

**THIS AGREEMENT IS SUBJECT TO ARBITRATION PURSUANT TO THE SOUTH  
CAROLINA UNIFORM ARBITRATION ACT.: SC CODE ANN. §15-48-10 ET SEQ.  
AND THE FEDERAL ARBITRATION ACT 9 U.S.C. 1 ET SEQ.**

RENEWABLE WATER RESOURCES

GREENVILLE, SOUTH CAROLINA



**CONTRACT DOCUMENTS**

**Richland Creek Trunk Sewer Upgrade**

**December 2015**

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**ADVERTISEMENT**  
**INVITATION FOR BIDS**  
**RENEWABLE WATER RESOURCES**  
**GREENVILLE, SOUTH CAROLINA**

Renewable Water Resources “ReWa” (herein called the “Owner”) is accepting bids at the Purchasing Department located at 561 Mauldin Road, Greenville, South Carolina 29607. Bids may be personally carried to the opening **January 12, 2016 before 2:00 P.M. on** at the Administration Building, 561 Mauldin Road, Greenville, South Carolina 29607, where they will be publicly opened and read aloud.

This Bid is for the Richland Creek Trunk Sewer Upgrade Project  
This Project is in accordance with the Contract Documents prepared by the Owner and Engineering (herein called the “Engineer”) and contained herein.

Pursuant to SC Labor Licensing Regulations, the contractor is required to have the following designation(s) to Bid on this Project: **WL**

This project consists of the Work (“Work”):

The work covered under this contract will be performed generally along road rights-of-way, and ReWa utility easements, alongside the Richland Creek corridor from Cleveland Park to Rutherford Road in Greenville, SC. The overall project will consist of the construction of a new gravity trunk sewer, ranging in size between 24 and 42 inches, associated appurtenances, erosion/sedimentation control, and equipment for the installation of the new sewer main. The work for this project includes, but is not limited to, the furnishing of labor, materials, and equipment for the construction of approximately 2,185 linear feet of 42-inch DIP sewer main, 2,970 linear feet of 36-inch DIP sewer main, 2,910 linear feet of 30-inch DIP sewer main, 5,825 linear feet of 24-inch DIP sewer main, 81 manholes, and all associated fittings, and appurtenances to complete the work.



Pre-Bid Conference:

A mandatory Pre-Bid conference will be held at 10:00 A.M, December 29, 2015, at the Administration Building. Representatives of Owner and Engineer will be present to discuss the Project. All Bidders are required to attend the Pre-Bid conference. In response to questions arising at the conference shall be sent to Purchasing in writing. Purchasing will issue Addenda as Engineer considers necessary.

**NOTE: THE FAILURE TO ATTEND THE MANDATORY PREBID CONFERENCE WILL RESULT IN REJECTION OF THE BID.**

Please note the following requirements:

- Any contract or contracts awarded under this Advertisement for Bids may be funded by a loan from the State Revolving Fund or by other grant or loans from DHEC/EPA or other agencies. Neither the State of South Carolina nor the United States nor any of their Departments, Agencies, or employees is or will be a party to this Advertisement for Bids or any resulting contract. The contract will be subject to regulations contained in Federal Register, Section 40 CFR.31 where applicable.
- Bidders must comply with the President's Executive Order Nos. 11246 and 11375, which prohibit discrimination in employment regarding race, creed, color, sex, or national origin. Bidders must certify that they have performed prior work in compliance with Executive Order Nos. 11246 and 11375. (See Sections of the Contract Documents and Supplemental General Conditions).
- Furthermore, where applicable Bidders must comply with Title VI of the Civil Rights Act of 1964, the Davis-Bacon Act, the Anti-Kickback Act, the OSHA Contract Safety Work Hours, Contract Work Hours and minority-owned businesses goals.
- Each Bidder must be qualified under the provisions of the South Carolina Contractor's Licensing Law, 1976 Code, Section 40-11-10, et seq. (as amended)

Contract Documents may be examined at the offices of the Owner and the Engineer. In addition, Contract Documents may be downloaded electronically from the ReWa website: [www.rewaonline.org](http://www.rewaonline.org). Please follow the links to the tab "PURCHASING," and then "Current Solicitations."

For Bids that exceed \$100,000, Bids must be accompanied by a Bid bond of not less than five percent (5%) of the amount Bid. **If you do not comply with this requirement, your Bid WILL BE REJECTED.**

Attention of Bidders is directed to applicable employment laws and regulations and to minimum wage and hour laws.

The Owner reserves the right to reject all Bids or an individual Bid, and to waive any informalities and technicalities in the Bid in accordance with its procurement code.<sup>1</sup> Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified will not be considered. No Bidder may withdraw a Bid after the actual date of Bid opening except in accordance with § 3-101 et seq. of the Owner's Procurement Code.

#### Renewable Water Resources

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<sup>1</sup> The Procurement Code is available online at [www.rewaonline.org](http://www.rewaonline.org), under the heading "Purchasing," "Procurement Code."

## INFORMATION FOR BIDDERS

1. Submittal, Receipt, and Opening of Bids: Bids will be received by the Renewable Water Resources “ReWa” (herein called the “Owner”) at its Administrative Office at 561 Mauldin Road, Greenville, South Carolina 29607 **until 2:00 p.m. (local time) on the 12<sup>th</sup> of January 2016**, and immediately thereafter publicly opened and read aloud.

Each Bid must be submitted in a sealed envelope, addressed to Renewable Water Resources “ReWa”, at 561 Mauldin Road, Greenville, SC 29607. Each sealed envelope containing a Bid must be plainly marked on the outside as **BID FOR #335-10/5/2015 Richland Creek Trunk Sewer Upