. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per SSPC-SP11-87T.
- H. All weld seams, sharp protrusions, and edges shall be ground smooth prior to surface preparation or application of any coatings.
- I. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the Owner's Representative.
- J. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in SSPC-SP11-87T.
- K. "Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also, strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Owner's Representative's attention; otherwise, Contractor assumes full responsibility.

### **3.2 PRETREATMENTS**

- A. When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

### **3.3 STORAGE**

- A. Materials shall be delivered to the job site in the original packages with seals unbroken and with legible unmutated labels attached. Packages shall not be opened until they are inspected by the Owner's Representative and required for use. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, and direct rays of the sun or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. The Contractor shall be solely responsible for the protection of the materials stored by him at the job site. Empty coating cans shall be required to be neatly stacked in areas designated by the Owner or Owner's Representative and removed from the job site on a schedule determined by the Owner or Owner's Representative. Owner and/or Owner's Representative may request a notarized statement from the Contractor detailing all materials used on the project.

### 3.4 PREPARATION OF MATERIALS

- A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint/coating prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one (1) gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.
- B. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.
- C. Condition materials to 70°F -80°F for a minimum of 24 hours prior to use.

### 3.5 APPLICATION

- A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint/coating manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50° F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period. Note some materials may have a lower minimum atmospheric temperature and manufacturer's recommendation shall be followed.
- B. Dew Point: temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5° above this point. Temperature must be maintained during curing.
  - Example: If air temperature is 70°F and relative humidity is 65%, the dew point is 57°F. No coating should be applied unless surface temperature is 62°F minimum.
- C. No coatings shall be applied unless the relative humidity is below 85%.
- D. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.
- E. Field Painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the Owner's Representative.
- F. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.
- G. The Contractor's scaffolding shall be erected, maintained, and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observations shall be cleaned immediately after paint application.
- H. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the Owner's Representative.
- I. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint/coating manufacturer.
- J. Each coat of paint shall be recoated as per manufacturer's instructions. Paint/coating shall be

considered re-coatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion. Follow the manufactures printed recoat times.

- K. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.
- L. Finish colors shall be in accordance with the Owner's Direction or match existing colors and shall be factory mixed (i.e., there shall be no tinting by the Contractor).
- M. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) after the 1<sup>st</sup> coat.
- N. All hairline cracks or patches shall receive "stripe coat" of the 1<sup>st</sup> coat prior to application of the full 1<sup>st</sup> coat.
- O. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

### **3.6 WORKMANSHIP**

- A. The Contractor must show proof that all employees associated with this project shall have been employed by the Contractor for a period not less than six (6) months.
- B. Painting/coating shall be performed by experienced painters/coaters in accordance with the recommendations of the paint/coating manufacturer. All paint/coating shall be uniformly applied without sags, runs, spots, or other blemishes. Work, which shows carelessness, lack of skill, or is defective in the opinion of the Owner or Owner's Representative, shall be corrected at the expense of the Contractor.
- C. The Contractor or subcontractor shall be certified and licensed for painting/coating and shall have a minimum of five (5) years of experience of similar projects in the State of South Carolina. Contractor shall be certified as SSPC QP1SM.
- D. The Contractor shall guarantee the workmanship of the Work performed and materials will be free from defects or failure of workmanship for a period of one (1) year upon completion of the Work.

### **3.7 APPLICATION OF PAINT**

- A. By Brush and/or Rollers:
  - 1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
  - 2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
  - 3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
  - 4. It may require two (2) coats to achieve the specified dry film thickness if application is by brush and roller.
- B. Air, Airless, or Hot Spray:
  - 1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
  - 2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
  - 3. High build coatings should be applied by a crosshatch method of spray application to ensure proper film thickness of the coating.

4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be thinned, then sprayed and backrolled or roller applied.

### **3.8 PROTECTION AND CLEAN-UP**

- A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint/coating work. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting/coating work.
- B. At the option of the Owner's Representative during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the Owner's Representative, including but not limited to, full shrouding of the area.
- C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.
- D. At completion of the work, remove all paint/coating where spilled, splashed, splattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted, and unpainted surfaces.
- E. After completion of all painting, the Contractor shall remove from job site all painting/coating equipment, surplus materials, and debris resulting from the Work.
- F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the jobsite in accordance with Local, State, and Federal requirements as outlined by the United States Environmental Protection Agency(USEPA).
- G. A notarized statement shall be presented to the Owner and Owner's Representative that all hazardous materials have been disposed of properly including but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and USEPA registration number.

### **3.9 TESTING**

- A. Prior to coating application, using Chlor\*test or equal, contractor should verify that the chloride content is  $\leq 25$  ppm and that the surface pH is between 4 and 9. If the chloride level is higher than allowable limits and / or the pH is outside of the allowable limits, contractor should use Chor\*rid or equal to wash until clean. Additional sweep blast of substrate will be required if wash is necessary.
- B. The Contractor shall conduct for the prime and intermediate coats a steel holiday test in accordance to ASTM G62. Test results shall be certified by an independent coating inspector certified by NACE.
- C. The Contractor shall conduct for the finish coat a spark test in accordance to ASTM D5162. Test results shall be certified by an independent coating inspector certified by NACE.

### **3.10 ON-SITE INSPECTION**

- A. During the course of this project the Owner and/or Owner's Representative will reserve the option of incorporating the services of a qualified inspection service. The inspection service will be responsible for assuring the proper execution of this specification by the successful Contractor.



### 3.11 COATING SYSTEM SCHEDULE

- A. Painting/coating: all items specified here in shall be in accordance with the manufacturer's recommendations for surface preparation, painting/coating system and application methods. If the painting/coating surface preparation, painting/coating system, dry film thicknesses, and application methods specified herein are in conflict the manufacturer's recommendations, the manufacturer's recommendations shall supersede what is specified herein.
- Sherwin-Williams product selections shall meet or exceed the coating system criteria and standards of the other listed manufacturers' systems listed in this section.
- B. Coordinate final colors with TOWN to match existing TOWN facilities.

#### 1. Non Ferrous and Steel – Structural Fabrications

Surface Preparation: For on-site surface preparation use SSPC-SP1 and SSPC-SP3 as to avoid blasting on-site. For shop applied coating, abrasive blast non-immersion surfaces to a minimum Commercial Grade Finish in accordance with SSPC SP 6 with a minimum 2.0 mil blast profile. For immersion service finish in accordance with SSPC 10. Near white abrasive blast with a minimum 2.0 mils per blast profile. All steel shall be coated the same day as blasted and before any rust bloom forms.						
	CARBOLINE		CORROCOAT		TNEMEC	
Coats		DFT mils		DFT mils		DFT mils
1st	Plasite 4500S	30 - 40	Plasmet ZF	10	Series 1 Omnithane <sup>1</sup>	2.5 – 3.5
2nd	NA		Plasmet ZF	10	Series 104HS	6 – 8
3rd	NA		Corrothane API	2	Non-Immersion Service: Series 740 UVX	3 - 5
					Immersion Service: H.S. Epoxy Series 104	6 – 10

Notes: New structural fabrications to be shop primed when applicable.

#### 2. Blockwall – Inside and Outside the building

Surface Preparation: For previously painted block, pressure wash at 5,000 psi with a cleaner and remove all old coating from corner blocks. For exterior new block, pressure wash at 3,500 psi.						
	CARBOLINE		CORROCOAT		TNEMEC	
Coats		DFT mils		DFT-mils		DFT-mils
1st	Carbocrylic 3357 HB	5 - 8	Polyglass WCP	4 - 6	<u>Previously Painted Block:</u> Tnemec Series 1026 Enduratone.	2 - 3
					<u>New Block:</u> Tnemec Series 1254 Epoxoblock	100 sq.ft per Gallon
2nd	Carbocrylic 3357 HB	5 - 8	NA		<u>Previously Painted Block:</u> Tnemec Series 1026 Enduratone	2 - 3
					<u>New Block:</u> Tnemec Series 1026 Enduratone	2 - 3
3rd	NA		NA		<u>New Block:</u> Tnemec Series 1026 Enduratone	2- 3

3. Metal – Inside and Outside the building

Surface Preparation: Metals prep with a minimum 5,000 psi pressure wash. Contractor to check for chloride contamination prior to coating.						
	CARBOLINE		CORROCOAT		TNEMEC	
Coats		DFT-mils		DFT-mils		DFT-mils
1st	Rustbond	1 – 2	Plasmet ZF	6	Spot prime Tnemec Series 135 Chembuild	4 - 6
2nd	Carbomastic 615 Grey	5 – 10	Plasmet ZF	6	Full coat of Tnemec Series 135 Chembuild	4 - 6
3rd	Carboxane 2000	3 – 7	Corrothane API	2 - 4	Tnemec Series 740 UVX	3– 5

- Notes: 1. 2<sup>nd</sup> coat required for outside and immersion service.  
 2. Piping, fitting, valves and pumps color: Olive green as per RSWW, section 2.14.

4. Outside piping, fitting, valves and pumps

Surface Preparation: NAPF-Standard for ductile iron pipe. Surface preparation on site shall use NAPF 500-03-01, 500-03-02 and/or 500-03-03 as to avoid blasting on-site. If painting powder coated fittings is required, abrade the surface per 500-03-03. Shop blasting shall be performed according to NAPF 500-03-04 and 500-03-05.						
	CARBOLINE		CORROCOAT		TNEMEC	
Coats		DFT-mils		DFT-mils		DFT-mils
1st	Carbomastic 615 Aluminum	5.0 – 10.0	Plasmet ZF	6.0	Tnemec Series 90-97 Tneme-Zinc	2.5 – 3.5
2nd	Carbomastic 615 Tan	5.0 – 10.0	Plasmet ZF	6.0	Full coat of Tnemec Series 135 Chembuild	4.0 - 6.0
3rd	Carboxane 2000	3.0 – 7.0	Corrothane API	2.0 - 4.0	Above Ground Exposed: Tnemec Series 740 UVX (Above Ground Exposed)	3.0 – 5.0
					Buried Pipe: Tnemec Series 142 Epoxoline	13 - 16

Note: 1. New materials and equipment is to be coated at factory with touch up kits provided for damage caused during installation.

2. Color: Olive green as per RSWW, section 2.14.

5. Inside/Immersed Piping, Fittings, Valves and Plumbing

Surface Preparation: NAPF-Standard for ductile iron pipe. Surface preparation on site shall use NAPF 500-03-01, 500-03-02 and/or 500-03-03 as to avoid basting on-site. Shop basting shall be performed according to NAPF 500-03-04 and 500-03-05.						
	CARBOLINE		CORROCOAT		TNEMEC	
Coats		DFT-mils		DFT-mils		DFT-mils
1st	Plasite 4500 S	20 - 60	Polyglass VE	30	Series 22 Epoxoline	30
2nd	NA		Polyglass VE	30	NA	
3rd	NA		Armagel	30	NA	

Notes: New materials and equipment is to be coating is factory with touch up kits provided for damage caused during installation.

**END OF SECTION 09900**

09900-10

**SECTION 11220**  
**LINESHAFT VERTICAL TURBINE PUMP**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work: The work included under this section consists of furnishing and installing one deep well lineshaft vertical turbine pump and electric motor, an above ground discharge, and related equipment for raw water transfer from the proposed well to the existing TOWN owned water storage and distribution facility. The pump shall be water lubricated type by the water being pumped and suitable for raw water service in a vertical groundwater well. The pump and well waters will be initially disinfected by chlorination after installation in accordance with AWWA standards, and SCDHEC Regulation 61-58, and periodically thereafter. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute, AWWA, and UL/FM standards for lineshaft turbine pumps and electric motors.
- B. All materials and coatings used in the manufacture shall conform to NSF 61 as required by the South Carolina Department of Health and Environment Control, Regulation 61-58 State Primary Drinking Water Regulations, and the pump must be NSF-61 certified.
- C. The CONTRACTOR shall provide a fully completed installation which is fully tested, complete and in satisfactory operating condition. Pump shall be suitable for installation in the existing well casings .

**1.2 REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. The reference edition in effect at the time of project bidding shall be used.

**AMERICAN BEARING MANUFACTURERS ASSOCIATION (ABMA)**

ABMA 9	Load Ratings and Fatigue Life for Ball Bearings
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**AMERICAN GEAR MANUFACTURERS ASSOCIATION (AGMA)**

ANSI/AGMA 2001	Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth
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ANSI/AGMA 2003	Rating the Pitting Resistance and Bending Strength of Generated Straight Bevel, ZEROL Bevel, and Spiral Bevel Gear Teeth
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ANSI/AGMA 6013	Standard for Industrial Enclosed Gear Drives
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**AMERICAN WATER WORKS ASSOCIATION (AWWA)**

AWWA E101	Vertical Turbine Pumps – Line Shaft and Submersible Types
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**ASME INTERNATIONAL (ASME)**

ASME B1.1	Unified Inch Screw Threads (UN and UNR Thread Form)
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ASME B16.1	Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250
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11220-1



the product of a fully experienced, reputable and qualified manufacturer. The manufacturer shall supply the ENGINEER with the shop drawing submittal in accordance with Division 1 Section 01340: Shop Drawings Working Drawings & Samples and as listed in this section.

2. The supplier shall supply the services of a qualified factory-trained service representative for a period specified in paragraph 3.2 of this specification. The representative shall inspect the completed equipment installation to ensure that it meets with the manufacturer's recommendations. Any necessary adjustment or modifications shall be made, at no additional cost to the TOWN, to place the equipment in trouble-free operation.
  3. Pumps shall be in accordance with applicable Hydraulic Institute Standards.
  4. Motors shall be in accordance with NEMA Standards.
  5. Pumps shall be NSF-61 certified.
- B. Balancing: All pump and motor units shall be statically and dynamically balanced. The vibration allowance in the units shall not exceed the upper limits as established by the Hydraulic Institute Standards.
- C. Tests: Each model pump with its own drive motor shall be fully tested on water at the pump manufacturer's plant before shipment. Tests shall consist of checking the unit at its rated speed, head, capacity, efficiency and brake horsepower, and at such other conditions of head and capacity to properly establish the performance curve. Certified copies of the test report shall be submitted to the ENGINEER. The Standards of the Hydraulic Institute shall govern the procedures and calculations for these tests. During these tests the pumps with drive motors shall be checked for balance.
- D. Equipment Manufacturers: The vertical turbine pump shall be manufactured by Flowserve, Goulds Water Technology, or Fairbanks Nijhuis. Substitution of equipment by alternate manufacturers will be considered if the equipment proposed for substitution is demonstrably equal or superior in quality and efficiency to the standards established in the specifications and this is demonstrated to the complete satisfaction of the ENGINEER and TOWN. Request for approval of substitute equipment shall be submitted in accordance with Section 00100: Instructions to Bidders. Use of approved alternate manufacturers in no way relieves any manufacturer of strictly adhering to the specification and submittal requirements.
- E. To assure a properly integrated and compatible system, all equipment described in this section, including but not limited to bowl assembly, column, lineshaft, discharge head, wellhead companion flange and motor, shall be furnished by the Pump Manufacturer, who shall assume full responsibility for the proper operation of the pump and associated equipment.

## 1.5 SUBMITTALS

- A. Shop Drawings: Prior to shipping the pumps and motors, the CONTRACTOR shall submit to the ENGINEER for review: shop drawings, test certificates, material specifications by ASTM reference and grade, and other pertinent data in conformance with the Standards of the Hydraulic Institute.
- B. The CONTRACTOR shall submit the following to the ENGINEER for approval:
1. Manufacturer's literature, illustrations and applicable data for the individual pumps, including the total weight of the equipment and the weight of the single largest item. Show linings and coatings.
  2. Submit expected bowl performance curves for approval, on which the specified operating points are shown. Include bowl head, efficiency, break horsepower and NPSH required at full speed. Indicate separately the impeller trim, head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the guarantee point. Submit manufacturer's certified bowl performance curve for approval prior to shipment. Provide pump maximum downthrust or upthrust in pounds.
  3. Curves shall be submitted on 8-1/2 inch by 11-inch sheets, at as large a scale as is practical. Curves shall

be plotted from no flow at shut off head to maximum pump runout head and gallonage allowed by the manufacturer.

4. Points of operation which cause bearing stress or shaft deflection in excess of the manufacturer's tolerances for continuous operation shall be indicated on the submitted curves.
  5. The shop drawings shall include details of pump assembly, installation layouts, procedures, types of materials used in pump construction, details on all pump accessories, and dimensions of major components, power and control wiring diagrams including terminals and numbers, complete motor nameplate data, as defined by NEMA, motor manufacturer and including any motor modifications.
  6. A signed certified letter from the pump manufacturer certifying that the column pipe and line shafting have been supplied by the pump manufacturer.
  7. A complete total bill of materials for all equipment.
  8. A list of manufacturer's recommended spare parts to be supplied, with the manufacturer's current price for each item to be replaced after 1 and 3 years of service. Include O-rings, seals, etc. on the list. List bearings by the bearing manufacturer's name and numbers only.
  9. Pumping equipment requiring special tools for maintenance shall be provided with one set of tools labeled, packed with instructions for use, and housed in a metal box with lock-end hoop for each two units provided.
  10. The following data shall be provided on the drive motors: rpm at full load, frequency, voltage, full load current, code and design letter, efficiency, horsepower, number of phases, time rating, temperature rise, service factor and bearing life rating. The submittal shall include motor manufacturer's recommended lubrication requirements.
- C. Operating and Maintenance Instructions: For all pumps furnished under this Section, the CONTRACTOR shall submit operation and maintenance manuals in accordance with Section 01730 - Operation and Maintenance Data, to include, at a minimum, the following:
1. Equipment function.
  2. Description.
  3. Normal and limiting operating characteristics.
  4. Installation instructions (assembly, alignment and adjustment procedures).
  5. Operation instructions (normal operating conditions and emergency situations).
  6. Lubrication and maintenance instructions.
  7. Troubleshooting guide.
  8. Parts list and predicted list of parts subject to wear.
  9. Drawings - cross sectional view, assembly and wiring diagrams.
  10. Performance curves.
- D. Factory Performance Test Data:
1. After acceptance of pump shop drawings, factory performance test data will be submitted for approval on each pumping unit. Duplicate units require factory testing for only one unit, unless otherwise specified.
  2. Test shall be certified by a registered professional ENGINEER.
  3. Tests shall be in accordance with the standards of the Hydraulic Institute including head, capacity, brake horsepower, pump efficiency and NPSH.
- E. Conformance with Agency Requirements: Where materials or equipment are specified to be an approved type, the seal or label of approval from a nationally recognized testing agency adequately equipped and competent

to perform such services, shall be attached thereto. A written certificate from the testing agency shall accompany the materials or equipment and shall be submitted to the ENGINEER stating that the items have been tested and that they conform to the applicable requirements of the specifications herein. The certificate shall indicate the methods of testing used by the testing agency. In lieu of certificate from the testing agency, published catalog specification data , accompanied by the manufacturer's certified statement to the effect that the items are in accordance with the applicable requirements of the specifications and the referenced standards, will be considered by the ENGINEER and may be acceptable as evidence that the items conform with agency requirements.

#### 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Finished surfaces of all exposed pump openings shall be protected by wooden blanks.
- B. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage, and handling. Each completed pump unit shall be totally encased in a shrink wrap, polyethylene plastic enclosure to protect the transported unit from adverse elements encountered during shipment. The plastic enclosure shall be of Griff-Shrink 5-ply VCI clear reinforced shrink film as manufactured by Reef Industries or equal.
- C. Each box or package shall be properly marked to show its net weight in addition to its contents.

#### 1.7 WARRANTY AND GUARANTEES

- A. Warranty: The pump manufacturer shall warrant the pumps being supplied to the TOWN against defects in workmanship and materials for a period of two (2) years after project acceptance under normal use, operation and maintenance. Should any part of the pumping system fail during the warranty period, it shall be replaced and restored to service at no additional expense to the TOWN. The manufacturer's warranty period shall run concurrently with the CONTRACTOR's warranty period.
- B. Certifications: The CONTRACTOR shall furnish the ENGINEER with a written certification signed by the manufacturer's representative noting that the installed equipment:
  - 1. Has been installed per manufacturer's requirements.
  - 2. Has been lubricated per manufacturer's instructions.
  - 3. Has been accurately aligned and proper running clearances set.
  - 4. Is free from undue stress imposed by piping or mounting bolts.
  - 5. Is ready to be operated on a continuous basis and is free from any known defects.
- C. The nominal nameplate horsepower rating for the motors at their rated speed shall not be exceeded by the drive equipment at any point of operation on its characteristic curve.

## **PART 2 - PRODUCTS**

### **2.1 EQUIPMENT GENERAL REQUIREMENTS**

- A. The equipment covered by these Specifications shall be designed, constructed, and installed in accordance with the best practice and methods. CONTRACTOR shall provide materials and equipment which are the standard products of a manufacturer regularly engaged in the manufacture of the products and that essentially duplicate items that have been in satisfactory use for at least five (5) years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the ENGINEER, reasonably convenient to the site. The manufacturer must be able to list at least ten (10) locations within the United States where their pumps have provided satisfactory service for at least five (5) years.
- B. All equipment for the pumps, including motors, well heads, and accessories shall be furnished as a complete unit by the pump supplier. The pump design requirements in Table 11220-A show the minimum pump requirements that are acceptable. Final selection of the pump performance point has not been completed at the time of bid, refer to Table 11220-A for assumptions to select a pump, column, discharge head and motor to provide a bid price.
- C. All parts shall be so designed and proportioned as to have liberal strength and stiffness, and to be especially adapted for the work to be done. Ample room and facilities shall be provided for inspection, repair and adjustment.
- D. Equipment Guards: Equipment driven by open shafts, belts, chains, or gears shall be provided with all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. The guards shall conform in all respects to all applicable safety codes and regulations.
- E. Equipment shall be rigidly and accurately anchored into position, precisely leveled and aligned, so that the completed installation is free from stress or distortion. All necessary foundation bolts, plates, nuts and washers shall be furnished and installed by the CONTRACTOR and conform to the recommendations and instructions of the equipment manufacturer. Anchor bolts, nuts, and washers shall be 316 Stainless Steel unless noted otherwise.
- F. Nameplates and Identification Tag:
  - 1. Stainless steel pump nameplate giving the name of the pump manufacturer, the rated capacity, head, speed, serial number, model number and any other pertinent data shall be attached to each pump on the well head.
  - 2. Stainless steel motor nameplate giving the name of the manufacturer, serial number, model number, horsepower, speed, voltage, amperes and all other pertinent data shall be attached to each motor.
- G. Hardware: All machine bolts, nuts and cap screws shall be of the hex head type. Hardware requiring special tools or wrenches shall not be used.
- H. Parts Numbering: Parts shall be completely identified with a numerical system to facilitate parts inventory control and stocking. Each part shall be properly identified by a separate number, and those parts which are identical for more than one size unit shall have the same number to effect minimum spare parts inventory.
- I. All pumps and motors shall be rated for continuous duty and shall be capable of pumping the specified flow range without cavitation or excess vibration. The pumps shall not infringe upon the motor service factor at any point of the full speed curve.



## 2.2 LINESHAFT VERTICAL TURBINE PUMP

- A. General: The pump shall be of the lineshaft turbine type with above ground discharge and complete with strainer, bowl assemblies / impellers, column pipe and shaft assembly, discharge head assembly with accessories and electric motor. The discharge head and electric motor shall be suitable for outdoor installation. The final pump length shall be determined by the pump manufacturer (base to bell) for optimum conditions. The lineshaft vertical turbine pump shall be constructed in accordance with AWWA E101 except as modified herein.
1. Pump performance requirements and design criteria are listed in Table 11120-A at the end of this specification section. Final pump selection will be determined after confirmation of well conditions by contractor.
- B. Suction Bowl Strainer:
1. Strainer: A suction strainer shall be furnished with the pump assembly. It shall be made of 316 or 316L stainless steel and threaded to the suction bowl. The cone strainer shall have a free area of at least four (4) times the flow area of the suction pipe. The strainer shall be of sufficient mesh size to block sand particles from entering the pump bowl assembly. Suction strainer shall be of the conical type, fabricated from stainless steel. Strainers shall be free from sand holes, blowholes, or other faults and must be accurately machined and fitted to close tolerances. They shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at rated flow or 1.5 times shut-off head, whichever is greater.
- C. Bowl Assembly: Pump bowl assembly shall include the pump bowl(s), pump impeller(s), pump shaft and bearings. The bowl assembly may be of single stage or multistage configuration.
1. Bowl assembly shall consist of flanged type bowls constructed of close grained cast iron conforming to ASTM A48 Class 30. The bowls shall be free of blow holes, sand holes, or other faults and accurately machined and fitted to close tolerances, and capable of meeting or exceeding the hydrostatic pressure ratings of the Hydraulic Institute.
  2. The intermediate bowls shall have enamel lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. A discharge bowl shall be sized and threaded to connect the bowl assembly to the discharge column.
  3. The discharge bowl and all intermediate bowls shall be fitted with Vesconite HiLube composite sleeve bearings by VescoPlastics.
  4. The suction bowl shall be provided with nonsoluble grease packed bronze bearing. A bronze sand collar shall be provided to protect this bearing from abrasives in the pumping fluids. The bearing housing shall have sufficient opening at the bottom for easy removal of the bearing.
  5. The bowls shall be assembled using all Type 316 stainless steel bolting.
  6. A stainless steel nameplate with the operating conditions and bowl and impeller date stamped into it shall be attached to the bowl with noncorrosive fasteners. An additional stainless steel nameplate shall be furnished loose for use by TOWN.
  7. Impellers shall be constructed of either Type 316 stainless steel or ASTM C95500 Nickel Aluminum Bronze. No silicone bronze alloy impellers shall be allowed.
  8. Impellers shall be free from defects and accurately cast, machined, filed, and polished for premium efficiency and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as a minimum.

9. Impellers shall be secured to the bowl shaft with tapered split Type 316 stainless steel bushing (collets).
10. The bowl shaft shall be constructed from Type 416 stainless steel meeting ASTM 582. It shall be precision ground, balanced, and polished with a surface finish better than 40 rms.
11. The pump shall be tested by the factory after trimming and assembly and a curve of the operating conditions including flow, head, efficiency, and horsepower shall be plotted and submitted to the ENGINEER for approval prior to shipping any materials. The test shall be a nonwitnessed test, but TOWN reserves the right to reject the test and witness any retesting at its own cost.

D. Water-Lubricated Column and Shaft Assembly:

1. Column pipe shall be furnished in sections not exceeding a nominal 10 feet, connected by threaded sleeve coupling, of nominal diameter listed in this section.
2. The top and bottom sections shall not be more than 5 feet in length.
3. Column shall be manufactured of ASTM A53 Grade B steel pipe, Schedule 40 (Standard) for nominal diameters 10 inches and less.
4. The column pipe ends shall be threaded, 8 threads per inch with 3/16-inch taper per foot thread and faced parallel to butt against the centering spiders so the assembled sections are accurately aligned.
5. Lineshaft shall be made of Type 416 stainless steel meeting ASTM 582. It shall be precision ground, balanced, and polished with a surface finish better than 40 rms. Each shaft length shall be straight, not exceeding 0.005 inch out in total indicator reading per 10-foot section.
6. Lineshaft diameter shall be a minimum 1-3/16-inch.
7. Lineshaft shall be furnished with a stainless steel coupling for each section of shaft. Couplings shall be machined from solid stainless steel bar and have left hand threads that will tighten during pump operation. The threads of the lineshaft and coupling shall be compatible. Couplings shall be Type 410 stainless steel.
8. Bearing retainers (spiders) shall be furnished for each column and shaft section. The spiders shall be made of Type 304 or 316 stainless steel or ASTM C95800 Nickel Aluminum Bronze and designed to drop in the column couplings and be retained by the butted ends of the column pipe.
9. Shaft bearings shall be Buna-N retained in the spider by a shoulder on each end of the bearing, designed for water lubricated operation with the appropriate shaft diameter.
10. The pump manufacturer shall provide a signed letter certifying that the column pipe and line shafting have been supplied by the pump manufacturer. Column and line shafting provided by suppliers or contractors other than the pump manufacturer will not be acceptable.
11. Lineshaft Sleeve. Stainless steel shaft sleeves shall be furnished at each bearing location. The shaft shall be provided with type 304 stainless steel sleeve to act as a journal at each bearing location. The sleeve shall be placed on a full size shaft without undercutting and secured in position by a suitable adhesive.

E. Discharge Head:

1. The discharge head shall be made of high-grade cast iron, ASTM A48 Class 30. A fabricated steel discharge head will be allowed provided that access to the wellhead is maintained as shown in the Drawings.
2. The discharge head shall be manufactured and provided by the pump manufacturer. The outlet shall be abovegrade, flanged, and sized to meet the flanged discharge piping diameter as listed in the operating conditions.

3. A Type 316 stainless steel nameplate with the pump serial number, pump model number, operating conditions, bowl data and impeller data stamped into it shall be attached to the head with noncorrosive fasteners.
4. The stuffing box shall be made of cast iron with Type 316 stainless steel split-type packing gland, studs, and nuts, and furnished with five rings of graphited synthetic fiber packing. The bearing shall be bronze, Type C89835 or equal. A rubber slinger shall be furnished with the stuffing box for securing to the shaft above the packing gland to protect the motor from excess spray. The head shall have a threaded connection in the stuffing box location for connecting a drain pipe.
5. Discharge head base shall be provided with an appropriate wellhead companion flange (as needed) which connects to the top of the well, see Drawings. The wellhead companion flange shall be threaded for the column pipe diameter as listed in the operating conditions. The connection shall be a watertight gasketed connection.
6. The discharge head assembly shall be furnished with the connections and openings shown on the Drawings. Accessories shall include non-metallic power cable ties, a 316 stainless steel safety cable with 316 stainless steel shackles and eyebolts, and 304 stainless steel thimble eyes, to go between the pump and the well head, and pack off devices to seal the motor cable coming through the well head.
7. Discharge head baseplate shall be equipped with bolt holes which match the diameter, number, and placement of the wellhead companion flange and access port assembly. Any necessary spool piece between the well casing and discharge head shall be ASTM A53 carbon steel Schedule 40.
8. Discharge head shall be designed to prevent contamination of the well from the surface, and shall accommodate the required motor assembly. Space shall be provided for access to the coupling between the pump shaft and drive shaft. Pipe taps shall be provided on the discharge head as required for prelubrication and a ½" discharge pressure gauge assembly connections.
9. The pump shall be furnished with a two-piece top shaft. The head shaft passing through the stuffing box shall be made of Type 416 stainless steel meeting ASTM 582. It shall be precision ground, balanced, and polished with a surface finish better than 40 rms. Its length shall be sized to accommodate the length of top column pipe plus the height of the head through the stuffing box, so that the couplings are easily accessible at the head and the first column pipe joint.

F. Electric Motors:

1. See Electrical Drawings and Division 16 Electrical Specifications.
2. The motor shall be designed for single, constant speed operation.
3. The pump manufacturer shall be responsible for supplying the motors and shall ensure proper coordination for mounting of the motors on the pumps. He shall properly select and size the drive unit for each pump inclusive of thrust bearing capacity for all conditions at startup, runout, and shutdown.
4. The motor shall be a heavy duty squirrel cage induction type, NEMA Class B or Class F insulation with TEFC enclosure, 1800 RPM maximum vertical hollow shaft motor, with a non-reverse ratchet (or self-release coupling) to prevent reverse rotation of the rotating elements. A thrust bearing of ample capacity to carry the weight of all rotating parts plus the maximum hydraulic thrust load under all conditions of operation calculated L10 life shall be no less than 8800 hours. The motor shall be premium efficiency, 1.15 service factor, and suitable for use on 460 volt, three phase, 60 Hz electric service. An adjusting nut shall be provided at the top of the motor for setting the impeller to bowl running clearance.
5. The motor bearing loading for the driver shall include the total pump lineshaft downthrust. The motor bearings shall be designed to withstand any momentary total upthrust.

6. Vertical hollow shaft electric motor drivers shall be provided with ball or roller bearings of adequate strength to carry the hydraulic thrust of the pump impellers and the weight of all rotating parts. The bearings shall have a minimum calculated L-10 rating life of 100,000 hours in accordance with ABMA 9. If there is a potential for pump upthrust during any operating condition, the drive shall be designed for this upthrust. The vertical hollow shaft motor shall be sized to transmit the maximum horsepower required by the pump over the entire operating range of the pump. Motor shall be provided with a nonreversible ratchet device to prevent reverse rotation of the pump and line shafts of pumps with settings of 50 feet or more. Provisions shall be made for vertical impeller adjustment at the top of the motor.
7. The motor shall be sized so that the service factor is not infringed upon throughout the full speed performance curve of the pump. The thrust bearing shall be of ample capacity to carry the weight of all the rotating parts plus the hydraulic thrust and shall be an integral part of the driver. The bearing shall be of such size that the average life rating is based on five (5) years continuous operation.
8. Performance Requirements:
  - a. Service rating: 460-volt, 3 phase, 60 Hz.
  - b. Vibration Shall not exceed Hydraulic Institute Standards
  - c. Sound pressure level: Shall not exceed 80 dbA at 5 feet under free field load conditions in accordance with IEEE Standard 85.
  - d. Temperature rise: Shall not exceed 80 degrees Centigrade (°C) as measured by resistance when motor is operated continuously at rated horsepower, rated voltage and frequency in ambient air temperature of 40 °C.
  - e. Factory tests: Completely assembled motors shall be given the following tests conducted in accordance with NEMA standards MG1-20.46 and MG 1-20.47.
    - (1) No load current
    - (2) Winding resistance
  - f. Pump motor shall be equipped with normally closed motor winding thermostats and 120 volt motor winding space heater. Provide wattage rating with the shop drawing submittals.

## 2.3 CONTROL PANEL

- A. Panel Requirements: See Electrical Drawings and Division 16: Electrical Specifications.

## 2.4 SPARE PARTS

- A. Spare parts to be provided by the Manufacturer for each pump shall be as follows unless noted otherwise:
  1. One (1) set of bearings.
  2. Two (2) sets of O-rings and gaskets.
  3. One (1) set of wear rings.
  4. One (1) year supply of lubricant.
  5. Where applicable, one (1) set of belts and sheaves.
  6. Where applicable, two (2) sets of packing and one (1) lantern ring.

7. Where applicable, one (1) set of mechanical seals or one (1) mechanical seal.
  8. Where applicable, one (1) shaft sleeve per unit supplied.
- B. All parts shall be packed for shelf storage and placed in boxes indicating model numbers, part numbers, manufacturer of part, manufacturer of pumping unit, manufacturer's local representative, and shall be tagged as spare parts. Instructions for preparation and installation of each spare part or group of parts shall be packaged with the spare part or parts.
- C. Spare parts and lubricants, as received, shall be turned over to the TOWN immediately upon receipt by the CONTRACTOR.

## 2.5 SPECIAL TOOLS

- A. A complete set of all special tools which may be necessary for the adjustment, operation, maintenance, and disassembly of all equipment shall be furnished. Special tools are considered to be those tools which because of their limited use are not normally available, but which are necessary for the particular equipment. Tools shall be high-grade, smooth, forged, alloy, tool steel. Special tools shall be delivered at the same time as the equipment to which they pertain. Properly store and safeguard such special tools until completion of the work, at which time they shall be delivered to the TOWN.

## 2.6 PAINTING AND COATING – FACTORY FINISH

- A. Discharge Head (Interior and Exterior)..
1. Exterior:
    - Surface preparation SP5 White Metal Blast Cleaning.
    - Manufacturer's standard NSF 61 certified fusion bonded coating.
  2. Interior: Coat interior with Tnemec Series N141 Pota-Pox epoxy coating, or approved equal, 8 mil minimum dry film thickness.
- B. Pump Bowl (Interior and Exterior) and Column Pipe (Interior and Exterior), and Suction Bell (Interior and Exterior): Coat interior and exterior with Tnemec Series N141 Pota-Pox epoxy coating, or approved equal, 8 mil minimum dry film thickness.
- C. Wellhead Flange and Access Port Arrangement Assembly, Interior and Exterior.
1. Surface preparation SP5 White Metal Blast Cleaning.
  2. Polyamidoamine Epoxy, Tnemec Series N141 applied at 2 coats at 4.0 to 6.0 MDFT per coat.
- D. Motor.
1. Surface preparation SP10 Near-White Metal Blast Cleaning.
  2. Polyamide High Build Epoxy. Two coats at 4.0 to 6.0 MDFT per coat.
  3. Top Coat: Aliphatic Acrylic Polyurethane, Tnemec Series 1095 applied at 2.5 to 5.0 MDFT.
- E. Finish Color: Submit color chart for Owner selection. See Section 09900: Protective Coatings
- F. Provide a sufficient quantity of the top coat paint for field touchup.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's field services technicians instructions. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer's recommendations.
- B. Connect suction and discharge piping without imposing strain to pump flanges.
- C. Orient discharge head to accurately mate with discharge piping.
- D. Anchor Bolts: Accurately place using equipment templates. Use new neoprene flange gasket.
- E. Painting and Coating:
  - 1. All coatings shall be ANSI/NSF-61 approved for use with potable water systems.
  - 2. See Section 09900 – Protective Coatings for color schedule.
  - 3. Color of finish coat shall match the color of the adjacent piping per color coding of piping system.
  - 4. All nameplates shall be properly protected during painting. Do not paint over any portion of the nameplate.

### **3.2 INSPECTION AND TESTING**

- A. General: Furnish the services of a competent and experienced factory representative who has complete knowledge or proper operation and maintenance of the equipment for a period of not less than two (2) days in two (2) separate visits to inspect the final installation, supervise a test run of the equipment and provide operator training. The first visit will be for checking and inspecting the equipment after it is installed. The second visit will be to operate and supervise the initial field test. At least one (1) of the two (2) days shall be allocated primarily to the instruction of plant personnel in operation and maintenance of the equipment. This instruction period shall be scheduled at least ten (10) days in advance with the TOWN and shall take place prior to start-up and acceptance by the TOWN. The final copies of operation and maintenance manuals must have been delivered to the ENGINEER prior to scheduling the instruction period with the TOWN.
- B. Well Casing Flange: Confirm Well Casing Flange with Pump Manufacturer. The Contractor shall conduct field tests to confirm the well casing flange is level and plumb and meets the requirements of the pump manufacturer. The precision of the field measurements to determine the well casing flange level shall be as recommended by the pump manufacturer.
  - 1. If the well casing flange does not meet the pump manufacturer's requirements, perform the following:
    - a. Notify the Engineer and Owner immediately.
    - b. Submit modifications to the Wellhead Flange and Access Port Arrangement Assembly to adjust for the well casing flange level to provide a sufficiently level base for the pump discharge head.
  - 2. If the well casing flange meets the pump manufacturer's requirements, submit a confirming statement with the pump Shop Drawing.
- C. Motors: The CONTRACTOR shall check all motors for correct clearances and alignment and for

correct lubrication in accordance with the manufacturer's instructions. The CONTRACTOR shall check the direction of rotation of all motors and reverse if necessary.

- D. Pumps: After the pumps have been completely installed and inspected by a factory representative, field tests shall be conducted on each unit in the presence of the ENGINEER to confirm mechanical soundness of the installation. The CONTRACTOR shall supply all electric power, water, labor, equipment and incidentals required to complete this test.
- E. Field Testing:
1. Upon completion of all the mechanical work, the CONTRACTOR shall conduct testing as specified herein to demonstrate that the equipment performs in accordance with all specifications.
  2. The CONTRACTOR shall perform initial testing of the equipment insuring to himself that the tests listed in the Demonstration Test paragraph below can be completed.
  3. The Demonstration Test shall demonstrate that all items of these Specifications have been met by the equipment, as installed, and shall include the following tests:
    - a. That the pumps can deliver the specified pressure and quantity at rated efficiency.
    - b. That the pump controls perform satisfactorily.
  4. In the event that the equipment does not meet the Demonstration Test, the CONTRACTOR shall, at his own expense, make such changes and adjustments in the equipment which he deems necessary and shall conduct further tests until written certification is received from the ENGINEER.
- F. Upon completion of the installation, the manufacturer, in the presence of the ENGINEER, shall perform a preliminary test at the specified service conditions of each system to insure the functioning of all component parts to the satisfaction of the ENGINEER. The manufacturer shall furnish all labor and equipment. Power shall be supplied by the CONTRACTOR. Approval of the preliminary test by the ENGINEER shall not constitute final acceptance of the equipment furnished.
- G. After the facility is in operation, a full operating test shall be performed in the presence of the ENGINEER and a qualified manufacturer's representative of the system. The manufacturer shall furnish all labor, material and equipment required for such tests and shall correct any deficiencies noted, by repairing or replacing the defective components and retesting as required until the equipment meets the specifications and the satisfaction of the ENGINEER. The manufacturer shall have 30 days to make the changes necessary to meet the Specifications, the owner may order the manufacturer to remove rejected equipment from the site and refund to the TOWN all payments made to him.
1. Functional Test: Conduct on each pump.
    - a. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
    - b. Vibration Test:
      - Test with unit installed and in normal operation, and discharging to the connected piping systems at rates between low discharge head and high discharge head conditions specified.
      - Shall not develop vibration exceeding the limits specified in Hydraulic Institute Standards 9.6.4. The vibration measurement

locations and directions shall be as shown on Figure 9.6.4.2.3.1 for a VS3 configuration.

- If unit exhibits vibration in excess of limits specified, adjust or modify as necessary. Unit that cannot be adjusted or modified to conform as specified shall be replaced.

2. Performance Test: Conduct on each pump.

- a. A step test shall be conducted in the presence of the Owner and Engineer.
- b. The step test shall include a minimum of four steps.
- c. The duration of each step shall be as required to obtain steady and reliable test data. The following data shall be measured and recorded during each step of the test:
  - Flow Measurement: Measured by flow instrumentation.
  - Pressure: Owner's pressure gauge, or as approved by the Engineer.
  - Operating Temperature: Monitor bearing areas on pump and motor for abnormally high temperatures
  - Water level shall be measured by level instrumentation or Engineer approved instrumentation.
  - Measure phase to phase volts and amp draw at the motor control center using an ammeter provided by the Contractor.

H. Performance Guarantee: Provide a written guarantee from the equipment manufacturer that the pump, motor, and drive are installed and operating properly in compliance with the plans and specifications and the manufacturer's specifications.

I. DISINFECTION AND TESTING:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SCDHEC REGULATION 61-58 STATE PRIMARY DRINKING WATER REGULATIONS. ALL MATERIALS OR PRODUCTS WHICH COME INTO CONTACT WITH DRINKING WATER SHALL BE CERTIFIED AS MEETING THE SPECIFICATIONS OF THE AMERICAN NATIONAL STANDARD INSTITUTE/NATIONAL SANITATION FOUNDATION STANDARD 61, DRINKING WATER SYSTEM COMPONENTS – HEALTH EFFECTS.
2. WELL, PUMP, PIPING AND EQUIPMENT IN CONTACT WITH DRINKING WATER SHALL BE DISINFECTED AND TESTED IN ACCORDANCE WITH SCDHEC REGULATION 61-58.2 AND 61-58.4. ALL NEWLY INSTALLED PIPE SHALL BE PRESSURE TESTED AND LEAKAGE TEST IN ACCORDANCE WITH AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARD C600.
3. The well shall be disinfected after installation of the thoroughly scrubbed and cleaned permanent pump.
  - a. Disinfectants - Chlorine disinfectant shall be delivered to the site of the work in original closed containers bearing the original label indicating the percentage of available chlorine. The disinfectant shall be recently purchased (chlorine compounds in dry form shall not be stored for more than one year and storage of liquid compounds shall not exceed 60 days). During storage, disinfectants shall not be exposed to the atmosphere or to direct sunlight. The quantity of chlorine compounds used for disinfection shall be sufficient to produce a minimum of fifty (50) milligrams per liter available chlorine in solution when mixed with the total volume of water in the well.



- b. Disinfection procedure - For each disinfection, a reliable means shall be provided for ensuring that the disinfecting agent is uniformly applied throughout the entire depth of the well including the casing, pipes and wiring above the water level. The disinfection shall be in accordance with current AWWA Standards for disinfection of wells.

After the contact period, the well shall be pumped to clear it of the disinfecting agent. The disposal point for the purged water shall be selected so as to avoid damage to aquatic life or vegetation.

- 4. Bacteriological analysis - Prior to sampling, the well shall be pumped until the chlorine residual is non-detectable. Two consecutive samples of water shall be collected at least twenty-four (24) hours apart and be analyzed for total coliform bacteria. The results of both samples must show the absence of total coliform bacteria using membrane filter methodology. The measured chlorine residual and non-coliform growth must also be reported. If the non-coliform growth is greater than eighty (80) colonies per one hundred (100) milliliters, the sample result will be deemed invalid and must be repeated. All samples must be analyzed by a laboratory certified by the Department. The Department (SCDHEC) may request that heterotrophic plate count analyses be conducted on a case-by-case basis where construction, development, or disinfection problems are suspected.

**TABLE 11220-A  
VERTICAL TURBINE PUMP DESIGN REQUIREMENTS**

<b>Item/Design Criteria</b>		<b>Design Condition</b>
a.	No. of Pumps Required	1
b.	Pump Discharge Size, Inches	10"
c.	Primary Operating Condition	1,500 gpm @ 236' TDH
d.	Primary Operating Hydraulic Efficiency, Minimum	74%
e.	Additional Condition	2,000 gpm @ 90' TDH
f.	Shut Off Head, maximum	214'
g.	Motor, Maximum HP	125
h.	Speed, Maximum RPM	1,800
i.	Voltage, Volts	460
j.	Phase	3
k.	Frequency, Hertz	60
l.	Service	Transfer Raw Water to Elevated Storage Tank and Distribution
m.	Control Panel	See Division 16
n.	NPSHR, Feet (Max)	22.50
o.	Setting Depth, Feet	135' below finished floor

**TABLE 11220-B  
VERTICAL TURBINE PUMP DESIGN REQUIREMENTS**

<b>Pump Manufacturer</b>	<b>Flowserve</b>	<b>Goulds</b>	<b>Fairbanks</b>
<b>Model No.</b>	12ENL	DWT-DITM 14RJLC	11H-SS
<b>Impeller Dia (In.)</b>	9.38"	9"	7.55"
<b>Stages</b>	5	4	6
<b>Column Dia (In.)</b>	8"	8"	8"

Design criteria identified in Table 11220-A above were selected based on the results of the Four Waters Engineering, Inc. design assumptions and calculations. These conditions and pumps listed in Table 11220-B shall be used for bidding purposes.

**END OF SECTION 11220**

**SECTION 15000**  
**MECHANICAL GENERAL REQUIREMENTS**

**PART I - GENERAL**

**1.1 DESCRIPTION**

- A. Scope of Work:
1. All equipment furnished and installed under this contract shall conform to the general stipulations set forth in this section except as otherwise specified in other Sections.
  2. Contractor shall coordinate all details of equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alternations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.
- B. Contract Drawings and Specifications: The Contract Drawings and Specifications shall be considered as complementary, one to the other, so that materials and work indicated, called for, or implied by the one and not by the other shall be supplied and installed as though specifically called for by both. The Contract Drawings are to be considered diagrammatic, not necessarily showing in detail or to scale all of the equipment or minor items. In the event of discrepancies between the Contract Drawings and Specifications, or between either of these and any regulations or ordinances governing work of these specifications, the bidder shall notify the Engineer in ample time to permit revisions.

**1.2 QUALITY ASSURANCE**

- A. Materials and Equipment: Unless otherwise specified, all materials and equipment furnished for permanent installation in the work shall conform to applicable standards and specifications and shall be new, unused, and undamaged when installed or otherwise incorporated in the work. No such material or equipment shall be used by the Contractor for any purpose other than that intended or specified, unless such use is specifically authorized in writing by the Town. No material shall be delivered to the work site without prior acceptance of drawings and data by the Engineer.
- B. Equivalent Materials and Equipment:
1. Whenever a material or article is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, the specific item mentioned shall be understood as establishing the type, function, and quality desired. Other manufacturer's products may be accepted provided sufficient information is submitted to allow the Engineer to determine that the products proposed are equivalent to those named. Such items shall, be submitted for review in accordance with Section 01340: Shop Drawings, Working Drawings, and Samples.
  2. Requests for review of equivalency will not be accepted from anyone except the Contractor and such requests will not be considered until after the contract has been awarded.
- C. Governing Standards: Equipment and appurtenances shall be designed in conformity with ANSI, ASME, ASTM, IEEE, NEMA, OSHA, AGMA, and other generally accepted applicable standards. They shall be of rugged construction and of sufficient strength to withstand all stresses, which may occur during fabrication, testing, transportation, installation, and all conditions or operations. All bearings and moving parts shall be adequately protected against wear by bushings or other acceptable means. Provisions shall be made for adequate lubrication with readily accessible means.

- D. Tolerances: Machinery parts shall conform to the dimensions indicated on the drawings within allowable tolerances. Protruding members such as joints, corners, and gear covers shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be rounded or chamfered. Clearances: Ample clearances shall be provided for inspection and adjustment. All equipment shall fit the allotted space and shall leave reasonable access room for servicing and repairs. Greater space and room required by substituted equipment shall be provided by the Contractor and at his expense.
- E. Testing:
1. When the equipment is specified to be factory tested, the results of the tests shall be submitted to the Engineer and approval of the test results shall be obtained before shipment of the equipment.
  2. When an item of equipment, including controls and instrumentation, has been completely erected, the Contractor shall notify the Engineer, who will designate a time to make such tests as required, and operate the item to the satisfaction of the Engineer. All testing shall be done in the presence of the Engineer. "Completely erected" shall mean that the installation is erected, all necessary adjustments have been made, all required utility connections have been made, required lubricants and hydraulic fluid have been added and the unit has been cleaned and painted.
- F. Pressure Test:
1. After installation, all the piping shall be pressure tested.
  2. All tests shall be made in the presence of and to the satisfaction of the Engineer and also, to the satisfaction of any local or state inspector having jurisdiction.
    - a. Provide not less than three days notice to the Engineer and the authority having jurisdiction when it is proposed to make the tests.
    - b. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the Engineer shall be retested in part or in whole as directed by the Engineer.
    - c. The piping systems may be tested in sections as the work progresses but no joint or portion of the system shall be left untested.
  3. All elements within the system that may be damaged by the testing operation shall be removed or otherwise protected during the operation.
  4. All defects and leaks observed during the tests shall be corrected and made tight in an approved manner and the tests repeated until the system is proven tight.
  5. Repair all damage done to existing or adjacent work or materials due to or on account of the tests.
  6. Provide test pumps, gauges, or other instruments and equipment required for the performance of all tests. Provide all temporary bracing, test plugs, additional restraint, and thrust blocking which may be required for test pressures above normal working pressures.
  7. All tests shall be maintained for as long a time as required to detect all defects and leaks but not less than the duration specified for each type of pipe or piping system in this Division.
- G. Failure of Test:

1. Defects: Any defects in the equipment, or deviations from the guarantees or requirements of the Specifications, shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to correct any defects or deviations, or if the replaced equipment when tested shall fail again to meet the guarantee or specified requirements, the Town, notwithstanding his having made partial payment for work and materials, which have entered into the manufacture for such equipment, may reject that equipment and order the Contractor to remove it from the premises at the Contractor's expense.
  2. Rejection of Equipment: In case the Town rejects a particular item of equipment, then the Contractor hereby agrees to repay to the Town all sums of money paid to him to deliver to the Contractor a bill of sale of all his rights, title, and interest in and to the rejected equipment provided, however that the equipment shall not be removed from the premises until the Town obtains from other sources other equipment to take the place of that rejected. The bill of sale shall not abrogate the Town's right to recover damages for delays, losses or other conditions arising out of the basic Contract. The Town hereby agrees to obtain the alternate equipment within a reasonable time and the Contractor agrees that the Town may use the original equipment furnished by him without rental or other charge until the other equipment is obtained.
- H. Responsibility During Tests: The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Town formally takes over the operation thereof.
- I. Acceptance of Materials:
1. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and acceptance of the Town. No material shall be delivered to the work without prior submittal approval of the Engineer.
  2. The Contractor shall submit to the Engineer data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications.
  3. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during the progress of the work, the Contractor shall submit samples of materials for such special test as may be necessary to demonstrate that they conform to the specification. Such sample shall be furnished, stored, packed, and shipped as directed at the Contractor's expense. Except as otherwise noted, the Town will make arrangements for and pay for tests.
  4. The Contractor shall submit data and samples sufficiently early to permit consideration and acceptance before materials are necessary for incorporation in the work.
- J. Safety Requirements: In addition to the components shown and specified, all machinery and equipment shall be safeguarded in accordance with the safety features required by the current codes and regulations of ANSI, OSHA, and local industrial codes.

### **1.3 SUBMITTALS (See Section 01340: Shop Drawings, Working Drawings and Samples)**

### **1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Packaging: All equipment shall be suitably packaged to facilitate handling and protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to

the elements and shall be kept thoroughly dry at all times.

- B. Protection: All machined surfaces and shafting shall be cleaned and protected from corrosion by the proper type and amount of coating necessary to assure protection during shipment and prior to installation. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces, which are damaged prior to acceptance of equipment, shall be repainted to the satisfaction of Engineer.
- C. Lubrication: Grease and lubricating oil shall be applied to all bearings and similar items as necessary to prevent damage during shipment and storage.
- D. Marking: Each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.
- E. Fabricated sub-assemblies, if any, shall be shipped in convenient sections as permitted by carrier regulations and shall be properly match-marked for ease of field erection.
- F. Responsibility:
  - 1. The Contractor shall be responsible for all material, equipment, and supplies sold and delivered to the site under this Contract until final inspection of the work and acceptance thereof by the Town. In the event any such material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Town.
  - 2. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven (7) days after written notice to do so has been given, the Town retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering, and any other costs associated with making the necessary corrections.
- C. Delivery: The Contractor shall arrange deliveries of products in accordance with construction schedules and coordinate to avoid conflict with work and condition at the site.
  - 1. The Contractor shall deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
  - 2. Immediately on delivery, the Contractor shall inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged.
  - 3. Under no circumstances shall the Contractor deliver equipment to the site more than one month prior to installation without written authorization from the Engineer. Operation and maintenance data shall be submitted to the Engineer for review prior to shipment of equipment as described in Section 01730: Operating and Maintenance Data.
- H. Storage and Protection of Products:
  - 1. The Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry non-corrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this project. Storage of equipment shall be in strict accordance with the "Instructions for Storage" of each equipment supplier and manufacturer including connection of space heaters, and placing of storage lubricants in equipment. Corroded, damaged, or deteriorated equipment and parts shall be replaced before acceptance of the project. Equipment and materials not properly stored will

not be included in a payment estimate.

- a. The Contractor shall store products subject to damage by the elements in weather-tight enclosures.
  - b. The Contractor shall maintain temperature and humidity within the ranges required by manufacturer's instructions. The Contractor shall store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. The Contractor shall cover products, which are subject to deterioration with impervious sheet coverings and provide adequate ventilation to avoid condensation.
  - c. The Contractor shall store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
2. All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft, or damage of any kind whatsoever to the material or equipment.
  3. Cement, sand, and lime shall be stored under a roof and off the ground, and shall be kept completely dry at all times. All structural and miscellaneous steel and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt, or grease, and in a position to prevent accumulations of standing water, staining, chipping, or cracking. Brick, block, and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.
  4. All materials which, in the opinion of the Town's Representative, have become damaged and are unfit for the use intended or specified, shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.
  5. The Contractor shall arrange storage in a manner to provide easy access for inspection. The Contractor shall make periodic inspections of stored products to assure products are maintained under specified conditions, and free from damage or deterioration.
  6. Protection after Installation: The Contractor shall provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. The Contractor shall remove covering when no longer needed.

## **1.5 WARRANTY AND GUARANTEES**

The manufacturer's written warranty shall be submitted for all major pieces of equipment, as specified in Section 01740: Warranties and Bonds. The manufacturer's warranty period shall be concurrent with the Contractor's correction period for one year after the time of completion and acceptance.

## **1.6 SPARE PARTS**

Spare parts for certain equipment provided under Division 11 — Equipment and Division 15 — Mechanical have been specified in the pertinent sections of the specifications. The Contractor shall collect and store all spare parts in an area to be designated by the Engineer or Town's Representative. In addition, the Contractor shall furnish to the Engineer an inventory listing of all spare parts, the equipment they are associated with, and the name and address of the supplier.

## **1.7 MAINTENANCE MATERIALS**

All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Town shall be furnished with a year's supply of required lubricants including grease and oil of the type

recommended by the manufacturer with each item of equipment supplied.

## **PART 2- PRODUCTS**

### **2.1 FABRICATION AND MANUFACTURE**

#### **A. Workmanship and Materials:**

1. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, materials, defective workmanship or materials and leakage, breakage or other failure. Materials shall be suitable for service conditions.
2. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
3. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least ¼-inch thick.

#### **B. Lubrication:**

1. Equipment shall be adequately lubricated by systems, which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.
2. Lubricants of the type recommended by the equipment manufacturer shall be furnished by the Contractor in sufficient quantity to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by Town. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.
3. Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

#### **C. Safety Guards: All belt or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gage or heavier galvanized or aluminum-clad sheet steel or ½-inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.**

#### **D. Equipment Foundation Supports:**

1. All foundations, platforms and hangers required for the proper installation of equipment shall be furnished and installed by the Contractor, unless otherwise indicated or specified, all equipment shall be installed on reinforced concrete bases at least 6 inches high. Cast iron or welded steel baseplates shall be provided for pumps, compressors, and other equipment. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components and adequate grout holes. Baseplates for pumps shall have a means for collecting leakage and a threaded drain connection. Baseplates shall be anchored to the



concrete base with suitable anchor bolts and the space beneath filled with grout as specified in Section 03600: Grout. All open equipment bases shall be filled with non-shrinking grout sloped to drain to the perimeter of the base.

2. The Contractor shall furnish, install and protect all necessary guides, bearing plates, anchor and attachment bolts, and all other appurtenances required for the installation of equipment. These shall be of ample size and strength for the purpose intended.
3. Equipment suppliers shall furnish suitable anchor bolts for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Anchor bolts shall comply with Section 05500: Miscellaneous Metals and, unless otherwise specified, shall have a minimum diameter of  $\frac{3}{4}$ -inch. Unless otherwise indicated or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete.
4. Structural steel supports and miscellaneous steel required for supporting and/or hanging equipment and piping furnished under this Division shall be provided and installed by Contractor.
5. All foundations, anchor pads, piers, thrust blocks, inertia blocks and structural steel supports shall be built to template and reinforced as required for loads imposed on them.
6. The Contractor shall assume all responsibility for sizes, locations and design of all foundations, anchor pads, pier, thrust blocks, inertia blocks, curbs and structural steel supports.

E. Shop Painting:

1. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces, which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished smooth, thoroughly cleaned, and filled as necessary to provide a smooth uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high-grade oil-resistant enamel suitable for coating in the field with an alkyd enamel. Coatings shall be suitable for the environment where the equipment is installed.
2. Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of the specified primer. Unless otherwise specified, the shop primer for steel and iron surfaces shall be Cook "391-N-167 Barrier Coat", Koppers "No. 10 Inhibitive Primer", or equal.
3. Machined, polished, and nonferrous surfaces, which are not to be painted, shall be coated with rust- preventive compound, Houghton "Rust Veto 344N Rust-Oleum "R-9", or equal.

F. Nameplates: Contractor shall provide equipment identification nameplates for each item of equipment. Unless otherwise noted, nameplates shall be 1/8-inch Type 304 stainless steel and shall be permanently fastened. Plates shall be fastened using round head metallic drive screws, or where metallic drive screws are impractical, with stainless steel pop rivets. Metallic drive screws shall be brass or stainless steel, Type V and No. 8 by 3/8- inch long. Names and/or equipment designations shall be engraved on the plates and the engraving painted with a primer and black paint system compatible with stainless steel. Contractor shall submit a list of proposed names and designations for review prior to fabrication of nameplates. At a minimum, each nameplate shall include equipment manufacturers name, year of manufacture, serial number and principal rating data.

G. Pipe Identification: Underground pipe: All PVC pressure piping shall have a No. 12 solid copper tracer wire taped along the top of the pipe. The tracer wire shall be terminated at a maximum of 500-foot intervals with a ground level type box/lid and approximately 3 feet of coiled up wire inside each box

along the entire length of the main.

## **2.2 ACCESSORIES**

Special Tools and Accessories: Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION AND OPERATION**

- A. Installation: Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary for proper results. When so specified, or when employees of Contractor or his subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.
  - 1. The Contractor shall have on site sufficient proper construction equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character. To minimize field erection problems, mechanical units shall be factory assembled when practical.
  - 2. Equipment shall be erected in a neat and workmanlike manner on the foundations and supports at the locations and elevations shown on the Drawings, unless otherwise directed by the Engineer during installation.
  - 3. All equipment shall be installed in such a manner as to provide access for routine maintenance including lubrication.
  - 4. For equipment such as pumping units, which require field alignment and connections, the Contractor shall provide the services of the equipment manufacturer's qualified mechanic, millwright, machinist, or authorized representative, to align the pump and motor prior to making piping connections or anchoring the pump base.
  - 5. Equipment of a portable nature, which requires no installation, shall be delivered to a location designated by the Town.
- B. Tolerances: Precision gauges and levels shall be used in setting all equipment. All piping and equipment shall be perfectly aligned, horizontally and vertically. Tolerances for piping and equipment installation shall be 1/4-inch to 30 ft horizontal and vertically. All valves and operators shall be installed in the position shown on the Contract Drawings or as directed by the Engineer, if not shown.
- C. Alignment and Level: The equipment shall be brought to proper level by shims (1/4 inch maximum). After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to bind the machine firmly into place against the wedges or shims. Grouting shall be as specified in Section 03600: Grout.
- D. Grouting: The grout shall be tamped into position with a board, steel bar, or other tool. Tamping should not be so hard as to raise or otherwise displace the plate.
- E. Contact of Dissimilar Metals: Where the contact of dissimilar metal may cause electrolysis and where aluminum will contact concrete, mortar, or plaster, the contact surface of the metals shall be separated using not less than one coat of zinc chromate primer and one heavy coat of aluminum pigmented asphalt paint on each surface.

- F. Cutting and Patching: All cutting and patching necessary for the work shall be performed by the Contractor.
- G. Operation: All equipment installed under this Contract, including that furnished by Town or others under separate contract, shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

### **3.2 OBSERVATION OF PERFORMANCE TESTS**

Where the specifications require observation of performance tests by the Engineer, such tests shall comply with the quality assurance paragraph in this section.

### **3.3 MANUFACTURERS FIELD SERVICES**

#### **A. Services Furnished Under This Contract:**

1. An experienced, competent, and authorized representative of the manufacturer of each item of equipment shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, the manufacturer's representative shall be present when the equipment is placed in operation. The manufacturer's representative shall re-visit the job site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of Engineer and/or Town's Representative.
2. Each manufacturer's representative shall furnish to Town and Engineer, a letter of certification stating that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.
3. All costs for field services shall be included in the contract amount.

**END OF SECTION 15000**

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## **SECTION 15045 PRESSURE TESTING**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

##### **A. Scope of Work:**

1. This section specifies the leakage testing of pressure piping systems.
2. It is the intent of this specification section that all piping be pressure tested. At a minimum, the pipe shall be tested at 1.5 times the working pressure for a duration of two (2) hours, unless specified otherwise herein or in other specification Sections.

##### **B. Test Pressures and Times: PVC, ductile iron, and stainless steel pipe for water, wastewater, or reclaimed water service mains shall be tested for a minimum of two (2) hours at 150 psi, unless otherwise required by Town.**

##### **C. HDPE Piping, if any, shall be pressure tested in accordance with the separate High-Density Polyethylene Pipe requirements.**

##### **D. The Contractor shall test pipelines installed under this Contract in accordance with these specifications prior to acceptance of the pipeline by the Town of Ridgeland or connecting pipeline to any existing pipeline or facility. All field tests shall be made in the presence of the Engineer and/or Town's Representative. Except as otherwise directed, all pipelines shall be tested.**

All piping to operate under liquid pressure shall be tested in sections of approved length. For these tests, the Contractor shall furnish clean water, suitable temporary testing plugs or caps, and other necessary equipment, and all labor required. If the Contractor chooses to pressure test against an existing Town of Ridgeland main/valve, the Town of Ridgeland will not be responsible for failure of the pressure test due to the existing valve leaking. If positive test results cannot be obtained because the Town of Ridgeland valves will not hold the test pressures, the Contractor shall be required to disconnect from the Town of Ridgeland System and re-test independent of the Town of Ridgeland System and at the Contractor's expense.

##### **E. Testing Records:**

1. Provide record of each piping installation during the testing. These records shall include:
  - a. Date of test.
  - b. Identification of pipeline tested or retested.
  - c. Identification of pipeline material.
  - d. Identification of pipe section tested.
  - e. Test pressure.
  - f. Remarks: Leaks identified (type and location), types of repairs, or corrections made.
  - g. Certification by Contractor that the leakage rate measured conformed to the specifications.
  - h. Signature of Town's representative witnessing pipe test.

2. Submit three (3) copies of the pressure test form to the Town's representative upon completion of the testing.

## **PART 2 – PRODUCTS**

### **2.01 GENERAL:**

- A. Testing fluid shall be water.
- B. The Contractor will use suitable pressure gauges, calibrated by an approved testing laboratory, with increments no greater than 2 psi. Gauges used shall be of such size that pressures tested will not register less than 10% nor more than 90% of the gauge capacity. Leakage and pressure testing shall be in accordance with AWWA C600 and as outlined below.

### **2.02 MATERIALS AND EQUIPMENT**

- A. Provide pressure gauges, pipes, bulkheads, pumps, and meters to perform the hydrostatic testing.

## **PART 3 – EXECUTION**

### **3.01 TESTING PREPARATION**

- A. Pipes shall be in place and anchored before commencing pressure testing.
- B. Conduct hydrostatic tests on exposed and above ground piping after the piping has been installed and attached to the pipe supports, hangers, anchors, expansion joints, valves and meters.
- C. Before conducting hydrostatic tests, flush pipes with water to remove dirt and debris.
- D. Test new pipelines which are to be connected to existing pipelines by isolating the new line from the existing line by means of pipe caps, special flanges, or blind flanges. After the new line has been successfully tested and cleared by relevant regulatory agencies, remove caps or flanges and connect to the existing piping.
- E. Conduct hydrostatic tests on buried pipe after the trench has been completely backfilled. The pipe may be partially backfilled and the joints left exposed for inspection for an initial leakage test. Perform the final test, however, after completely backfilling and compacting the trench.

### **3.02 TESTING**

- A. Unless it has already been done, the section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. If blow offs or other outlets are not available at high points for releasing air, the Contractor shall make the necessary taps at such points and shall plug said holes after completion of the test.
  - B. Hydrostatic testing shall consist of a combined pressure test and leakage test. Specified test pressures, based on the elevation of the highest point of the line or section under test, and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection and all necessary apparatus, shall be furnished by the Contractor and shall be subject to the approval of the Engineer. All valved sections shall be hydrostatic tested to insure sealing (leak allowance) of all line valves.
1. All piping shall be pressure and leakage tested for a minimum of two hours duration at the test pressure noted in paragraph 1.01 for the relevant type of service. Pressure tests shall be

conducted with a pressure loss of not more than 5 psi regardless of length being tested. No pipe will be accepted if pressure loss is greater than 5 psi. regardless of leakage test results. All exposed pipe, fittings, valves and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings or valves that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated until it is satisfactory. Repairing, replacing and retesting shall be done at the Contractor's expense.

2. Leakage tests shall be conducted simultaneously with the pressure tests. At the end of the pressure test, the line will be pumped back to initial test pressure. The quantity of water used to repump the line shall be measured and compared to the limitations calculated using the leakage equation below. No pipe installation will be accepted if the leakage is greater than determined by the following formula which is applicable to DIP, PVC, or combination of both:

$$L = \frac{SD P^{1/2}}{148,000}$$

In which L is the allowable leakage in gallons per hour; S is the length of pipeline tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch. If any test discloses leakage greater than that specified above, the Contractor shall, at its own expense, locate and repair the defective material and retest until the leakage is within the specified allowance.

In the event a section fails to pass the tests, the Contractor shall do everything necessary to locate, uncover (even to the extent of uncovering the entire section), and replace the defective pipe, valve, fitting or joint. Visible leaks shall be corrected regardless of total leakage. Lines which fail to meet these tests shall be retested as necessary until test requirements are complied with. All testing shall be performed at the Contractor's expense.

6. If, in the judgment of the Engineer, it is impracticable to follow the foregoing procedures exactly for any reason, modifications in the procedure shall be made with approval; but, in any event, the Contractor shall be responsible for the ultimate tightness of the piping within the above requirement. For water mains, re-disinfection shall be required if the line is de-pressurized for repairs prior to tying into the Town of Ridgeland system.

**END OF SECTION 15045**

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## **SECTION 15100**

### **VALVES AND APPURTENANCES**

#### **PART 1 - GENERAL**

##### **1.1 SCOPE**

This section describes the valves and appurtenances required for a complete piping system as shown on the Drawings and as specified herein.

##### **1.2 GENERAL REQUIREMENTS**

- A. The Contractor's attention is directed to the requirements of Section 15301, Mechanical Equipment - General, in regard to the general requirements for all equipment furnished and installed under this division of the specifications.
- B. Where extension stems are required, substantial adjustable wall brackets and extension stems shall be furnished and located as directed. Generally however, brackets shall not be more than six feet (6') apart. Extension stems shall be provided on all buried valves when the operating nut is deeper than four feet (4') below the final grade and where required for above ground operators. Sufficient stem extension shall be provided so that the nut will be less than four feet (4') below finish grade.
- C. The contractor shall prepare and submit for review a layout schedule of the proposed equipment, piping, and valves depicting dimensions.
- D. All valves shall be suitable and appropriately certified (NSF 61) for use in Potable Water Systems.

#### **PART 2 - PRODUCT**

##### **2.1 GATE VALVES (REFERENCE SECTION 02661 – WATER VALVES AND APPURTENANCES)**

##### **2.2 KNIFE GATE VALVES (NOT USED)**

##### **2.3 SILENT GLOBE CHECK VALVES**

- A. Silent globe check valve shall be flanged ductile iron body with stainless steel seat, disc and spring and resilient seat. Valve disc shall be center guided at both ends with an integral shaft and shall be spring loaded for silent operation. The spring shall be helical or conical and stone tumbled to achieve a micro-finish to resist mineral deposits. The seat and disc shall be replaceable in the field.
- B. The flanges shall be manufactured in accordance with ANSI/AWWA C111. Valves shall be rated to 250 psi for all sizes.
- C. Materials of Construction:
  - 1. Valve Body: Ductile iron. ASTM A536 GR65-45-12
  - 2. Disc: 304 or 316 stainless steel. SS ASTM A276 T304/T316
  - 3. Spring: 316 stainless steel. SS ASTM A276; Stone Tumbled and Stress Relieved
  - 4. Resilient Seat: Buna-N
  - 5. Bushing: 304 or 316 stainless steel. SS ASTM A276 T304/T316.

- 6. Hardware: 316 stainless steel.
- D. The manufacturer shall furnish certified results of a proof of design test performed at an independent testing laboratory.
- E. Approved Manufacturers:
  - 1. Crispin , Model GC101.R
  - 2. Cla-Val. Series 581
  - 3. Approved equal

#### **2.4 PLUG VALVES (NOT USED)**

#### **2.5 INSERT VALVE (NOT USED)**

#### **2.6 TAPPING SLEEVE**

- A. To be utilized only for live tap applications. No taps (all sizes) shall be made within five (5) pipe diameters or five (5) feet (whichever is smaller) of a joint. Unless approved otherwise, size-on-size taps are limited on PVC mains to 12 inch size and smaller. Size-on-size taps are acceptable on D.I.P. (all sizes). For size-on-size taps, on 8-inch and larger mains, the actual tap hole size shall be reduced by 1-inch.
- B. Stainless Steel: Stainless steel tapping sleeves may be used on 4-inch pipe and larger and as noted on Drawings. Stainless steel tapping sleeves shall be all 304 stainless steel, including flanges, bolts and nuts and shall be rated for 150 psi minimum operating pressure and 200 psi minimum test pressure. The tapping sleeve shall have a pilot flange recessed for tapping per MSS SP-60. The pilot flange shall be pressure rated Class D according to AWWA C207 with 125 pound drilling conforming to ANSI B16. Each sleeve shall be supplied with a flanged gasket bonded to the flange. The body gasket shall be a full circle, grid pattern, converting the entire length of the sleeve, cloth reinforced with attached stainless steel bridge to support the gasket at the lugs. The gasket shall be made of SBR rubber or similar material, compounded for use with water, salt solution, mild acids, bases and sewage. The sleeve shall have a ¾ inch NPT bronze or stainless steel test plug. All welds shall conform to ASTM A380 and shall be fully passivated. Tapping sleeves 8-inch and smaller may have outlet connection to fit a mechanical joint tapping valve.

#### **2.7 TAPPING VALVE (REFERENCE SECTION 02661 – WATER VALVES AND APPURTENANCES)**

#### **2.8 BUTTERFLY VALVES**

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
  - 1. Keystone. Model GRL-10-D11E-A1-K-BO
  - 2. Mueller. BF Series.
  - 3. Approved equal.
- B. Type:
  - 1. Operating Pressure: Class 150B
  - 2. Connection: Lugged
  - 3. 90-degree closing, shutoff service. Bubble tight / zero leakage.
  - 4. Suitable for outdoor installation and continuous exposure to intense sunlight and atmospheric heat (110 °F).

- C. Materials of Construction
  - 1. Body: Ductile iron
  - 2. Disc and stem: Stainless steel
  - 3. Seat: EPDM. Field adjustable / replaceable
  - 4. O-Rings: Nitrile
- D. ASME Compliance: B16.34
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valve Actuators: (Not Used)

## 2.9 BALL VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B1.20.1 for threads for threaded-end valves.
  - 2. ASME B16.1 for flanges on iron valves.
  - 3. ASME B16.5 for flanges on steel valves.
  - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 5. ASME B16.18 for solder-joint connections.
  - 6. ASME B31.1 for power piping valves.
  - 7. ASME B31.9 for building services piping valves.
- C. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- D. Valve Sizes: Same as upstream piping unless otherwise indicated.
- E. Valve Actuator Types:
  - 1. Handlever: For quarter-turn valves smaller than NPS 4.
- F. One-Piece Bronze Ball Valves with Bronze Trim:
  - 1. Description:
    - a. Standard: MSS SP-110.
    - b. CWP Rating: 400 psig
    - c. Body Design: One piece.
    - d. Body Material: Bronze.
    - e. Ends: Threaded.
    - f. Seats: PTFE.
    - g. Stem: Bronze.
    - h. Ball: Chrome-plated brass.
    - i. Port: Reduced.

## 2.10 WELL SERVICE AIR VALVE

- A. Scope: Well Service Air Valves shall be fully automatic float operated valves designed to exhaust air which is present in the pump column on pump startup and allow air to re-enter the column on pump shutdown to prevent vacuum formation. A Dual Port Throttling Device shall provide adjustable control of the exhaust rate and allow free flow into the valve through a separate inlet port.

B. Standards, Approvals and Verification

1. Manufacture and testing: AWWA C512.
2. NSF/ANSI 61 Drinking Water System Components - Health Effects.

C. Design:

1. The valve body shall provide a through flow area equal to the nominal valve size. A bolted cover with alloy screws and flat gasket shall be provided to allow for maintenance and repair.
2. Floats shall be unconditionally guaranteed against failure including pressure surges. The float shall have a guide shaft supported in the body by circular bushings to prevent binding from debris. The float shall be protected against direct water impact by an internal baffle.
3. The resilient seat shall provide drop tight shut off to the full valve pressure rating. The seat shall be a minimum of 0.5 in. thick on 2 in. and larger valves and secured in such a manner as to prevent distortion.
4. Valves 3 in. (75 mm) and smaller shall be equipped with a double acting throttling device to control the discharge of air from the valve and allow full vacuum flow through a separate port. The device shall have an externally adjustable screw and locknut for adjusting the discharge control disc. The vacuum port shall be equipped with a spring loaded disc to allow flow into the valve during negative pressure conditions. Throttling devices with a common exhaust and vacuum port are not acceptable. The material of the body shall be consistent with the Well Service Air Valve. The spring shall be ASTM A313 Type 316 Stainless Steel.

D. Connection: 2-inch NPT. Connecting pipe: 2-inch NPT

E. Materials:

1. Body and Cover: Cast Iron ASTM A 126, Class B
2. Float: 316 Stainless Steel
3. Air Valve Internal Parts: 316 Stainless Steel
4. Arrestor Check: Stainless/Bronze
5. Seal: Buna-N® Rubber
6. Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550. The valve exterior shall be coated with a universal alkyd primer.

F. Manufacturers:

1. Val-Matic. Model 102ST
2. Apco / DeZurik. Model 146DAT
3. Cla-Val. Model 372-WS-2-TD
4. Approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Comply with Manufacturer's instructions, provisions of AWWA C600 and as specified.
- B. Thoroughly clean and remove all shipping materials prior to setting. Operate all valves from fully opened to totally closed.
- C. Surface preparation and finish painting are specified in Section 09900: Protective Coatings. Exterior of all above ground ductile iron valves shall be primed for painting. There shall not be any bitumastic or coal tar type coating on the exterior of the above ground ductile iron pipe.

**END OF SECTION 15100**

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## **SECTION 15130 PRESSURE GAUGES**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. Scope of Work: This section includes materials and installation of pressure gauges and accessories.
- B. General Design: Minimum pressure rating shall be equal to that of the pipeline in which they are to be installed.

#### **1.2 QUALITY ASSURANCE**

- A. Qualifications: The manufacturer shall have a minimum of five (5) years experience in the manufacture of pressure gauges.
- B. Manufacturers: Gauges and tools shall be as manufactured by Ashcroft, Wika, or equal.

#### **1.3 SUBMITTALS**

- A. Submit shop drawings in accordance with the General Conditions and Division 1.
- B. Manufacturer's catalog data and descriptive literature.
- C. Materials of construction by ASTM reference and grade.
- D. Manufacturer's certificate of compliance with the referenced ANSI standards.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Gauge Design: Gauges shall comply with ANSI B40.1, Grade 2A. Gauges shall incorporate the following features:
  - 1. Solid or open front with side or rear blowout relief.
  - 2. Pressure tight.
  - 3. 270 degree arc with adjustable pointer.
  - 4. Stem mounted.
  - 5. Glycerin filled unless specified otherwise.
  - 6. Size of gauge shall be 4-1/2 inches for all process liquid and 6 inches for process air unless otherwise indicated on the Drawings.
  - 7. Stem or connection size shall be 3/8 inch minimum unless otherwise indicated on the Drawings.
  - 8. Provide a gauge having a pressure range determined by the greater of the following two criteria:

- a. Two times the normal operating pressure; and
  - b. One and one-third times the test pressure.
9. Gauges of size smaller than 4-1/2 inches shall conform to ANSI B40.1, Grade A. Otherwise, construction shall be as described above.
10. All gauge assembly components shall be suitable and appropriately certified (NSF 61) for use in Potable Water Systems.

## 2.2 MATERIALS

A. Materials of construction shall be as shown in the following table:

	Item	Material	Specification
1.	Case	Stainless steel	AISI 316
2.	Bourdon tube	Stainless steel	AISI 316
3.	Windows	Glass	
4.	Ring	Stainless steel	AISI 316
5.	Stem	Stainless steel	AISI 316
6.	Dial face	Aluminum with clear baked- on acrylic coating	6061-T6, ASTM B209

## 2.3 ACCESSORIES

- A. Pipe Nipples and Fittings: Nipples for connection gauges to piping shall be Schedule 80S, Grade TP 316 seamless stainless steel, conforming to ASTM A 312. Fittings shall conform to ASTM A 403, Class WP316. Threads shall conform to ANSI B2.1. Size of pipe nipple shall match the gauge connection size.
- B. Tools for Gauges: Provide one gauge tool kit, containing a hand jack set, screwdriver, five reamers (minimum), two pin vise holders, wiggler, tweezers, and carrying case.
- C. Gauge Protectors (for use in process piping containing liquids having solids concentration greater than 0.1 percent):
- 1. Gauge protector shall consist of three parts: a flexible, impermeable, elastomer cylinder; a captive sensing liquid; and a stainless steel housing.
  - 2. As process liquid flows through the housing, the cylinder shall transmit pressure through the sensing liquid. An attached 4-1/2 inch pressure gauge, as specified previously, shall indicate the pressure. Gauge outlet in the spool or ring shall be threaded, 1/4 inch, per ANSI B2.1.
  - 3. Spools of sizes 1 inch through 4 inches shall be of the isolation-spool type with flanged ends. Spools of sizes 6 through 10 inches shall be of the isolation-ring type, fitting between two adjacent flanges.
  - 4. Determine the flange rating based on the test pressure. For test pressure 200 psi and less, use Class 150 flanges, ANSI B16.5. For test pressures greater than 200 psi, use Class 300



flanges, ANSI B16.4.

5. Materials of construction shall be as follows:

<u>Item</u>	<u>Material</u>	<u>Specification</u>
Housing	Stainless steel	AISI 316
Flexible cylinder	Buna N or Neoprene	
Sensing liquid	Glycerin	

6. Protectors shall be manufactured by Ronningen-Petter, Red Valve, or equal.

D. Diaphragm Seals (for use in all processing piping containing liquids, except potable water):

1. Provide diaphragm seals with gauge mountings where shown on the drawings.
2. Material of construction shall be Type 316 stainless steel. Pressure rating shall be at least that of the pressure gauge to which it is attached. Liquid filling shall be silicone.
3. Gauge and diaphragm seal shall be assembled together at the factory, with the liquid fill included. Provide a Type 316 stainless steel plug or cock in the flush connection.
4. Provide one pint of replacement fill liquid for every ten gauges having diaphragm seals or one pint for the entire project, whichever quantity is greater.

E. Pressure Snubbers: Provide with gauge mountings on all gauges. Material shall be Type 316 stainless steel. Inlet and outlet connections shall be 1/2-inch NPT.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install gauges before conducting pressure tests. Ream, clean and remove burrs from threaded piping before making up joints. Apply thread lubricant to threaded ends before assembling.

#### **3.2 INSPECTION AND TESTING:**

- A. Compare pressure readings of permanent gauges with Master test gauge. If reading of installed gauges varies by more than  $\pm 5$  percent from the Master gauge the installed gauge shall be replaced.
- B. Provide factory certification of testing and calibration for each Annular Seal or Diaphragm Seal Assembly. Unit shall be tested and calibrated in accordance with practice procedures on test equipment traceable to the National Institute of Standards and Technology (NIST).

**END OF SECTION 15130**

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## **SECTION 15145 HANGERS AND SUPPORTS FOR PIPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Metal pipe hangers and supports.
  - 2. Trapeze pipe hangers.

#### **1.3 DEFINITIONS**

- A. MSS: Manufacturers Standardization Society of the Valve and Fittings Industry Inc.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  - 1. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

#### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
  - 1. Trapeze pipe hangers.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of trapeze hangers.
  - 2. Design Calculations: Calculate requirements for designing trapeze hangers.

#### **1.6 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.

## **1.7 QUALITY ASSURANCE**

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

## **PART 2 - PRODUCTS**

### **2.1 TRAPEZE PIPE HANGERS**

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

### **2.2 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Stainless Steel: 316.
- C. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Non-staining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

## **PART 3 - EXECUTION**

### **3.1 HANGER AND SUPPORT INSTALLATION**

- A. Metal Trapeze Pipe-Hanger Installation: Comply with ANSI/MSS SP-58-2009. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A36/A36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- B. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- C. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

- E. Install lateral bracing with pipe hangers and supports to prevent swaying.
- F. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers.
- G. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

### **3.2 METAL FABRICATIONS**

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

### **3.3 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm)

### **3.4 PAINTING**

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 09900 – Painting.
- D. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION 15145**

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**SECTION 15301**  
**MECHANICAL EQUIPMENT - GENERAL**

**PART 1 - GENERAL**

**1.1 SCOPE**

The work to be performed under this section consists of furnishing all materials and equipment, and performing all necessary services for a complete, operable installation of all mechanical and control equipment delineated hereinafter and in strict accordance with the Contract Documents and the approved manufacturer's shop drawings.

**PART 2 – PRODUCT (NOT USED)**

**PART 3 - EXECUTION**

**3.1 PIPE LOCATION**

- A. Exterior pipelines will be located substantially as indicated on the Contract Drawings, but the right is reserved by the Town, acting through the Engineer, to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required without additional compensation.
- B. All piping shown on the Contract Drawings, except as noted below, is indicated diagrammatically, and the exact location will be determined from approved shop drawings. Piping will be arranged in a neat, compact and workmanlike manner with a minimum of crossing and interlacing and, in general, without diagonal runs.
- C. Small interior piping is indicated diagrammatically on the Drawings and the exact location is to be determined in the field. Piping will be arranged in a neat, compact and workmanlike manner with a minimum of crossing and interlacing and, in general, without diagonal runs.

**3.2 BOLTS, ANCHOR BOLTS AND NUTS**

- A. All anchor bolts, anchor bolt templates and location drawings required for the installation of the equipment, support columns, and for all other equipment or machinery included under this Contract will be furnished by the Contractor and/or the equipment manufacturer under this Contract. Anchor bolts, sleeves and inserts will be set in place in forms and cast in the concrete by the General Contractor. It will be the responsibility of the equipment manufacturers under this Contract to furnish such anchor bolts, templates and approved location drawings in proper time to avoid delay, and it will be his further responsibility to check and approve the location and setting of the anchor bolts, sleeves and inserts prior to the casting of the concrete. Parts of anchors of metal work that are not built into masonry and concrete will be coated with approved red lead paint. Anchor bolts for column base plates and other structural elements will be of steel; anchor bolts for drives, motors, fans, blowers and other mechanical equipment will be of Type 316 Stainless Steel or high strength bronze. Anchor bolts will be of ample size and will be provided with hexagonal nuts of the same quality of metal as the bolts. All threads will be clean cut and of United States Standard size. All anchor bolts, washers and nuts will be Type 316 Stainless Steel. During installation of stainless steel bolts & nuts, the Contractor will apply a never-seize type compound to the threads before tightening assemblies together.
- B. Expansion bolts will have malleable iron and lead composition elements of the required number of units and size. Expansion bolts, if required, will be furnished and installed under this Contract. Unless otherwise specified, stud, tap and machine bolts will be of the best quality refined bar iron. Hexagonal

nuts of the same quality of metal as the bolts will be used. All threads will be clean cut and will conform to ANSI Standard B1.1-1949 for Unified and American Screw Threads for Screws, Bolts, Nuts and Other Threaded Parts.

- C. Bolts, anchor bolts, nuts and washers not specified to be stainless steel will be zinc-coated after being threaded by the hot dip method process in conformity with the ASTM A123 (latest edition) for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips, or ASTM A153 (latest edition) for Zinc-Coating (Hot Dip) on Iron and Steel Hardware, as is appropriate.
- D. Anchor bolts and expansion bolts will be set accurately. If anchor bolts are set before the concrete has been placed, they will be carefully held in suitable templates of approved design provided under this Contract. Where indicated on the Drawings, specified, or required, anchor bolts will be provided with square plates at least four inches (4") by four inches (4") by three-eighth inches (3/8") or will have square head and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking will be done at the Contractor's expense under this Contract, and care will be taken not to damage the structure or finished by cracking, chipping, spalling or otherwise during the drilling and caulking.

### **3.3 CONCRETE INSERTS**

Concrete inserts will be designed to support safely, in the concrete that is used, the maximum load that can be imposed by the hangers used in the inserts. Inserts will be of a type which will permit adjustment of the hangers both horizontally (in one plane) and vertically and locking of the hanger head or nut. All inserts will be galvanized.

### **3.4 SLEEVES**

- A. Unless otherwise indicated on the Drawings or specified, openings for the passage of pipes through floors and walls will be formed of sleeves of standard-weight, galvanized steel pipe. The sleeves will be of an ample diameter to pass the pipe and its insulation, if any, and to permit such expansion as may occur. Sleeves will be of sufficient length to be flush at the walls and the bottom of slabs and to project one (1) inch above the finished floor surface. Threaded nipples will not be used as sleeves.
- B. Sleeves in exterior walls below grade or in walls to have water, sewage or wastes on one or both sides will have a two inch (2") annular fin of 1/8 inch (1/8") plate welded with a continuous weld completely around the sleeve at about mid-length.
- C. All sleeves will be set accurately before the concrete is placed or will be built-in accurately as the masonry is being built.

### **3.5 FOUNDATIONS. INSTALLATION AND GROUTING**

- A. The Contractor will furnish the necessary materials and construct suitable concrete foundations for all equipment installed by him at no additional cost to the Town, even though such foundations may not be indicated on the Drawings. The tops of the foundations will be at such elevations as will permit grouting as specified below.
- B. All equipment will be installed by skilled mechanics and in accordance with the instructions of the manufacturer.
- C. In setting pumps, motors and other items of equipment customarily grouted, the Contractor will make an allowance of at least one (1") inch for grout under the equipment bases. Shims used to level and adjust the bases will be metal. Shims may be left embedded in the grout, in which case they will be brass or bronze and installed so as to be inconspicuous as possible in the completed work.



- D. Provide non-shrink type grout under all equipment bases.
- E. Unless indicated otherwise in other sections, grout will consist of one (1) part cement, two (2) parts or less of fine aggregate, and the minimum quantity of water necessary to permit the grout to be properly placed. Where practical, the grout will be placed through the grout holes in the base and worked outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form so constructed as to provide a suitable chamfer around the top edge of the finished foundation. Where such procedure is impractical, the method of placing grout will be as approved. After the grout has hardened sufficiently, all forms, hoppers, and excess grout will be removed, and all exposed grout surfaces will be patched in an approved manner, if necessary, and given a burlap-rubbed finish.

### **3.6 SERVICES OF MANUFACTURER'S REPRESENTATIVE**

- A. The Contractor will arrange for a qualified service representative from the company manufacturing or supplying certain equipment as listed below, to perform the duties herein described.
- B. After installation of the listed equipment has been completed and the equipment is presumably ready for operation, but before it is operated by others, the representative will inspect, operate, test and adjust the equipment. The inspection will include, but will not be limited to, the following points as applicable:
  - 1. Soundness (without cracked or otherwise damaged parts).
  - 2. Completeness in all details, as specified.
  - 3. Correctness of setting, alignment, and relative arrangement of various parts.
  - 4. Adequacy and correctness of packing, sealing and lubricants.
  - 5. Correction of calibration, etc.

The operations, testing and adjustment will be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified.

- C. On completion of his work, the manufacturer's or supplier's representative will submit in triplicate to the Engineer, a complete signed report of the result of his inspection, operation, adjustments and tests. The report will include detailed descriptions of the points installed, tests and adjustments made, quantitative results obtained if such are specified and the suggestions for precautions to be taken to ensure proper maintenance. The report also will include a certificate that the equipment conforms to the requirements of the Contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty void and null. The manufacturer or supplier will file with his shop drawing submittal, an equipment warranty guaranteeing his equipment for a period of one (1) year from date of final acceptance of the equipment by the Town.
- D. The provisions of this section will apply, among others, to the following equipment:
  - 1. Pumping equipment.
  - 2. Emergency power generation.
  - 3. Instrumentation.

In addition to the above requirements, the Contractor will employ the services of a factory service engineer for the special service specified in this section.

### **3.7 STANDARDIZATION OF GREASE FITTINGS**

The Contractor will ensure that all grease fittings on all pieces of equipment furnished under this Contract are standardized so that only the button-head type of fitting is used. Fittings will be standard or giant size according to the type of service to be performed. Unless otherwise approved, all fittings will be the product of one manufacturer.

### **3.8 NAMEPLATES**

- A. With the exceptions mentioned below, each piece of equipment will be provided with a substantial nameplate of non-corrodible metal, securely fastened in place and clearly and permanently inscribed with the manufacturer's name, model or type designation, serial number, principal rated capacities, electrical or other power characteristics, and similar information as appropriate.
- B. This requirement will not apply to standard, manually operated hydrants; gates, globe, check and plug valves; or accessories and specialty not having an electrical connection.

### **3.9 OPERATING INSTRUCTIONS AND PARTSLIST**

- A. The Contractor will furnish for each piece of equipment, five (5) complete, neatly bound sets giving the following listed below:
  - 1. Clear and concise instructions for the installation, operation, adjustment and lubrication and other maintenance of the equipment. These instructions will include a complete lubrication chart.
  - 2. List of all parts for the equipment with catalog numbers and other data necessary for ordering replacement parts.
  - 3. In addition to the above, the Contractor, prior to requesting payment for equipment stored on-site, will submit to the Engineer, a complete list of maintenance and spare parts requirements as specified below. For each piece of mechanical equipment furnished under this Contract, the following information will be supplied:
    - a. Complete part's list.
    - b. Complete set of preventive maintenance requirements as a function of running and/or elapsed time.
    - c. Complete set of lubrication instructions including schedule and quantity and type of lubricant (s).
    - d. Complete listing of consumable items sufficient for one (1) years' operation, i.e., light bulbs, belts, etc.
    - e. Recommended spare parts inventory.
  - 4. Identification of Valves:
    - a. Each shut-off or control valve installed in process piping systems will be provided with a 1-1/2 inch minimum diameter heavy brass tag. Each tag will bear the identifying number of the valves and, when so indicated in the Project Specifications and/or on the Contract Drawings, an identifying letter symbol of the serviceline.

The tags will be attached to the valve by split-key rings soldered so that ring and tag

cannot be removed. The numbers and letters will be block type, with ½ high numbers and ¼-inch high letters stamped thereon and filled with black enamel.

5. Valve Directories: The Contractor will furnish and install approved schematic pipe diagrams and valve directories for each process piping system. Each schematic pipe diagram will be single line showing the relative position of valves, valve numbers and the direction of flow. Each directory will show each valve number and the location of each valve. Each diagram and directory will be on approved material and framed in a glazed frame with screw eyes and wires for hanging and will be located as directed by the Engineer.
- B. Such instructions and part's list will have been prepared for the specific equipment furnished and will not refer to other sizes and types or models of similar equipment.

### **3.10 LUBRICANTS**

The Contractor will furnish all lubricants used during testing and prior to acceptance, and in addition, he will furnish an estimated six (6) months supply of all grease and oil necessary for the proper lubrication of all equipment furnished under this Contract. Lubricants for this supply will be furnished in the original sealed containers, each correctly identified as to brand and grade with reference to the particular piece of equipment for which it is intended.

### **3.11 TOOLS**

- A. For each type of equipment furnished by the Contractor, he will provide a complete set of all special tools (including grease guns, or other lubricating devices), which may be necessary for the adjustment, operation, maintenance and disassembling of such equipment. Tools will be a high grade, smooth, forged, alloy, tool steel.

### **3.12 PATENTS**

- A. General: The Contractor will guarantee to the Town that all equipment offered under these Specifications, or that any process resulting from the use of such equipment in the manner stated, is not subject of patent litigation, and that he is not knowingly offering equipment, the installation, or use of which is likely to result in a patent controversy, in which the Town, as user, is likely to be made the defendant.
- B. License: Where patent infringements are likely to occur, each Contractor will submit, as a part of his bid, license arrangements between himself, and the manufacturer of the equipment offered, and the patent Town or the controller of the patent, which will permit the use in the specified manner of such mechanical equipment as he may be bidding upon.
- C. Liability: Each Contractor, by submitting his bid, agrees to hold and save the Town or its officers, agents, servants and employees harmless from liability of any nature or kind including cost and expenses for or on account of any patented or un-patented invention, process, article, or appliance manufactured or used in the performance of the work under this contract including the use of same by the Town.

### **3.13 PIPING AND CONNECTIONS**

- A. Equipment will be oriented and connected as indicated on the drawings. Deviations from dimensions and arrangements shown on the Drawings caused by equipment characteristics will be shown on completely dimensioned layouts and submitted by the Contractor to the Engineer for approval prior to installation of the equipment. The approved deviation and all related changes in piping, conduits, supports, etc., will be made at no additional cost to the Town.
- B. Electrical connections will be performed as specified under Division 16, ELECTRICAL.

### **3.14 ELECTRIC MOTORS**

See Division 16: Electrical

### **3.15 SUBMISSION OF APPROVAL DATA WITH BID**

- A. It will be the Contractor's responsibility to submit with his bid, complete information on the equipment offered. In the case of equipment listed or specified herein, this may be a statement to the effect that the equipment being offered meets the Specifications and conforms with the plans in every detail, any and all exceptions will be listed so that a decision may be made prior to award, otherwise, it will be assumed the equipment conforms to these Specifications in every respect. This will not relieve the Contractor of Shop Drawing submittals as set forth in the Specifications.
- B. For equipment not listed or specified herein, complete Shop Drawings and Specifications will be filed, listing or showing weights, thicknesses, material, performance characteristics, etc.
- C. For pumps, the manufacturer's material will show the manufacturer of the motor (s) and for all pumps more than 45 g.p.m., a guaranteed performance curve and/or other data required in the paragraphs delineating the pump (s).

### **3.16 MATERIAL TO BE OBTAINED FROM THE MANUFACTURER**

- A. The Contractor will obtain all items named in these Specifications or so noted on the plans from the equipment manufacturer and such incidental items as may be required for the safe and proper operation of the equipment for the purpose (s) intended.
- B. Shop Drawings will not be approved until all materials are listed along with the names and catalog numbers of any units being furnished by separate manufacturers.
- C. Equipment offered contrary to the provisions of this paragraph will be subject to rejection.

### **3.17 CUTTING AND PATCHING**

- A. The Contractor will leave all chases or openings for the installation of his own or any other contractor's or subcontractor's work, or will cut the same in existing work, and will see that all sleeves or forms are at the work and properly set in ample time to prevent delays. He will see that all such chases, openings, and sleeves are located accurately and are of proper size and shape and will consult with the Engineer and the contractors or subcontractors concerned in reference to this work.
- B. In case of his failure to leave or cut all such openings or have all such sleeves provided and set in proper time, he will cut or set them afterwards at his own expense, but in so doing, he will confine the cutting to the smallest extent possible, consistent with the work to be done. In no case will piers or structural members be cut without consent and the approval of the Engineer.
- C. The Contractor will carefully fit around, close up, repair, patch and point around the work specified herein to the entire satisfaction of the Engineer.
- D. All of this work will be done by careful workmen, competent to do such work and with the proper small hand tools. Power tools will not be used except where the type of tool proposed can be used without damage to the structure beyond the limits of the work.
- E. Except with the consent of the Contractor or subcontractor involved, given in writing or in the presence of the Engineer, the Contractor will not himself, and will not permit his subcontractors to cut or alter the work of any other contractor or subcontractor. All cutting and patching or repairing made necessary by the negligence, carelessness or incompetence of the Contractor or any subcontractor will be done at

the expense of the Contractor at fault.

**END OF SECTION 15301**

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**SECTION 16000**  
**BASIC ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General Information on the Electrical Installation not covered elsewhere. This section applies to all other electrical sections.

**1.02 SCOPE**

- A. It is the intent of DIVISION 16 to outline the electrical requirements of the contract. The complete scope of work covers the furnishing, installation, testing, adjusting, and placing in operation all electrical equipment, devices, facilities, materials, and auxiliary items necessary for the complete and successful operation of all electrical equipment as herein described, shown on the plans, or deemed necessary for the completion of the electrical portion of the project. Scope of work shall include such things as:
  - 1. Power and electrical systems
  - 2. Lighting systems
  - 3. Lightning protection and grounding systems
  - 4. Connection of electrically powered mechanical equipment
  - 5. Instrumentation, control, and SCADA systems
  - 6. Temporary construction power and construction lighting systems

**1.03 QUALITY ASSURANCE**

- A. All electrical work shall be in accordance with the following codes and agencies:
  - 1. The National Electrical Code (NFPA-70), 2020 Edition with South Carolina modifications.
  - 2. The International Building Code, 2021 Edition with South Carolina modifications.

3. Regulations of the local utility company concerning metering and service entrance.
  4. State and local ordinances governing electrical work.
- B. All materials shall be new and shall conform to standards where such have been established for the particular material. All UL listed equipment shall bear the UL label.

#### 1.04 PERMITS

- A. Obtain all permits and inspections required for the work involved. Deliver to the owner all certificates of inspection.

#### 1.05 PROTECTION OF ELECTRICAL EQUIPMENT

- A. Electrical equipment shall be protected from the weather during shipment, storage, and after installation in accordance with manufacturer's requirements and recommendations. Should any equipment be subjected to damage through water penetration, it shall be thoroughly dried out and put through a dielectric test, at the expense of the CONTRACTOR. The results of the test shall be submitted to the ENGINEER for review and approval. Equipment deemed unsuitable for continued operation shall be replaced by the CONTRACTOR at no additional cost to the OWNER.

#### 1.06 UTILITIES

- A. The electrical CONTRACTOR shall install a fully operational electrical service as described in the plans. Coordinate with the utility company for the services and install the services in accordance with their requirements, regulations and recommendations. CONTRACTOR shall include with their bid and be responsible for payment of all electrical service permit fees and inspection fee

#### 1.07 WARRANTY

- A. The CONTRACTOR shall warrant all lighting for a period of one (1) year after the date of substantial completion. Guarantee shall include material and labor for re-lamping.
- B. The CONTRACTOR shall warrant all other electrical systems, materials, and workmanship to be free from defects for a period of one (1) year from the date of substantial completion unless noted otherwise or in accordance with OWNER requirements. He shall correct all defects arising within this period upon notification by the OWNER or ENGINEER, without additional compensation.



- C. It is understood that the rights and benefits given to the OWNER by the guarantees found in the technical specifications are in addition to and not in derogation of any rights or benefits found in the special and general provisions of the contract.

#### 1.08 TEMPORARY POWER AND LIGHTS DURING CONSTRUCTION

- A. It shall be the responsibility of the CONTRACTOR to provide and maintain adequate temporary power and lighting at all times during construction, so that the various other trades can accomplish their work in a flawless manner and to maintain at all times plant operations.

#### 1.09 REFERENCES

- A. ANSI/NFPA 70 – National Electrical Code
- B. ANSIC2 – National Electrical Safety Code
- C. NEMA – National Electrical Manufacturer's Association
- D. UL – Underwriters Laboratories
- E. NFPA – National Fire Protection Association
- F. IEEE – The Institute of Electrical and Electronics Engineers
- G. IESNA – The Illuminating Engineering Society of North America
- H. NETA – International Electrical Testing Association
- I. Standards for Water and Wastewater Facilities as published by the OWNER
- J. Authority Having Jurisdiction standards and requirements including permitting and fees.

#### 1.10 SUBMITTALS

- A. The CONTRACTOR shall review and approve all shop drawings prior to submittal to the ENGINEER for review. As part of the review, the installer shall certify that the provided equipment or components shown and marked in the submittal are in compliance with the contract drawing and specifications, can be installed in the allocated space, will be stored in accordance with the manufacturer's recommendation, and will be installed per NEC.

- B. Submit Shop Drawings, catalog sheets, or other descriptive data with sufficient information to establish design, quality and performance. Data shall describe apparatus, equipment, panels, fixtures, and other items requiring descriptive literature. Provide submittals as a single package including all required electrical items. Partial packages will not be reviewed. Submittals items shall be in accordance with the individual specification sections. See project general notes in design drawings for a list of items required for submittal. See Administrative Requirements section for more information on submittals.
- C. Collect and neatly retain maintenance and service data supplied with equipment furnished and installed under this Contract until job completion, at which time deliver to the General Contractor for inclusion in the Maintenance Manual. All such data must be properly identified as for equipment served.

#### 1.11 STAFFING

- A. The electrical CONTRACTOR shall provide a “Master Electrician” who has been deemed a “Master Electrician” by exam through the State, or any other Local Permitting Authority as the Electrical Superintendent for the project. The Electrical Superintendent shall provide direct supervision of all lower craft labor any time any electrical work is performed by the CONTRACTOR.

#### 1.12 AS-BUILT DRAWINGS

- A. The As-Built drawings shall include detailed drawings of all duct banks, underground conduit, above ground conduit, motor control centers, PLC control panels, control drawings. These drawings shall indicate exact location of all duct banks, underground electrical wiring, and fiber optic cable.
- B. The location shall indicate the following:
  - 1. Centerline location
  - 2. Width / Cross section
  - 3. Depth
- C. Upon request, the ENGINEER will provide an electronic PDF copy of the conformed construction drawings for use by the CONTRACTOR.

#### 1.13 CUTTING, PATCHING, EXCAVATING & BACKFILLING

- A. All cutting and patching required to carry out the work shall be provided under other Specification Sections.
- B. All excavation and backfilling required to install conduit shall be provided under this Section. Backfill shall be compacted as required under other Specification Sections.

#### 1.14 COORDINATION - GENERAL

- A. Drawings are generally diagrammatic. Review all project Drawings and coordinate all work with CONTRACTOR and different trades prior to installing any work so that interferences between electrical work and ducts, piping, equipment, architectural and structural work will be avoided. Do not install conduits, boxes and fittings in spaces required for ductwork or piping.
- B. Furnish all necessary offsets in raceways, fittings, etc., required to properly install work so as to take up minimum space. Install all equipment to provide code required "working space". Furnish and install all materials required to accomplish this without additional cost.
- C. In case interference develops, the General CONTRACTOR will decide which trade work must be relocated regardless of which was installed first. Damage from interference or rework caused by inadequate coordination with other trades shall be rectified without additional cost to the OWNER.
- D. Within 30 days following award of Contract, report to the General CONTRACTOR in writing all real or potential errors, ambiguities and/or conflicts on electrical work or between trades. Those reported after 30 days, except as a result of unforeseen circumstances, shall be resolved at the discretion of the General CONTRACTOR. Report conflicts resulting from progress of work to the General CONTRACTOR immediately.

#### 1.15 COORDINATION – ELECTRICAL/MECHANICAL

- A. Unless specifically required otherwise, all motors, integral starters, control and monitoring devices (including wire and conduit for control circuits), timers, relays, pilot devices and other required control components for mechanical systems will be furnished and installed by the Mechanical Contractor.
- B. Unless specifically required otherwise, make all power wiring connections to all water heaters, pumps, machinery, appliances, water coolers and other electrically operated equipment as indicated on the Drawings or as required. Furnish and install disconnect switches, starters and protective devices as indicated on the Drawings, except for items furnished with integral disconnect switches and/or starters. Coordinate the exact

location of receptacles, flexible conduit, and disconnects for mechanical and plumbing equipment with the mechanical or plumbing contractor.

- C. Review approved Shop Drawings and verify final electrical characteristics and wiring before rough-in of power feeds to any equipment. When electrical data on approved Shop Drawings differs from contemplated design, make necessary adjustments to wiring, disconnect, and branch-circuit protection for equipment actually installed.

#### 1.16 WORKING CLEARANCES

- A. Working clearances and dedicated space around electrical equipment requiring service shall comply with NEC requirements. Coordinate and verify clearances from equipment and work furnished by other trades. Should there be any apparent violations of clearance requirements, notify the ENGINEER before proceeding with connection or placement of equipment. Rework caused by inadequate coordination shall be rectified at no extra cost.
- B. For power distribution equipment, control equipment, and other equipment requiring wire and cable terminations, the CONTRACTOR shall ascertain that lug sizes and wiring gutters or space allowed for proper accommodation and termination of the wires and cables are adequate.

#### 1.17 SHORT CIRCUIT/COORDINATION STUDY/ARC FLASH HAZARD ANALYSIS

##### A. Scope

- 1. The contractor shall furnish short-circuit and protective device coordination studies which shall be prepared by the equipment manufacturer.
- 2. The contractor shall furnish and Arc Flash Hazard Analysis Study per NFPA 70E – Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D.

##### B. Submittals For Construction

- 1. The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. No more than five (5) bound copies of the complete final report shall be submitted.
- 2. The report shall include the following sections:
  - a. One-line diagram showing protective device ampere ratings and associated designations, cable size & lengths, transformer kVA & voltage ratings, motor

& generator kVA ratings, and switchgear/switchboard/panelboard designations

- b. Descriptions, purpose, basis and scope of the study
- c. Tabulations of the worst-case calculated short circuit duties as a percentage of the applied device rating (automatic transfer switches, circuit breakers, fuses, etc.); the short circuit duties shall be upward-adjusted for X/R ratios that are above the device design ratings
- d. Protective device time versus current coordination curves with associated one line diagram identifying the plotted devices, tabulations of ANSI protective relay functions and adjustable circuit breaker trip unit settings
- e. Fault study input data, case descriptions, and current calculations including a definition of terms and guide for interpretation of the computer printout
- f. Incident energy and flash protection boundary calculations
- g. Comments and recommendations for system improvements, where needed
- h. Executive Summary including source of information and assumptions made

#### C. Qualifications

1. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the supervision and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies. The Registered Professional Electrical Engineer shall be a full-time employee of the electrical power equipment manufacturer (Square D, Eaton, GE/ABB or equal).

#### D. Studies

1. Contractor to furnish short-circuit and protective device coordination studies as prepared by equipment manufacturer. The coordination study shall begin with the utility company's feeder protective device and include all of the electrical protective devices down to and include the largest feeder circuit breaker and motor starter in the 480 Volt system. The study shall also include variable frequency drives, harmonic filters, power factor correction equipment, transformers and protective devices associated with variable frequency drives, emergency and standby generators associated paralleling equipment and distribution switchgear.
2. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E
3. - Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D.

#### E. Data Collection

1. Contractor shall furnish all field data as required by the power system studies. The Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract.

#### F. Short-Circuit and Protective Device Evaluation Study

1. Use actual conductor impedances if known. If unknown, use typical conductor impedances based on IEEE Standards 141, latest edition.
2. Transformer design impedances and standard X/R ratios shall be used when test values are not available.
3. Provide the following:
  - a. Calculation methods and assumptions
  - b. Selected base per unit quantities
  - c. One-line diagram of the system being evaluated with available fault at each bus, and interrupting rating of devices noted
  - d. Source impedance data, including electric utility system and motor fault contribution characteristics
  - e. Typical calculations
  - f. Tabulations of calculated quantities
  - g. Results, conclusions, and recommendations
4. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault  
at each:
  - a. Electric utility's supply termination point
  - b. Enclosed breaker
  - c. 480V and 240V panelboards
  - d. Reduced voltage starters
  - e. Standby generators and automatic transfer switches
5. For grounded systems, provide a bolted line-to-ground fault current study for areas as defined for the three-phase bolted fault short-circuit study.
6. Protective Device Evaluation:
  - a. Evaluate equipment and protective devices and compare to short circuit ratings

#### G. Protective Device Coordination Study

1. Proposed protective device coordination time-current curves

shall be graphically displayed on log-log scale paper.

2. Include on each curve sheet a complete title and one-line diagram with legend identifying the specific portion of the system covered.
1. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which device is exposed.
2. Identify device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
3. Plot the following characteristics on the curve sheets, where applicable:
  - a. Electric utility's protective device
  - b. Medium voltage equipment relays
  - c. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
  - d. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
  - e. Transformer full-load current, magnetizing inrush current, and ANSI transformer withstand parameters
  - f. Conductor damage curves
  - g. Ground fault protective devices, as applicable
  - h. Pertinent motor starting characteristics and motor damage points
  - i. Pertinent generator short-circuit decrement curve and generator damage point
4. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

#### H. Arc Flash Hazard Analysis

1. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2004, Annex D.
2. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Alternative methods shall be presented in the proposal.
3. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (enclosed breaker, pump control panel, wet well, junction box, generator and automatic transfer switch) where work could be performed on energized parts.

4. The Arc-Flash Hazard Analysis shall include all MV, 480V locations and significant locations in 240 volt and 208 volt systems fed from transformers equal to or greater than 125 kVA.
5. Safe working distances shall be specified for calculated fault locations based upon the calculated arc flash boundary considering an incident energy of 1.2 cal/cm<sup>2</sup>.
6. The Arc Flash Hazard analysis shall include calculations for maximum and minimum contributions of fault current magnitude.
7. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. Maximum clearing time will be capped at 2 seconds based on IEEE 1584-2002 section B.1.2.

#### I. Report Sections

1. Input Data
2. Short-Circuit Data
3. Recommended Protective Device Settings
  - a. Circuit Breakers:
4. Incident energy and flash protection boundary calculations.
  - a. Arcing fault magnitude
  - b. Device clearing time
  - c. Duration of arc
  - d. Arc flash boundary
  - e. Working distance
  - f. Incident energy
  - g. Hazard Risk Category
  - h. Recommendations for arc flash energy reduction

#### J. Field Adjustment

1. Adjust relay and protective device settings according to the recommended settings table provided by the coordination study.
2. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
3. Notify Owner in writing of any required major equipment modifications.



## K. Arc Flash Warning Labels

1. The vendor shall provide a 3.5 in. x 5 in. thermal transfer type label of high adhesion polyester for each work location analyzed.
2. The label shall have an orange header with the wording, “WARNING, ARC FLASH HAZARD”, and shall include the following information:
  - a. Location designation
  - b. Nominal voltage
  - c. Flash protection boundary
  - d. Hazard risk category
  - e. Incident energy
  - f. Working distance
  - g. Engineering report number, revision number and issue date
3. Labels shall be machine printed, with no field markings
4. Arc flash labels shall be provided in the following manner and all labels shall be based on recommended overcurrent device settings.
  - a. For each 480 and applicable 240 volt enclosed breaker and disconnects, one arc flash label shall be provided
  - b. For each reduced voltage starter, one arc flash label shall be provided
  - c. For each panelboard, one arc flash label shall be provided
5. Labels shall be field installed by the contractor.

## PART 2 PRODUCTS

### 2.01 MATERIAL STANDARDS

- A. All materials used in this project shall be new, unless otherwise noted, and listed by the Underwriters' Laboratories, Inc. as conforming to its standards where such standards have been established. These materials shall bear the UL label.
- B. Before purchasing any equipment, the contractor shall reconfirm the availability of the project's voltage, phase (single phase versus three phase), and service configuration with the electric utility.
- C. Material shall be new and comply with standards of Underwriters' Laboratories, Inc., where standards have been established for the particular product and the various NEMA, ANSI, ASTM, IEEE, AEIC, IPCEA or other publications referenced.

## PART 3 EXECUTION

### 3.01 TEST EQUIPMENT

- A. The CONTRACTOR shall include all test equipment and supplies deemed necessary to perform the required testing at no extra cost to the OWNER. These supplies shall include such things as: volt meters, amp meters, clamp-on ground rod test meter, light meters, generator load banks and temporary cables, watt meters, harmonic distortion test equipment, thermal image camera, megger tester, high pot test equipment, power quality analyzers, recording power meter, and oscilloscopes.

### 3.02 FINAL INSPECTION AND TESTING

- A. After the electrical installation is complete, the CONTRACTOR shall deliver to the ENGINEER the following information with his request for final inspection.
- B. One set of contract drawings marked to show all significant changes in equipment ratings and locations, alterations in locations of conduit runs, or of any data differing from the contract drawings. This shall include revised or changed panelboard and switchgear schedules.
- C. Certificates of final inspection from local authority.
- D. A tabulation of all motors listing their respective manufacturer, horsepower, nameplate voltage and current, actual running current after installation and overload heater rating.
- E. The electrical work shall be thoroughly tested to demonstrate that the entire system is in proper working order and in accordance with the plans and specifications. Each motor with its control shall be run as nearly as possible under operating conditions for a sufficient length of time to demonstrate correct alignment, wiring capacity, speed and satisfactory operation. All main switches and circuit breakers shall be operated, but not necessarily at full load. CONTRACTOR may be required during final inspection, at the request of the ENGINEER to furnish test instruments for use during the testing.
- F. All wiring shall be given a megger test using a 1000 Volt megger. This test shall be performed after conductors are pulled, but before final connections are made. The ENGINEER shall be given two (2) days' written notice of the anticipated test date so that he may witness the test if so desired. In any event, the CONTRACTOR shall record the circuit designation and the megger reading on each phase. This written record shall be submitted to the ENGINEER. The cost of this test or any retest caused by insufficient megger readings shall be the responsibility of the CONTRACTOR (All tests shall be done in accordance with NETA Standards).

### 3.03 CLEANUP AND PAINTING

- A. After electrical installation, remove all rubbish, trash and debris from the site and dispose of in an approved manner.
- B. Remove oil, dirt, grease and foreign materials from all equipment to provide a clean surface. Touch up scratched or marred surfaces of lighting fixtures, panelboard and cabinet trims, and equipment enclosures with paint manufactured specifically for that purpose.

**END OF SECTION 16000**

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## **SECTION 16100**

### **GENERAL ELECTRICAL WORKS**

#### **PART 1 GENERAL**

##### **1.01 DESCRIPTION OF WORK**

- A. In general, the work specified in this division of the specifications includes the furnishing of all labor, material, auxiliaries, and services necessary to install complete and properly operating electrical systems, including all fees, charges, and permits necessary.
- B. The Contractor shall furnish and install all cables, conductors, conduits, wiring devices, lighting fixtures, motor controllers, safety switches, relays, control equipment, and all other apparatus and accessories indicated, specified, and / or required for complete lighting, power, control and instrumentation systems for the project facilities.
- C. The Contractor shall refer to every section of these specifications for installation and coordination requirements applicable to the work specified in this division. The Contractor shall furnish and install all wiring and connections to all electrical equipment furnished under other sections of these specifications, except where specified or indicated otherwise.
- D. The Contractor shall coordinate all electrical work with other project construction trades, installation requirements, sequence of construction schedule, etc., including coordination and installation of required conduit sleeves and supporting devices.
- E. The Contractor shall be required to coordinate all electrical system connections with each appropriate utility company and shall furnish and install all equipment or material necessary to provide complete electrical and telephone service in accordance with all utility company requirements.
- F. The Contractor shall apply for, obtain, and pay all permit and inspection fees as required for the project as shown or required by the local Authority Having Jurisdiction to provide a fully functional and complete installation as described by the Contract Documents.

##### **1.02 GENERAL REQUIREMENTS**

- A. Design drawings are diagrammatic and intended to show approximate installation and equipment locations. All dimensions shall be verified in the field and coordinated with shop drawings issued. Equipment schedules are intended to serve as a guide only and does not relieve the Contractor of the responsibility for the complete furnishing and installation of all wiring, cable, conduits, or additional apparatus required.

- B. The Contractor shall furnish and install reinforced concrete pads, for electrical equipment, of size as shown on the drawings or required. Unless noted otherwise, pads for indoor equipment shall be 4 inches high and exceed the equipment dimensions by 6 inches on all sides not flush to a wall; pads for outdoor equipment shall be a minimum of 12 inches thick and exceed the equipment dimensions by 2-1/2 feet on sides equipped with door access and 6 inches on all remaining sides. Motor control centers, switchboards, etc., located indoors and equipped with a wireway at the base, shall be centered on a continuous reinforced concrete curb, minimum 6 inches high and 8 inches wide.
- C. The Contractor shall furnish and install a system of engraved, laminated nameplates (black lettering on a white background), designed to identify each major piece of equipment.
- D. Motors will be furnished with the equipment they drive unless indicated otherwise. Motors shall be premium efficiency design. Motors located outdoors or within corrosive environments shall be severe duty construction.
- E. The Contractor shall remove all existing electrical equipment or materials within areas to be demolished and shall coordinate with the Owner for all reusable materials to be salvaged. Materials shall be transported to Owner designated locations or disposed of by the Contractor at no additional cost to the Owner. Equipment feeder conductors shall be removed up to the first remaining circuit disconnect.
- F. All electrical equipment exposed in wet wells, or otherwise subject to accelerated corrosion, shall be furnished as specified for "corrosive atmospheres".
- G. All electrical equipment and installation within hazardous areas shall comply with the requirements of the National Electrical Code for Class I, Division 1, Hazardous Locations.

### 1.03 SUBMITTALS

- A. For each individual section of this division, there shall be submitted for approval a single, complete shop drawing submission. All elementary and schematic diagrams shall be provided with indication of system coordination and complete description of sequence of operation. Deviations from the contract documents shall be clearly identified.
- B. Complete operation and maintenance instruction manuals, including system schematics which reflect "as-built" modifications, shall be provided. All wire terminations shall be numbered and identified on as-built drawings included as part of the operations and maintenance manuals. All drawings included within the operation and maintenance manuals shall be reduced to a maximum dimension of 17 inches x 11 inches and shall be legible and reproducible. Special maintenance requirements particular to the system shall be clearly defined along with special calibration and test procedures.

- C. Following approval of the operation and maintenance instruction manual submittals, an electronic copy of all as-built electrical apparatus drawings, schematic diagrams, control wiring diagrams, instrumentation drawings, etc. shall be provided. A drawing index, identifying each electronic drawing file name and a description of the contents, shall be included within the operation and maintenance instruction manuals.
  - 1. Unless otherwise approved prior to submittal, all electronic drawings shall be provided on compact disk in AutoCAD 2021 format.
- D. One complete set of design drawings shall be neatly marked daily as a record of job progression and "as-built" installation. The drawings shall reflect the actual installed locations of all equipment and indicate the exact routing and elevations of all concealed conduits. Upon completion of the project, the drawings shall be coordinated with the as-built drawings and submitted to the Engineer.
- E. The Contractor shall maintain a record of all construction documentation including construction survey data, inspection reports, manufacturer's installation certifications, test reports, startup logs, etc. Upon completion of the project, copies of all construction documentation shall be submitted to the engineer.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. All material shall be new and shall conform with the standards of the Underwriter's Laboratories, Inc., American National Standards Institute, National Electrical Manufacturers' Association, Insulated Power Cable Engineers Association, and Institute of Electrical and Electronic Engineers in every case where such a standard has been established for the materials in question.
- B. The use of a manufacturer's tradename and catalog number is not intended to indicate preference but only the type and quality of the product desired. Products of reputable manufacturers of equal quality and functional type will be acceptable. Substitutes which tend to lower the quality of the work will not be permitted.
- C. Acceptance of alternate equipment does not relieve the Contractor of the responsibility of compliance with the performance and accuracy requirements of these specifications. Where such substitutions alter the design or space requirements indicated on the Contract Drawings, detailed drawings shall be prepared and submitted by the Contractor delineating any changes in or additions to the work shown on the Contract Drawings, and such drawings and changes or additions to the work shall be made by the Contractor at no additional expense to the Owner. In all cases, the burden of proof that the material or equipment offered for substitution is equal in construction, efficiency, and service to that named on the Contract Drawings and in these Contract Documents shall rest on the

Contractor and, unless the proof is satisfactory to the Engineer, the substitution will not be approved.

- D. Wherever possible, equipment items having the same or similar rated capacity or function shall be identical.
- E. All equipment and apparatus shall be the manufacturer's latest proven design, neither presently scheduled for obsolescence nor developmental prototype.
- F. All electrical apparatus and lighting equipment shall follow the Federal Energy Policy Act of 1992, including all subsequent updates, revisions, and replacements.

## 2.02 IDENTIFICATION

- A. Raceways, Conductors, and Metal Clad Cable: All raceways shall be labelled in accordance with ANSI standards and shall include a suitable combination of the following:
  - 1. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
  - 2. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
  - 3. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.
  - 4. Aluminum Wraparound Marker Labels: For use in below grade manholes and handholes. Cut from 0.014-inch- thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.
- B. Warning Labels: Provide warning labels for cabinets, boxes, and enclosures for power and lighting systems in accordance with OSHA 29 CFR 1910.145 or NFPA 70 as required.
  - 1. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
  - 2. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.



3. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
  4. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
  5. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 7 by 10 inches.
  6. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch grommets in corners for mounting. Nominal size, 10 by 14 inches.
  7. Warning label and sign shall include, but are not limited to, the following legends:
    - a. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
    - b. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
- C. Equipment Identification Labels: Label all equipment including but not limited to junction boxes, control panels, disconnect switches, power distribution panels, transformers, transfer switches, switchboards, motor control centers, and other similar equipment.
1. Identification shall be engraved, laminated acrylic or melamine labels, punched or drilled for screw mounting. Identification labels shall have black letters on a white background. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1 1/2-inch high label; where 2 lines of text are required, use labels 2 inches high. Mount labels with stainless hardware. Labels for field mounted equipment shall include the name of the equipment, and the location from which power is fed.
  2. Elevated Components: Increase the size of the labels and letters to those appropriate for viewing from the floor.
- D. Instrumentation System Component Labels: Label all instrumentation equipment such as flow, pressure, level, transmitters, elements, or other related instrumentation system components.

1. Identification shall be engraved, aluminum or stainless steel, 2-inch x 1-inch, dog tag style labels, punched or drilled for cable mounting. Unless otherwise indicated, provide 2 lines of text with minimum 3/16-inch text height. Mount labels with stainless hardware. Tag identification shall be in accordance with the Contract documents or ISA 5.1 unless noted otherwise.

## 2.03 RACEWAYS

- A. The following specifications and standards are incorporated into and become a part of this specification:
  1. Underwriter's Laboratory, Inc. Publications 1, 6, 467, 651, 797, 1242.
  2. American National Standards Institute C-80.1, C-80.3.
- B. Raceway is required for all wiring, unless specifically indicated or specified otherwise. The minimum size of conduit shall be 3/4" but shall not be less than size indicated on the drawings or required by the NEC.
- C. Conduits shall be provided for the following conditions:
  1. Conduits above grade shall be aluminum rigid conduit (ARC).
  2. Conduits installed within concrete slabs shall be schedule 80 heavy wall PVC. Where transition is made from raceway in slab to any type of raceway out of slab, make transition with an ARC.
  3. Conduits installed in direct contact with earth shall be schedule 80, heavy wall PVC.
  4. Conduits, fittings, outlet boxes, etc. in chemical rooms shall be schedule 80 PVC.
- D. ARC fittings shall be standard threaded couplings, threaded hubs, bushings, and elbows. All ARC fittings shall be aluminum alloy; set screw or non-threaded fittings are not permitted. Non-metallic conduit fittings shall be of the same material as the conduit furnished and shall be the product of the same manufacturer.
- E. All conduit support parts and hardware shall be stainless steel. Conduit clamps shall be two piece 316 stainless steel type. Conduit support channels shall be 1-5/8" x 1- 5/8" - 14 gauge channel. Wire or chain is not acceptable for conduit hangers. Individual conduit hangers shall be stainless steel specifically designed for the purpose.

- F. Leave all empty conduits with a 200 lb. test nylon cord pull line. Complete raceway runs prior to installation of wires or cables. Deformed conduits shall be replaced. Protect conduits against dirt, plaster, and foreign debris with conduit plugs.
- G. Fasten conduit support devices to structure with toggle bolts on hollow masonry, expansion anchors on solid masonry or concrete, and machine bolts or clamps on steel. Nails are not acceptable.
- H. Conduit shall be run parallel or at right angles to walls, ceilings, and structural members. Support branch circuit conduits at intervals not exceeding 10 feet, and within 3 feet of each box or change of direction.
- I. All conduits entering or exiting concrete or installed below grade shall be protected from corrosion.
  - 1. Metallic conduits shall be protected from corrosion as follows:
    - a. Apply two coats of 3M Scotchwrap pipe primer. Allow the primer to dry before application of the second coat or application of tape.
    - b. Apply two overlapping layers of 3M Scotchwrap 51 tape.
    - c. Pipe primer and tape shall extend from the end of the metallic conduit to 6" above grade or concrete.
- J. All conduits entering electrical equipment from below grade shall be sealed with electrical putty.
- K. Conduit terminations to enclosures shall utilize threaded hubs.
- L. Conduits in chemical rooms shall be sealed with electrical putty at all terminations, outlets, fixtures, etc.

## 2.04 WIRES AND CABLE

- A. The following specifications and standards are incorporated into and become a part of this specification:
  - 1. Underwriter's Laboratories, Inc. Publications 44, 83, 486, 493.
  - 2. Insulated Cable Engineers Association Standards S-61-402, S-66-524.
  - 3. National Electrical Manufacturer's Standards WC-5, WC-7.

- B. Low Voltage Cable: Low voltage wire and cable shall be 600 volt, single-conductor copper, rated 90 degrees C dry and 75 degrees C wet. Unless indicated otherwise, low voltage building wire shall have XHHW-2 insulation.
- C. Instrumentation Cable: Instrumentation cable shall be single or double twisted pair, 600 volt, stranded, tinned copper conductors with cross-linked polyethylene primary insulation, overall foil shield with tinned copper braid, and chlorinated polyethylene jacket; Belden 3072F or equivalent.
- D. VFD Rated Cable: VFD power cables shall be shielded for variable speed drives subject to non-linear power distortions. VFD cable shall be used to interconnect AC variable frequency drives to compatible AC motors. VFD cables shall be 1000V rated UL flexible motor supply cable, 3 stranded tinned copper circuit conductors with XLPE insulation, 1 stranded tinned copper ground wire with PVC insulation, overall combination tinned copper braid and foil shield, and black PVC jacket.

## 2.05 TERMINAL BLOCKS AND WIRE MARKING

- A. Terminal blocks for power conductors shall be 600 volt, three pole unit construction type with high pressure solderless connectors, headless socket screws, and ampere rating equal to or greater than the ampacity of the maximum conductor size to be terminated; Square D Type LBC, or equal.
- B. Terminal blocks for control and instrumentation conductors shall be 600-volt, sectional rail mounted terminal blocks with plastic pre-printed terminal numbering markers on both the inside and outside tracks, and provisions for center terminal bridge jumper cross connections with no loss of space on terminal or rail; Siemens 8WA1 011-1DF11, or equal. Terminal blocks for general control connections shall be feed-through terminal blocks; terminal blocks for instrumentation signal circuits shall be knife type test/disconnect terminal blocks; and terminal blocks for cable shield termination and grounding shall be ground blocks.
- C. Cable and conductor markers shall be heat-shrinkable sleeve markers with permanent legible machine printed markings.

## 2.06 BOXES

- A. The following specifications and standards are incorporated into and become a part of this specification:
  - 1. Underwriter's Laboratories, Inc. Publications 50, 467, 514.
- B. General: Boxes shall be installed at all locations necessary to facilitate proper installation and equipment connection, including each conduit/cable transition.

1. The minimum dimensions of boxes shall not be less than NEC requirements and shall be increased if necessary for practical reasons or where required to suit job conditions.
  2. Boxes shall have only the holes necessary to accommodate the conduits at the point of installation. All boxes shall have lugs or ears to secure covers.
  3. All boxes shall be rigidly secured in position. All boxes, except on unfinished ceilings and walls, and where conduit is run exposed, shall be so set that the front edge of box shall be flush with or recessed not more than 1/4-inch behind the finished wall or ceiling line.
- C. Pull Boxes: Pull boxes, including junction boxes and terminal boxes, shall be installed at all necessary points, whether indicated or not, to prevent injury to the insulation or other damage that might result from pulling resistance or other reasons during installation.
1. Unless indicated otherwise, pull boxes shall be NEMA 12 construction with gasketed screw covers and gray baked enamel over a rust-inhibiting primer finish. Pull boxes installed outdoors on in corrosive atmospheres shall be NEMA 4X type 316 stainless.
  2. Pull boxes in hazardous areas shall be explosion proof, cast aluminum construction with hinged, threaded, screw-on covers. Explosion proof pull boxes shall be equipped with threaded conduit openings as required for the initial installation, all identified future connections, and a minimum of one spare conduit opening sized to match the largest otherwise required conduit opening.
- D. Underground Pull Boxes: Underground pull boxes shall be minimum 24-inch x 14-inch x 18-inch deep composolite service boxes constructed of reinforced polymer concrete suitable for light traffic loading, with locking cover and molded logo; Quazite Composolite, or equal.
1. Unless otherwise indicated underground pull boxes shall have solid bottoms. Where open bottom pull boxes are indicated or approved for installation, a bed of gravel, minimum 12" thick and exceeding the pull box footprint by 6 inches on all sides, shall be placed beneath each open bottom pull box.

## 2.07 WIRING DEVICES

- A. The following specifications and standards are incorporated into and become a part of this specification:
1. National Electrical Manufacturer's Association Publications WD-1, WD-5.

B. Wall Switches: Wall switches shall be specification grade, totally enclosed, toggle switches rated 20 ampere, 120/277 volt. Switches shall be single pole, double-pole, 3-way, or 4-way as indicated; GE-5951 through 5954, Hubbell 1221 through 1224, Leviton 1221 through 1224, or equal.

1. Wall switches shall be furnished with suitable plates. The material, colors, and finishes of switch plates shall be as directed to harmonize with the surroundings. In general, standard switches shall be brown with Sierra S-1N, Hubbell S-1N, or equal, 302 stainless steel plates.
2. Unless specified otherwise, wall switches installed outdoors or in corrosive atmospheres shall be weatherproof and vapor tight. Weatherproof and vapor-tight switches shall consist of standard wall switches as previously specified, enclosed in Series FS condulets equipped with vapor-tight gasketed covers; Crouse-Hinds Series DS128, Appleton Series FSK-1VTS, or equal.
3. Switches requiring pilot lights shall be similar in quality and construction to the standard switches previously specified with neon pilot light in Lexan handle; Hubbell 1221-PL, GE-SP121-8G, or equal.

C. Receptacles: Receptacles shall be specification grade, grounding type, totally enclosed, duplex receptacles rated 20 ampere, 125 volt; GE 8300-9, Hubbell 5362-GRY, Leviton 5362-GY, or equal.

1. Each receptacle shall be provided with a single gang plate for flush mounting. The materials, colors, and finishes of the plates shall be as directed to harmonize with the surroundings. In general, receptacles shall be gray with Hubbell S-8N, Sierra S-8N, or equal, 302 stainless steel plates. Unless specified otherwise, receptacles installed outdoors shall be weatherproof. Weatherproof receptacles shall each consist of standard duplex receptacles as previously specified, enclosed in Series FS condulets equipped with a weatherproof cover; Crouse-Hinds WLRD or equal. Outdoor receptacles installed on circuits without ground fault protection shall be type GFCI. Explosion-proof receptacles shall each consist of a 20 ampere, 125 volt, 2-pole, 3-wire receptacle enclosed in Series FS condulets equipped with an angle cover with third pole grounded to body; Appleton U-Line, Crouse-Hinds ENR, or equal. Explosion-proof plugs shall insert, twist, and lock to activate and shall also fit standard receptacles.
2. Receptacles installed in corrosive atmospheres shall be corrosion resistant type, Hubbell HBL53CM62 or approved equal.
3. Special purpose outlets shall be black melamine locking receptacles with voltage, phase, and current ratings in accordance with the connected service and intended duty. Special purpose outlets shall be grounding type with permanent rating identification following installation; GE NEMA-Line, Hubbell Twist-Lock, Leviton

Spec-Master, or equal, equipped with plates, boxes, etc., as indicated for standard receptacles.

4. The Contractor shall connect the grounding terminal in each receptacle to the inside of the metal enclosure.
5. The Contractor shall furnish one matching nylon, corrosion-resistant, dead front plug for each individual special purpose outlet and for every 10 standard receptacles installed.

## 2.08 CIRCUIT AND MOTOR DISCONNECTS

A. The following specifications and standards are incorporated into and become a part of this specification:

1. Underwriter's Laboratories, Inc. Publications 98, 198.2, 198.4.
2. National Electrical Manufacturer's Association Publications KS-1.

B. Products of GE/ABB, Eaton, or Square D which comply with these specifications are acceptable.

C. Disconnect switches shall be heavy duty non-fusible safety switch type, unless fused type is indicated on the drawings, with the number of poles required to disconnect all ungrounded conductors serving the equipment.

1. Furnish a solid neutral when the circuit includes a neutral conductor.
2. Furnish an equipment grounding conductor lug bonded to the switch enclosure.
3. Furnish NEMA type one enclosure for all interior dry locations, and NEMA type 3R for all damp, wet, or exterior locations unless other types are indicated on the drawings.
4. Switches for air conditioning equipment shall be fused if required by the equipment manufacturer. Fuse size shall be as shown on the equipment nameplate.
5. Furnish with break-first/make-last auxiliary contacts on operator shaft where specified.

D. Switches shall have the following features:

1. Quick-make, quick break switching mechanism.

2. Line terminal shields.
  3. Provisions for padlocking in the "off" position.
  4. Door interlocks to prevent door from opening when switch is closed. Provide inconspicuous means to defeat this interlock.
  5. Permanent name plate indicating all ratings.
  6. Arc chute for each pole.
  7. 600 volt rating for 250 to 600 volt systems, 250 volt rating for systems below 250 volts.
  8. Rejection clips to accept only RK1 or RK5 fuses when switch is fusible type.
- E. Disconnect switches for three phase motors rated two horsepower and above shall be three pole non-fusible type. Disconnect switches for three phase motors rated less than two horsepower shall be three pole manual motor starter switches without overload protection. Disconnects for single phase motors shall be single or two pole horsepower rated switches without overload protection.

## 2.09 CIRCUIT BREAKERS

- A. Circuit breakers shall be 600 volt thermal magnetic, quick-make, quick-break molded case air circuit breakers, with trip-free operation, incorporating an internal trip bar and a single external handle. Breaker ratings shall be coordinated with the installed service and loads supplied. Unless indicated otherwise, breakers shall be rated not less than 35,000 amperes RMS symmetrical.
1. Unless indicated otherwise, circuit breakers shall have NEMA 12 enclosures with gray baked enamel over a rust-inhibiting primer finish. Breakers located outdoors or in corrosive atmospheres shall have NEMA 4X type 316 stainless steel enclosures.
  2. Circuit breakers used as a service disconnecting device shall be 100% rated and UL service entrance rated; shall be equipped with long time, short-time, instantaneous and ground fault adjustments for system selectivity; and shall be fully rated for the maximum fault current, without the use of current limiters.

## 2.10 ENCLOSED BREAKERS

- A. The following specifications and standards are incorporated into and become a part of this specification:



1. Underwriter's Laboratories, Inc. Publications 50, 67,489.
  2. National Electrical Manufacturer's Association Publications PB-1, AB-3.
- B. Products of GE/ABB, Eaton or Square D which comply with these specifications are acceptable.
- C. All circuit breakers shall be UL listed and bear a UL label. Where enclosed breakers serve as service entrance equipment, breaker assembly shall bear a UL label indicating such. Enclosed shall be of the dead front safety type.
- D. Breaker lugs shall be UL approved for copper or aluminum conductors and shall be of a size range for the conductors indicated on the drawings. Each enclosed breaker shall contain mechanical lugs for each conductor and, when required, a full size insulated neutral. The neutral and ground busses shall have a sufficient number of lugs to singularly terminate each individual conductor requiring a connection. Provide bonding jumper sized per NEC Table 250.102(CXZ).
- E. Provide gutters and bending space to conform with the NEC. Key all enclosures throughout the project alike.
- F. Circuit breakers shall be quick-make, quick-break, thermal magnetic type. Multi-pole breakers shall be common trip and common reset type; tie handle connections are not acceptable. Interrupting ratings on 240 volt systems shall be 10,000 RMS symmetrical amps minimum; provide higher ratings when indicated on the drawings.
- G. Provide bonding jumper sized per NEC Table 250.102(C)(1).

## 2.11 PANELBOARDS

- A. The following specifications and standards are incorporated into and become a part of this specification:
1. Underwriter's Laboratories, Inc. Publications 50, 67,489.
  2. National Electrical Manufacturer's Association Publications PB-1, AB-3.
- B. Products of GE/ABB, Eaton, or Square D which comply with these specifications are acceptable.
- C. All panels and circuit breakers shall be UL listed and bear a UL label. Panels shall be of the dead front safety type. Provide panels complete with factory assembled circuit

breakers connected to the bus bars. Number all panelboards in the following sequence: Circuits 1 and 2 - Phase A; circuits 3 and 4 - Phase B; circuits 5 and 6 - Phase C.

- D. All bus bars shall be copper. Main lugs and main breaker shall be UL approved for copper or aluminum conductors and shall be of a size range for the conductors indicated on the drawings. Each panel shall contain a full size grounding bus and, when required, a full size insulated neutral bus. The neutral and ground busses shall have a sufficient number of lugs to singularly terminate each individual conductor requiring a connection. The ground bus shall be brazed or riveted to the panel enclosure, but not attached to the panel interior. Where designated, each "space" shall include all bussing, device supports and connections for future breaker installation. Where indicated, provide sub-feed or through-feed lugs and increase box height to provide additional cable bending space; lug size shall match ampacity of mains.
- E. Branch circuit panel board width shall be between 20 and 22 inches; depth shall be 5 3/4" maximum. Distribution panel board width shall be 32" minimum and depth shall be 14" maximum. Provide gutters and bending space to conform with the NEC. Key all panels throughout the project alike.
- F. Circuit breakers shall be quick-make, quick-break, thermal magnetic type bolted to the bus. Multi-pole breakers shall be common trip and common reset type; tie handle connections are not acceptable. Interrupting ratings on 240 volt systems shall be 10,000 RMS symmetrical amps minimum and on 480 volt systems shall be 18000 RMS symmetrical amps minimum; provide higher ratings when indicated on the drawings. Provide the following when specified, indicated on the drawings, or required by the NEC:
  - 1. Ground fault interrupting circuit breaker (GFI).
  - 2. NEMA 4X Stainless Steel enclosure

## 2.12 FULL VOLTAGE / NON-REVERSING (FVNR) MAGNETIC STARTERS

- A. Magnetic starters shall be NEMA size one unless other size is shown on the drawings or unless larger size is required by actual motor controlled. Mount starters within the pump control panel, unless noted otherwise. Starters shall be for operation on a three-phase 460-volt, 230V or 208V, as applicable, system.
- B. Each magnetic starter shall have solid state overload protection. Control voltage shall be 120 volts provided from a separate source. Provide fuse for control coil. Provide hand-off-automatic switch. Interlocks shall be provided to provide control sequence indicated on the drawings.
- C. Provide Square D type S contactors and Square D Class 9065 Motor Logic solid state overload relays.

- D. Combination type starters shall be furnished with a control power transformer with motor circuit protection, H-O-A switch, and a NEMA 4X fiberglass enclosure.

## 2.13 REDUCED VOLTAGE SOLID STATE STARTER

### A. Quality Assurance

1. The soft start shall be listed by an independent testing laboratory in accordance with Electric Industrial Control Equipment Specification UL508.
2. The soft start shall carry the CE mark for indication of compliance to low voltage and EMC directives.
3. The manufacturer shall be a certified ISO 9002 facility.

### B. Warranty

1. An eighteen-month warranty shall be provided on materials and workmanship from date of invoice.

### C. General Description

1. The soft starter shall be provided by the manufacturer in an enclosure rated as NEMA 4X stainless steel for industrial use when mounted separately.
  - a. Enclosure shall include a door mounted digital keypad for adjusting the soft start parameters and viewing the motor, soft start and fault status without opening the enclosure door.
  - b. Provisions shall be available for padlocking the enclosure door.
2. The enclosed product shall be provided complete with one of the following overcurrent protective devices (OCPDs) for Type 1 short circuit protection:
  - a. Molded case disconnect switch and in-line fuse block for RK Type power fuses from 10 to 600 A or Class L power fuses from 601 to 1600 A. Short circuit withstand rating shall be 65KA rms.
3. The motor must be automatically protected from solid state component failure by one of the following means:
  - a. Shunt trip coil to trip disconnect in the event of a controller fault condition including a shorted thyristor.
4. The soft start shall utilize a thyristor (SCR) bridge consisting of at least two SCRs per phase to control the starting and stopping of industry standard motors.

5. The soft start shall provide torque control for linear acceleration without external feedback independent of motor load or type of application. The gating of the thyristors will be controlled in such a manner to ensure smooth and stable acceleration ramp.
6. The soft start shall be controlled by a microprocessor that continuously monitors the current and controls the phasing of the SCRs.
7. A shorting contactor shall be supplied with soft starts rated 47 A or above in Type 1 enclosures. Protective features and deceleration control options integral to the soft start shall be available even when the shorting contactor is employed.

#### D. Ratings

1. The soft start shall be designed to operate in an ambient temperature 0 deg C to 40 deg C. For ambient temperatures between 40 deg C and 60 deg C, derate the current by 1.2% per deg C above 40 deg C.
2. Maximum relative humidity shall be 93% at 40 deg C, non-condensing.
3. The soft start shall be capable of operation between -15% and +10% of nominal voltage rating.
4. Frequency tolerance shall be 5% when starting and between +5% and -15% during steady state operation.
5. The soft start shall be capable of supplying 300% of rated full load current for 30 seconds at maximum ambient temperature.
6. The SCRs shall have a minimum P.I.V. rating of 1400 Vac. Lower rated SCRs with protection by MOVs are not acceptable.

#### E. Adjustments and Configurations

1. All dialogue functions, display units, remote functions, terminal blocks, configuration switches and adjustment potentiometers shall be accessible on the front of the control module.
2. Digital indication shall provide, as a minimum, the following conditions:
  - a. Soft start status - ready, starting/stopping, run.
  - b. Motor status - current, torque, thermal state, power factor.
  - c. Fault status - Motor thermal overload, starter thermal fault, phase fault, frequency fault, supply fault, locked rotor fault, motor underload, max start time

exceeded, external fault, serial link fault, phase inversion, internal failure, overcurrent.

3. The starter must be preset to the following for adjustment-free operation in most applications:
  - a. Torque acceleration ramp of 10 seconds.
  - b. Current limitation to 300% of the motor full load current rating.
  - c. Class 10 overload protection.
  - d. Motor current preset per NEC and UL tables for standard hp motors.
4. A digital keypad shall be utilized configure the following operating parameters as required:
  - a. Motor full load amps adjustable from 50 to 130% of the controller's rating.
  - b. Current limitation on starting adjustable from 1.5 to 7 times rated motor current.
  - c. Torque ramp adjustable from 1 to 60 seconds.
  - d. Initial torque adjustable from 10 to 100% of nominal motor torque.
  - e. Torque limit adjustable from 10 to 200% of nominal motor torque.
  - f. Maximum start time adjustable from 10 to 999 seconds.
  - g. Voltage boost adjustable from 50 to 100% of the nominal supply voltage.
  - h. Selection of freewheel, soft stop or braking.
  - i. Adjustable soft stop torque ramp time from 1 to 60 seconds.
  - j. Threshold to change to freewheel following a soft stop from 0 to 100% of the nominal motor torque.
  - k. Selection of Class 2, 10, 10A, 15, 20, 25 or 30 motor thermal overload protection.
5. A digital keypad shall be utilized configure the following controller parameters as required:
  - a. Selectable automatic reset operation.
  - b. Cancellation of the torque control loop for multi-motor installations.
  - c. Adjustment of the stator loss estimation for specialty motors.
  - d. Assignment of controller inputs and outputs.
  - e. Activation of phase reversal protection.
  - f. Reset of motor thermal state.
  - g. Return to factory settings.
  - h. Activation of test mode for use with low power motors.
  - i. Indication of elapsed time in hours of starting, running and stopping.
6. Output relays shall provide the following status indications:
  - a. One form A and one form B minimum for indication of fault or control of an isolation contactor.
  - b. One form A for indication that torque ramp is complete and current is below 130% motor FLA (End of start).

- c. Four form A for control and interlock of chemical system equipment such as chemical pumps and Trichlor Chemical solenoid and booster pumps as indicated on the drawings.
- 7. Additional inputs and outputs shall be available to provide the following status indications:
  - a. One logic input for force to freewheel, indication of external fault, force to local control, control of cascading motors, or external motor overload reset.
  - b. One logic output for indication of motor thermal overload pre-alarm or presence of motor current and one logic output to indicate overcurrent alarm.
  - c. One analog output shall be available for 4 to 20 or 4 to 20 milliamp indication of motor current, torque, thermal state, or power factor.
- 8. Relay and I/O functions listed above must be isolated with respect to common.
- 9. Communications protocol shall be as determined by the SCADA system supplier and delivered through copper ethernet conductors.

#### F. Protection

- 1. A microprocessor controlled thermal protection system shall be included which continuously calculates the temperature-rise of the motor and soft start and provides:
  - a. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 110%. This function shall be annunciation only.
  - b. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.
  - c. An analog electronic circuit with a time-constant adjustable to the motor's thermal cooling time-constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.
- 2. The soft start shall provide phase loss, phase reversal, underload, stall, and jam protection.
- 3. The integral protective features shall be active even if an external shorting contactor is used to bypass the SCRs during steady state operation.

#### G. Control Options

- 1. The soft start's control circuit shall be fed from the line supply and be completely independent of the power circuit and separate from the control logic.

2. The peripheral soft start control circuitry shall be operated at 120 Vac 60 Hz from a control power transformer included within the enclosure.
3. Operator devices shall be door mounted and shall be (choose all that apply:)

H. Shorting Contactor (Standard on Soft Starts 47A and above)

1. A microprocessor shall control the operation of the shorting contactor via an output relay.
2. The shorting contactor shall close, shorting the thyristors after the motor current is below 130% of motor FLA and voltage is below nominal voltage (indicating ramp complete), and open on a stop command to allow a deceleration ramp.
3. Overload protection integral to the soft start shall continue to protect the motor when shorting is utilized.

I. Control power shall be 120 volts AC from the pump control panel. The electronic control shall contain pilot lamps to indicate the following:

1. Control Power On
2. Trip Condition Due to Load Unbalance.
3. Trip Condition Due to Overload or Locked Rotor

J. An oil-tight pilot lamp indicating motor running shall be mounted on the compartment door.

K. Reduced voltage starter shall be mounted in the pump control.

L. Provide Altistart 48 by Square D or equivalent by Eaton, GE/ABB or Danfoss.

M. Document all settings with record drawings.

## 2.14 TRANSFORMERS

A. The following specifications and standards are incorporated into and become a part of this specification:

1. Underwriter's Laboratories, Inc. Publications 506.

2. National Electrical Manufacturer's Association Publication ST-20.
  3. American National Standards Institute Publications C-57, C-89.2.
- B. Products of GE/ABB, Eaton or Square D which comply with these specifications are acceptable.
- C. Transformers shall be self-cooled, rated for continuous operation at rated KVA, 24 hours per day, 365 days per year with normal life expectancy. Transformers shall be rated for average temperature rise by resistance of 150 degrees C. in 40 degrees C. maximum ambient, 30 degrees C. average ambient unless otherwise indicated. Transformer insulation system shall be UL rated as 220 degrees C. system. Sound rating shall not exceed NEMA and ANSI standards for the KVA rating. Internal vibration dampening shall be provided on all transformers.
- D. Transformer enclosures shall be open, ventilated, drip-proof with removable front and rear cover panels, suitable for floor mounting, for transformers rated 30 KVA and up. For transformers up to 25 KVA, transformers shall be totally enclosed, non-ventilated with a resin encapsulated core and coil and drip-proof housing.
- E. Primary ratings shall be 480 volts, 1 phase, 2 wire. Secondary service shall be 240/120 volts, 1 phase, 3 wire. Nominal impedance shall be 4.5 percent minimum.
- F. Core assemblies and the center ground connection point of the coil secondaries shall be grounded to their enclosures by adequate, flexible ground straps. Provide grounding lug at the strap to enclosure bonding location for connection of three conductors.

## 2.15 INSTRUMENTATION SYSTEMS

### A. Magnetic Flow Meters:

1. Magnetic flow meters shall be of the pulsed DC short-form design utilizing electromagnetic induction to produce a 4-20 mA analog and a scaled pulse output signal directly proportional to flow, in one direction only.
2. Metering tubes shall be constructed of Type 304 stainless steel with an NSF approved hard rubber liner and ANSI 150# carbon steel flange end connections. Electrodes shall be Type 316 stainless steel.
3. Magnetic flow meters shall be NEMA 4 suitable for Class I, Group D, locations. Meter housings shall be provided with a corrosion-resistant epoxy coating. Meters shall be capable of accidental submergence up to 30'.



4. Meters shall be equipped with type 316 stainless steel grounding rings and all necessary signal cable.
5. Flow meters shall be hydraulically calibrated and computer printouts of the actual calibration data shall be furnished with each meter.
6. Magnetic flow transmitters shall be of the feedback type utilizing solid-state printed circuit construction and shall be provided with low flow cutoff circuitry for positive return to zero during no flow conditions.
7. Each transmitter shall be remote or integrally mounted to the flow tube as indicated. Flow transmitter housings shall be NEMA 4 cast aluminum. Remote mounted transmitters shall be equipped with a full-scale indicating meter and observation window.
8. Magnetic flow meter accuracy shall be  $\pm 0.5\%$  full scale for the range indicated. Magnetic flow meters shall be Endress Hauser Promag W400 compact version with IFC100 45 degree signal converter, or pre-approved equal.

B. Hydrostatic Well Level Meters:

1. Well level pressure meters shall be fully submersible high performance sensors for measurement of hydrostatic water levels.
2. Sensors shall be fully welded 0.69 inch diameter titanium construction.
3. Sensor cables shall be submersible polyurethane jacketed shielded cable with 1 meter datum point markings.
4. Each well level pressure meter shall be furnished with a moisture-proof sensor termination enclosure and 17.5 mm diameter slimline sink weight.
5. Unless otherwise indicated, or required for the specific application, well level pressure sensor operating range shall be 0-30 psi.
6. Sensor output shall be 2 wire 4-20mA analog output proportional to level/pressure.
7. Hydrostatic well level pressure meters shall be GE Druck Model PTX1830, or pre-approved equal.

## 2.16 SCADA SYSTEM

- A. The SCADA system shall be a Distributed Remote Access Control System – Remote Terminal Unit (DRACS-RTU).
- B. The preferred vendor for this system is by Lord & Company, Inc. of 2100 Carolina Place Drive; Fort Mill, South Carolina 29708. For standardization purposes no other products will be considered.
- C. The Contractor shall furnish and install a DRACS-RTU with all accessories, and appurtenances at the well and as shown on the contract drawings.
- D. DRACS-RTU systems shall include the RTU hardware and the required RTU programming and SCADA System HMI software configuration for the application. This includes HMI driver, I/O database, and graphic screens to match the owner's existing graphic screens to include trends, alarms, alarm notifications, etc. The graphics platform/program shall be VT SCADA by Trihedral, no exceptions.
- E. Each DRACS-RTU shall be furnished with the following features:
  - 1. NEMA 4X 304 stainless steel enclosure.
  - 2. Reliable non-proprietary industrial grade components that are readily available from local distributors.
  - 3. Onboard CPU for distributed control of the pump station.
  - 4. Low power consumption energy efficient with battery backup for a minimum of 24 hours of operation on battery.
  - 5. Standard off the shelf batteries.
  - 6. Battery shelf with strap to secure batteries.
  - 7. Communication ports: (3) Ethernet (2) Serial Ports.
  - 8. SCADA communications via 4G cellular modem. The system shall be upgradable to 5G in the future.
  - 9. Smartphone / tablet approved remote access view.
  - 10. RTU 120 VAC loss of power alarm
  - 11. Standard non-proprietary I/O modules.

12. Manufactured in the USA.
13. RTU intrusion alarm.
14. Automatic switchover to battery on power fail.
15. Low Battery Alarm
16. Full size DIN rail mounted terminal blocks for easy field wiring terminations.
17. UL-508A industrial control panel certification.
18. Surge protection built-in (120 VAC incoming power)

F. The DRACS-RTU shall have standard inputs and outputs of the following:

1. 32 Digital Inputs (Dry Contact Inputs)
2. 8 Digital Outputs (Relay Dry Contact Outputs)
3. 8 Analog Inputs (4-20 mA DC)

G. The DRACS-RTU I/O shall have expandable inputs and outputs of the following:

1. 4 Analog Inputs (4-20 mA DC)
2. 4 Analog Outputs (4-20mA DC)

H. The communications connection shall be via Ethernet and protocol will be the open non-proprietary DNP3. The protocol shall have the following features at a minimum with no exceptions:

1. True open & non-proprietary protocol
2. Classification of field data, real time and time stamped event data. Four different classes of data, 0,1,2,3. Each class of data shall be independent from the other. A class of data will have variation parameters which allow the user to select the type of value, time, and diagnostic information to be recorded.
3. Report by exception unsolicited reporting or polled, user selectable.

4. Time-stamped data allowing for event data to be logged in the PLC and uploaded during the next successful communication with the system.
  5. Support for time synchronization.
  6. Secure authentication.
  7. Diagnostic information for each I/O point.
  8. Communication to multiple masters.
  9. Interoperability between multi-vendor devices.
- I. Each DRACS-RTU shall allow remote access view with the SCADA System to include mobile phones, tablet and laptops with the proper login and password.
  - J. The DRACS-RTU shall provide interface with the well motor controller (RVSS) and generator with a standard program for well control. Provide minimum run time when well is called to run and a minimum time delay to next start.
  - K. The DRACS-RTU shall provide controls for interface to the generator/automatic transfer switch for programmed startup of the pump station when switching to emergency or utility power, and for the lock-out of equipment during emergency power operation.

## 2.17 SUPPORT SYSTEMS

1. Groups of two or more conduits, and all boxes and equipment, shall be mounted on a system of minimum 1-5/8-inch x 1-5/8-inch heavy wall aluminum or 316 stainless steel channel with a minimum of 25% unused capacity.
2. Overhead conduits shall be supported on trapeze hangers from approved concrete inserts and shall be grouped with pipes wherever possible.
3. Support system hardware, including hanger rods, shall be aluminum or stainless steel.

## 2.18 GROUNDING

- A. The following specifications and standards are incorporated into and become a part of this specification:
  1. Underwriter's Laboratories, Inc. Publications 44, 83, 467, 486, 493.
  2. National Electrical Manufacturer's Association Standards WC-5, WC-7.

- B. The project's grounding system shall consist of a grounding electrode system in accordance with NEC, bonded to a main ground bus interconnecting such things as power distribution equipment, cold water piping, foundation rebar, and structural steel. Ground rods shall be located at each service connection, transformer pad, generator pad, outdoor electrical equipment pad, and as indicated or required, and shall be bonded to the main ground bus. Ground rod sections shall be coupled and driven to establish a maximum resistance to ground of 10 ohms throughout the grounding system.
- C. Ground rods shall be minimum 10 feet long, 3/4-inch diameter, copper-clad steel sections.
- D. Unless indicated otherwise, the main ground bus cable shall be minimum No. 2/0, 19 strand bare copper. Bonding jumpers shall be minimum No. 6. Unless noted otherwise, all grounding conductors shall be insulated and shall have green colored insulation.
- E. All grounding hardware such as clamps, connectors, couplings, lugs, bolts, nuts, and washers shall be of silicone bronze.
- F. Below grade grounding connections shall be exothermic (Cadweld or equal), above grade non-reversible grounding connections shall be compression type (Burndy HyGround or equal), and reversible above grade connections shall be mechanical type.

## 2.19 SURGE PROTECTION

- A. The Contractor shall furnish and install UL 1449 (latest edition) listed surge protection devices (SPD) for the protection of all AC electrical circuits from the effects of lightning-induced currents, substation switching transients, and internally generated transients from inductive and/or capacitive load switching.
- B. Each SPD unit shall be marked with a short circuit current rating and shall not be installed at a point on the system where the available fault current is in excess of that rating.
- C. Complete UL 1449 performance ratings, including the fault current rating and VPR rating, shall be posted on the UL label of each SPD.
- D. Submit copies of the UL Standard 1449 Listing documentation for each proposed SPD.
- E. AC power surge protection devices (SPD), formally transient voltage surge suppressors (TVSS), shall utilize heavy duty 'large block' MOVs, each exceeding 30mm diameter, with redundant modules per phase. SPD equipment shall provide suppression elements between all phases and each phase conductor and the system neutral. AC power surge protection equipment shall be APT, or equal.
- F. SPD shall be UL labeled as Type 1, intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode,

including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

G. SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

H. SPD shall be UL labeled with 20kA Inominal (I-n) for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

1. Minimum surge current capability (single pulse rated) per phase shall be: Service Entrance Equipment: 300kA

2. Power Distribution Equipment: 200kA

3. Panelboards & Control Panels: 100kA

I. SPD shall provide surge current paths for all modes of protection: L-N, L-G, and N-G for Wye systems; L-L, L-G in Delta and impedance grounded Wye systems.

J. UL 1449 Listed Voltage Protection Ratings (VPRs) shall not exceed the following:

1. Numerically lower is allowed/preferred; old-style Suppressed Voltage Ratings (SVRs) shall not be submitted, nor evaluated due to outdated less-strenuous testing)

System Voltage	L-N	L-G	L-L	N-G
208Y/120	700V	700V	1200 V	700V
480Y/277	1200V	1200V	1800 V	1200V

K. UL 1449 Listed Maximum Continuous Operating Voltage (MCOV):

System Voltage	Allowable Voltage Fluctuation (%)	MCOV
208Y/120	25%	150V
480Y/277	15%	320V

L. SPD shall have UL 1283 EMI/RFI filtering with minimum attenuation of -50dB at 100kHz.

M. SPD shall include visual LED diagnostics including a minimum of one green LED indicator per phase, and one red service LED. SPD shall include an audible alarm with on/off silence function and diagnostic test function (excluding branch).

- N. Warranty – Each SPD shall have a warranty period of not less than 10 years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.

## PART 3PART 3 - EXECUTION

### 3.01 CODES, PERMITS, AND INSPECTIONS

- A. The installations shall be in accordance with the regulations of the latest editions of the National Electrical Code, National Electrical Safety Code, applicable city, state, and local codes and regulations and other applicable codes, including utility company codes.
- B. All permits required by state or local ordinances shall be obtained and after completion of the work, a certificate of final inspection and approval from the electrical inspector shall be furnished to the Owner. All permits for installation, inspections, connections, etc., shall be taken out and paid for as part of the work under this section.

### 3.02 CONDUIT INSTALLATION

- A. Conduit Installation: All conduits shall be run in such a manner as to cause the least interference with other trades. Conduits shall be joined by means of couplings or 3-piece coupling type conduit unions. Joints shall be set up tight. Runs shall be straight and true; elbows, offsets, and bends shall be uniform and symmetrical. Installation workmanship shall be of the best quality and skill.
- B. Conduits shall be of sizes required to accommodate the number of conductors in accordance with the tables given in the current edition of National Electrical Code or as noted in the drawings. The minimum size of conduit shall be 3/4-inch.
- C. Conduit runs shall terminate below the section of the motor control center or equipment to which their respective circuits run. Concealed conduits shall be run in as direct a line as possible. Exposed conduits shall be run parallel to or at right angles with the lines of the building. All bends shall be made with standard conduit ells, conduit bent to not less than the same radius, or aluminum conduit outlet bodies with gasketed cast iron covers. Adjacent conduit runs shall be installed with concentric bends. All bends shall be free from dents or defects. No more than the equivalent of four quarter bends shall be used in any one run between terminals at cabinets, outlets, and junction or pull boxes. Boxes shall be in accessible locations.
- D. Conduit shall be continuous from outlet to outlet and from outlets to cabinets, junctions, or pull boxes and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from point of service to all outlets. Insulated ground bushings shall be used on all metallic conduits. Terminals of all conduits shall be plugged with an approved cap to prevent the entrance of foreign materials when exposed during construction.

- E. As far as practicable, all exposed conduits shall be run without traps. Where dips are unavoidable, a pull box or approved conduit outlet body shall be placed at each low point. Conduit systems shall be completed before conductors are drawn in. Where conduits must be run exposed, except as indicated in the drawings, locations of the runs shall be subject to approval.
- F. Where exposed conduit needs clamping to the structures, clamps shall consist of aluminum 1-hole pipe straps and pipe spacers, galvanized steel bolts of appropriate size to fill the holes in the straps and spacers, and approved expansion shields. Clamps used with aluminum conduit, and clamps located outdoors or in “corrosive atmospheres”, shall be PVC coated, aluminum or 316 stainless steel. Clamps shall be bolted to the structure or where necessary to intermediate galvanized steel brackets. Spacing between conduit supports shall not exceed the recommendations published by the National Electrical Code. No deformed, split, or otherwise defective conduit or fitting shall be installed. Conduit shall be installed with a minimum number of joints.
- G. Aluminum Myers hubs shall be used for all threaded conduit connections to enclosures that do not contain integral threaded conduit hubs. Conduit connections to enclosures located outdoors shall only enter the bottom of the enclosure.
- H. Where conduit has been cut in the field, it shall be cut square using a hand or power hacksaw or approved pipe cutter using cutting knives. The use of pipe cutters with cutter wheels will not be permitted. The cut ends of the field-cut conduit shall be reamed to remove burrs and sharp edges. Where threads must be cut on conduit, the threads shall have the same effective length and shall have the same thread dimensions and taper as specified for factory-cut threads on conduit. Conduits installed in the work with threads not complying with these requirements shall be removed and replaced.
- I. Where conduit installed in concrete or masonry extends across building joints, expansion joints with approved type grounding straps and clamps shall be installed. Expansion joints shall be Type XJ as manufactured by Crouse-Hinds, Appleton, or equal. Where conduit enters a building through the concrete foundation, below final grade, approved type FSK entrance seals shall be used.
- J. All conduits shall be cleaned, prior to pulling in wire and cable, by pulling a stiff wire brush of the size of the conduit through it. This cleaning shall remove all foreign matter, including water, from the conduit. All boxes in which the conduit terminates shall be cleaned of all concrete, mortar, or other foreign matter and all threads in boxes shall be left clean and true upon completion of the work.
- K. All spare, future, or telephone conduits shall be equipped with a pull wire prior to capping.



- L. All conduits, fittings, and electrical equipment used within hazardous areas shall comply with requirements of the National Electrical Code for the type of hazardous location encountered and shall be furnished as specified for "corrosive atmospheres".
  - 1. In such hazardous locations, conduits terminating at boxes enclosing electric switching, or circuit opening equipment, shall be sealed at the entrance to the enclosure with approved, compound-filled, sealing fittings to prevent passage of explosive or combustible gases through the conduits.
  - 2. All conduits exiting from such hazardous locations or entering said locations shall be similarly sealed at point of exit or entrance.

### 3.03 WIRE AND CABLE INSTALLATION

- A. The installation of wires and cables includes all splicing of these wires and cables to each other and connecting them to receptacles, switches, control boxes, lighting fixtures, motors, and all other electrical apparatus installed under this Contract. All cable installation methods shall correspond to the manufacturer's recommendations.
- B. Wire and cable shall be suitably protected from weather or damage during storage and handling, and it shall be in first-class condition when installed.
- C. The minimum size of wire or cable conductor shall be No. 12, unless indicated otherwise in the drawings. Wire sizes No. 8 and larger, and all wire sizes utilized for control or instrumentation, shall be stranded. All sizes called for in the specifications or shown on the drawings are American Wire Gauge sizes.
  - 1. No wire smaller than No. 12 shall be used for any branch circuit unless noted otherwise on the drawings. Larger sizes shall be used where required or indicated on the drawings. If the single distance from the panelboard to the first device exceeds 50 feet, the minimum size for this run shall be No. 10 AWG with the minimum between devices as No. 12 AWG.
- D. All sizes of wire and cable furnished and installed under these specifications shall be color-coded with a separate color for each phase and neutral used consistently throughout. Each conductor shall have factory color-coded insulation. As an alternative, wire sizes No.8 and larger shall have black insulation and shall be color-coded with waterproof phasing tape at each termination, junction box, pull box, etc. All 480Y/277-volt wiring shall be color-coded yellow, brown, and orange for hot legs (Phase A, B, and C, respectively). All 208Y/120-240-volt wiring shall be color-coded black, blue, and red for hot legs (Phase A, B, and C, respectively). The grounded neutral conductor of each circuit shall be color-coded white. Grounding conductors shall be color-coded green.
- E. All wires and cables shall, as far as practicable in the judgment of the Engineer, be continuous from origin to destination without running splices in intermediate pull boxes,

junction boxes, or wireways. At the ends of these wires and cables, only sufficient slack shall be left as may be required for making proper connections. There shall be no unnecessary slack.

- F. In connecting wires and cables to apparatus, various methods shall be used depending upon the local conditions as detailed in the drawings. In general, solderless pressure connectors shall be used for terminals, taps, and splices for all wires and cables. Solderless pressure connectors or vinyl-covered steel spring-type connectors shall be securely fastened and shall not loosen under vibration or normal strain. All connections shall be in accordance with the manufacturer's recommendations and shall be with connectors approved for the connection conditions.
- G. Where wires and cables are connected to metallic surfaces, the coated surfaces of the metal shall be polished before installing the mechanical connector. The lacquer coating of the conduits shall be removed where a ground clamp is to be installed.
- H. All soldered joints shall be made mechanically strong before soldering and shall be carefully soldered without the use of acid and shall be taped with insulating tape to a thickness equal to that of the insulation.
- I. The installation of wires and cables shall include the furnishing and installing of all hangers, racks, cable cleats, and supports that may be necessary to make a neat and substantial wiring installation in all pull boxes, wireways, cable channels, and in such other locations as may be required. Plastic ties shall be used to hold the wires and cables together and to the racks or supports.
- J. Each junction box, terminal box, control cabinet, or other terminal location containing a total of four or more conductor terminations or splices, shall be equipped with 1 or more terminal boards, as required, for connecting each wire including the spare wires. Each wire terminal shall be permanently marked throughout the entire system using, wherever possible, the notation of the wires given on the manufacturer's wiring diagrams. Sufficient terminal blocks shall be provided to terminate all wires routed to the enclosure including all spare conductors. In addition, the greater of 20 percent or four unused spare terminals shall be provided. All connections for future functions shall be wired to numbered terminal blocks, grouped separate from the terminal blocks in use. Terminal blocks shall be grouped to isolate power conductors from control conductors and to separate AC circuits from DC circuits.
- K. Each control, instrumentation, and power cable and conductor shall be marked with the proper feeder symbol or termination number in each manhole, handhole, pull box, wireway, terminal cabinet, panelboard, switchboard and all additional locations required to provide positive identification. Each conductor shall be marked at each point of termination following final installation.

- L. The electrical installation shall maintain suitable isolation between power, control and instrumentation conductors. Approved isolation barriers shall be provided within each pull box, terminal box, wireway, cable tray, handhole, manhole, etc.

### 3.04 CIRCUIT AND MOTOR DISCONNECTS

- A. Locate switches to provide full accessibility and working clearances required by the NEC. Locate adjacent to equipment served unless drawings indicate otherwise. Mount switch directly to structure or to metal channel depending upon field conditions. Mount switch handle between 36" and 60" above finished floor.

### 3.05 ENCLOSED BREAKERS

- A. Mount enclosed breakers with operating handle not more than 6'-6" above finished floor. Enclosures shall be secured by a minimum of four fastening devices. Attach enclosure directly to masonry or concrete, maintaining a 1" rear clearance. Mount enclosure to metal channel for installations on steel structure or masonry.

### 3.06 PANELBOARDS

- A. Mount panel boards with top circuit not more than 6'-6" above finished floor. Enclosures shall be secured by a minimum of four fastening devices. Attach enclosure directly to masonry, concrete, or wood, maintaining a 1" rear clearance. Mount enclosure to metal channel for installations on steel structure or drywall.
- B. Provide in each panel board a typewritten circuit directory mounted under clear plastic in metal holder in the door of the panel reflecting all field changes additions. Install push-in knock-out closure plugs in any unused knock-out openings.

### 3.07 TRANSFORMERS

- A. Dry type transformers larger than 15 kva shall be floor mounted; 15 KVA and below shall be wall mounted. Installation shall meet the requirements of the N.E.C. Article 450. Transformers shall be mounted on neoprene, waffle type vibration pads 5/8" thick minimum. Primary and secondary connections shall be made with flexible conduit. The secondary windings of each transformer shall be grounded in accordance with the NEC requirements for separately derived systems.
- B. Do not install equipment over transformers, unless indicated on the drawings. Install secondary over current protective device within 10 feet horizontally from the transformer. Where none is indicated on the plans, provide an enclosed circuit breaker within 10 feet rated 125 percent of the transformer full load ampacity but not greater than the secondary conductor ampacity. Provide full working clearances as required by the NEC.

### 3.08 GROUNDING

- A. The concrete-encased steel reinforcement within the foundation of each structure shall be grounded, with a minimum of one 20-foot ground rod, at each corner column and at intermediate columns at distances not to exceed 60 feet. The main ground bus shall be interconnected to each ground rod throughout the structural grounding system with a continuous bare copper cable loop, minimum No. 4/0 (19 strand), buried 30 inches below grade and 24 inches outside the structural footing.
- B. A minimum of one 20-foot ground rod shall be located within each manhole and handhole. The main ground bus shall be interconnected to each ground rod throughout the underground duct bank system with a continuous bare copper cable, minimum No. 4/0 (19 strand), encased within the duct bank concrete envelope.
- C. All grounding connections shall be made in the same manner as current carrying connections are made with bolted clamps and solderless connectors. All underground grounding system connections, cable-to-cable, cable-to-ground rod, etc., shall be made with exothermic-fused connections. Contact surfaces shall be equal in area to those of current carrying connectors. All contact surfaces shall be thoroughly cleaned before connections are made.
- D. All ground connections shall be made with connectors or lugs approved for the specific type of connection.
- E. Insulated-type grounding bushings shall be used for all metallic conduit terminations.
- F. Permanent and effective ground connections shall be provided for transformer secondary neutrals.
- G. The metallic frame of each motor, generator, transformer, panelboard, lighting fixture, outlet box, control equipment enclosure, etc. shall be grounded to the ground bus of the power distribution equipment with an insulated grounding conductor included in the feeder or branch circuit conduit.
- H. The base of each street or area lighting standard shall be grounded to a ground rod driven into the ground near the base of the standard and to a separate ground wire run with the feeder. Ground rods shall be driven so that the top is 6 inches below finished ground grade. When the foundation is placed, a suitable ground wire shall be embedded in the concrete to facilitate connection to the base on the inside.
- I. Installed ground cables shall be protected from subsequent mechanical damage. Sleeves shall be provided in foundation walls and in floors to facilitate the installation of ground cables. Where ground cables enter buildings through sleeves, the sleeves shall be sealed with jute packing and approved sealing compound.

### 3.09 SURGE PROTECTION

- A. Service Entrance - Each service entrance shall have an SPD installed with integral overcurrent protection and shall be replaceable modular construction. A UL approved 30A breaker shall be provided if integral overcurrent protection is not available.
- B. Power Distribution - Each switchboard, motor control center, or control panel shall have an SPD with integral overcurrent protection and shall be replaceable modular construction. Each SPD shall have an independent means of servicing disconnect such that the protected power distribution equipment remains energized. A 30A breaker (or larger) may serve this function.
- C. Sub Panels - Each SPD installed on power distribution panelboards, lighting panelboards, control panels, unit equipment, etc. shall be encapsulated construction.
- D. SPD equipment shall be installed per manufacturer's installation instructions with lead lengths as short (less than 24") and straight as possible. Gently twist conductors together.
- E. Installer may reasonably rearrange breaker locations to ensure short & straightest possible leads to SPDs.
- F. SPD shall be installed on the load side of the main service disconnect.
- G. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC.
- H. Status indication pilot lights for each SPD shall be remote mounted and shall be visible from the front of the protected equipment enclosure.

### 3.10 RVSS PANEL FUNCTION DESCRIPTION

- A. Control Requirements: Control operations shall be as follows:
- B. RVSS Control Panel shall be supplied with a physical HOA switch on the panel dead front, for an operator to select the method of control. There are two methods of controlling the well pump: Local and Remote. The RVSS shall also be interlocked with the Trichlor booster pump, Trichlor solenoid valve, Ortho pump, and Hypo pump and will call valve to open and chemical pumps to run anytime the well pump is running.
- C. Local:

1. When the panel HOA switch is placed in **Hand Position**, the pump will ramp up to full speed and continue to run until the pump is placed into the Off Position then the pump will ramp to zero speed and stop.
2. Interlocks for local operation of the pump are pump overtemperature and RVSS fault.

D. Remote:

1. When the panel HOA switch is placed in **Remote Position**, the RVSS will be controlled by the DRACS RTU as described below:
  - a. **Remote Hand:** A soft Remote Hand - Remote Off- Remote Auto switch is displayed on the Human-Machine Interface (HMI).
    - 1) When in the Remote **Off Position**, the pump will ramp to zero speed and stop the pump.
    - 2) When in the Remote **Hand Position**, the pump will ramp up full speed and continue to run until the pump is placed into the **Off Position** when the pump will ramp to zero speed and stop the pump
  - b. **Remote Auto:** A soft Remote Hand - Remote Off- Remote Auto switch is displayed on the HMI. When in the Remote **Auto Position**, the pump will be called to start and stop base off the elevated tank level (LIT-1) and controlled via start and stop set points within HMI.
2. **Interlocks:** Any of the following interlocks will cause the pump to ramp to stop and prevent it from restarting until the interlock condition is removed.
  - a. **No Flow Alarm** – if the pump is called to run and the discharge flow falls below the minimum GPM for 30 seconds (operator adjustable from 0-60s), a No Flow condition will be generated. The No Flow Alarm condition can be cleared by 1) moving the local HOA switch to the Off Position, 2) pressing the Pump Reset button from the HMI.
  - b. **Check Valve Limit Switch Alarm** – if the pump is called to run and the check valve limit switch fails to open within 30 seconds (operator adjustable from 0-60s), a Check Valve Limit Switch Alarm will be generated. Check Valve Limit Switch Alarm can be cleared by 1) moving the local HOA switch to the Off Position, 2) pressing the Pump Reset button from the HMI.
  - c. **High Discharge Pressure Alarm** – (PIT-1) if the pump is called to run and the discharge pressure exceeds the high discharge set point for more than 30 seconds (operator adjustable from 0-60s), a high discharge condition will be generated. The high discharge condition can be cleared by 1) moving the local HOA switch to the Off Position, 2) pressing the Pump Reset button from the HMI
  - d. **High Tank Level Alarm** – (LIT-1) If the tank level is over the high level set point an alarm will be generated and the alarm will remain until the level is normalized.
  - e. **RVSS Fault** – the pump's RVSS monitors a number of faults, such as motor thermal overload, motor phase imbalance, motor ground fault, buss voltage high, high temperature, and others. If the RVSS fault is generated, it must be reset from the pump RVSS LCD Keypad.

- E. Pump protection relays (pump vendor specific) shall disable pump operation during automatic system operation on over temperature only after an adjustable time delay.

### 3.11 SCADA SYSTEM

- A. The preferred vendor for this system is by Lord & Company, Inc. of 2100 Carolina Place Drive; Fort Mill, South Carolina 29708. For standardization purposes no other products will be considered.
- B. All testing and certification shall be by the SCADA vendor.
- C. At project completion, the Contractor and SCADA vendor shall demonstrate satisfactory operation of the system, including all modifications to the owner's graphic screens for the well.

### 3.12 TESTING

- A. Upon completion, the Contractor shall provide all necessary instruments and special apparatus to thoroughly test the complete installation and shall conduct all tests that may be required to ensure system is free of all improper grounds and short circuits, and that all the feeders are properly balanced. All electrical equipment shall be tested to determine proper polarity, phasing, relay settings, and operation. The system shall be checked for quality and completeness in accordance with the provisions of the General Conditions. Any objectionable noise, heating, voltage drop, or excessive current draw, after in operation, shall be identified and corrected. All testing shall be in accordance with NETA standards.
- B. Prior to energization, the electrical system ground resistance shall be tested. Additionally, the insulation resistance of all electrical gear, power feeders, and electric motors shall be measured. Upon completion of all corrective measures required, certified acceptance reports, including tabulations of all initial and final resistance measurements, shall be submitted for approval in accordance with the provisions of the General Conditions.
- C. Each motor starter overload element, and each motor circuit protector, shall be selected and adjusted to coordinate with the nameplate full-load current and service factor of the actual motors installed. Improper units shall be replaced. Upon completion of all corrective measures required, certified compliance reports, including tabulation of the actual full load current and voltage measurements for each phase of each motor, together with the nameplate current rating, overload element rating, and motor circuit protector setting, shall be submitted for approval in accordance with the provisions of the General Conditions.
- D. System testing shall include complete circuit breaker tests for each power circuit breaker and complete thermal surveys of all new and existing electrical apparatus. Upon

completion of all corrective measures required, certified acceptance reports, including satisfactory infrared photographs, shall be submitted for approval.

### 3.13 FACTORY ACCEPTANCE TESTING (FAT)

- A. A FAT shall be performed after fabrication of the electrical equipment and prior to shipment to the project site to prove the equipment is ready for installation and commissioning. The FAT shall test and document the results of such things as:
  - 1. Panel fabrication in accordance with approved shop drawings and UL 508 standards.
  - 2. Panel components furnished and installed in accordance with approved shop drawings.
  - 3. Wiring segregated and trained neatly within the equipment and wiring gutters.
  - 4. Input / Output functional testing and recording of analog values at 0%, 50%, and 100% intervals.
  - 5. Tags and identification furnished and installed
  - 6. PLC programming and operational functionality
  - 7. HMI graphical screens
- B. The FAT shall be scheduled 3 weeks in advance and shall include all project stakeholders at their discretion such as Engineer, Owner, and Prime Contractor.
- C. A FAT test document shall be prepared and submitted for approval 4 weeks prior to FAT testing.

### 3.14 STARTUP AND COMMISSIONING

- A. The Contractor shall enlist the services of the Control Panel fabricator, system integrator, programmer, and / or manufacturers' representatives to perform startup and commissioning services including:
  - 1. Verification and certification of installation in accordance with manufacturers requirements. A certificate of installation shall be submitted to the Owner upon completion.
  - 2. Onsite guidance and support during startup and commissioning for troubleshooting.



- B. Any errors, omissions, or deficiencies in the proposed works or system operation during the Site Acceptance Testing period shall be corrected at no cost to the Owner.

### 3.15 SPARE PARTS

- A. The Contractor shall furnish, upon completion of the project, one year's supply of all consumable parts utilized within the electrical system, including pilot lights (minimum 12 of each type), fuses (minimum 12 of each type below 100 amps and 6 of each type 100 amps and above), etc.

### 3.16 GUARANTEES

- A. All materials and workmanship shall be guaranteed to be free from defects. Any part of the system considered defective by the Engineer within the guarantee period shall be immediately replaced or corrected to the Engineer's satisfaction without further expense to the Owner.
- B. Upon final completion, the Contractor shall furnish certification from each equipment manufacturer that all equipment has been installed in accordance with the requirements of these specifications, is ready for permanent operation, and that nothing in the installation shall render the warranty null and void.

**END OF SECTION 16100**

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**TOWN OF RIDGELAND**  
**WELL SITE NO. 3 IMPROVEMENTS PROJECT**

**APPENDIX A**

**SCDHEC GENERAL COASTAL ZONE CONSISTENCY CERTIFICATION**  
**REF # HQ1-SD4S-XDW7M**

## Coastal Zone Consistency Determination

To: Dennis Averkin, Town of Ridgeland  
From: Bisig, Anna M., OCRM Coastal Zone Consistency Section *AB*  
Project Name: Town of Ridgeland Well Site No. 3 Improvements  
Site Location: Jasper Hwy & Captain Bill Road, Ridgeland, Jasper County, SC  
Ref #: HQ1-SD4S-XDW7M  
Date: March 13, 2024

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The staff of the Office of Ocean and Coastal Resource Management (OCRM) reviewed the above referenced Coastal Zone Consistency project request for land disturbance associated with site improvements including the expansion of the building footprint for updated chemical storage, interior improvements, facade improvements, and electrical grounding system improvements for Stormwater and Water permits. No wetland impacts. The total area of disturbance will be 0.30 acres of a 0.30-acre project site.

We hereby certify the above referenced project is Conditionally Consistent with the Guidelines for the Evaluation of All Projects as well as the Transportation Facilities (*Roads and Highways, Parking Facilities*), Commercial Development, Public Services and Facilities (*Sewage Treatment and Water Supply*), and Stormwater Management (*Runoff*) policies contained in the S.C. Coastal Zone Management Program provided the provided the following conditions are included in the permit and adhered to by the applicant.

### Conditions for Minor Impact Projects

1. The Coastal Zone Consistency certification does not alleviate the applicant's responsibility for obtaining any other necessary local, state and/or federal approvals for the development of the residential lot prior to work beginning.
2. All construction BMPs must be installed, inspected and maintained to hold sediment onsite and to protect any adjacent or downstream critical area, wetlands and waters through the life of the project. Upon completion of construction activities, all disturbed (includes undeveloped) areas, including those impacted for access, must be immediately stabilized.
3. Projects that are part of a LCP are authorized/granted coverage provided the consistency determination review for the development including its stormwater management drainage system has been approved under a previously authorized NPDES CGP Land Disturbance Permit (clearing and grading or site development). The development infrastructure, and site layout deemed consistent under the referenced NPDES Land Disturbance Permit's

Stormwater Pollution Prevention Plan (SWPPP) remains unchanged from the time of approval as referenced under Section 2.2.2.A of the current NPDES General Permit For Stormwater Discharges From Construction Activities, as well as, compliant with the S.C. Stormwater Management and Sediment Reduction Regulations (26 S.C. Code Ann. Regs. 72-300) and Chapter III, Section XIII, A, E, and D of the SCCZMP.

4. For all projects with a permanent water quality pond having a permanent pool, regardless of size, which are located within one-half (1/2) mile of a receiving water body in the coastal zone, the applicant must demonstrate storage of the first ½ inch of runoff from the entire site or storage of the first one (1) inch of runoff from the built-upon portion of the property, whichever is greater. Storage may be accomplished through retention, detention or infiltration systems as appropriate for the specific site. Additionally, if the project is in close proximity to shellfish beds (within 1000' of the project), the applicant must demonstrate that the first one and half (1½) inches of runoff from the built upon portion of the property is retained onsite.
5. The project, as applicable, must be compliant with any MOA or Restrictive Covenants/Recorded plats for the project associated with previous Coastal Zone Consistency Determinations of any respective Bureau Permit. Proof of compliance must be included with the request narrative and shown on the lot construction plan sheet.
6. In the event that any historic or cultural resources and/or archaeological materials are found during the course of work, the applicant must notify the State Historic Preservation Office (SHPO) and the South Carolina Institute of Archaeology and Anthropology. Historic or cultural resources consist of those sites listed in the National Register of Historic Places and those sites that are eligible for the National Register. Archaeological materials consist of any items, fifty years old or older, which were made or used by man. These items include, but are not limited to, stone projectile points (arrowheads), ceramic sherds, bricks, worked wood, bone and stone, metal and glass objects, and human skeletal materials.
7. The applicant must continue to adhere to all conditions of any Coastal Zone Consistency Determinations of respective Bureau permits.
8. Project development must not result in adverse impacts through nonpoint stormwater runoff and/or point source water discharge on adjacent lands.
9. The project must adhere to sediment, erosion and water quality controls required by the current NPDES General Permit for Stormwater Discharges from Large and Small Construction Activities and the S.C. Stormwater Management and Sediment Reduction Regulations (26 S.C. Code Ann. Regs. 72-300, as amended, are satisfied by the project design and are correctly installed and maintained.
10. The proposed activity is not located in areas identified as "Areas of Special Resource Significance" as detailed in Chapter III, Section XII of the SCCZMP, as refined. Areas of Special

Resource Significance includes (1) Barrier Islands, (2) Dune Areas (outside of the critical area), (3) Navigation Channels, (4) Public Open Spaces, and (5) Wetlands.

11. The proposed activity is not located in areas identified as GAPCs as detailed in Chapter IV of the SCCZMP; Areas of Unique Natural Resource Value: (1) Heritage Trust Sites, (2) State Wildlife Preserves, (3) State Parks, (4) Scenic Rivers, (5) Marine and Estuarine Sanctuaries, (6) Shellfish Areas, (7) Groundwater Resources, and (8) Threatened and Endangered Species; Activities or Facilities Dependent on Coastal Location: (1) State Ports, (2) Navigation Channels, and (3) Mining Operations; Areas of Special Historic, Archaeological or Cultural Significance: (1) special historic, (2) archaeological, or (3) culturally significant sites. For those projects adjacent to or that may significantly affect a priority of use for any GAPC, DHEC OCRM will determine a project's affects during individual review of application for coverage under this GCZC. Those projects which are likely to adversely affect the priority of use for a GAPC will require an individual certification.

This determination shall serve as the DHEC OCRM State/Federal Coastal Zone Consistency Determination for the work described above. This determination **does not** serve as the final permitting decision and **does not** alleviate the applicant's responsibility to obtain final authorizing State or Federal permit(s). Local government authorizations **may also** be required.

**TOWN OF RIDGELAND  
WELL SITE NO. 3 IMPROVEMENTS PROJECT**

**APPENDIX B**

**SCDHEC CONSTRUCTION PERMIT FOR WATER FACILITIES FOR  
IMPROVEMENTS AT WELL SITE NO. 3**

**PENDING**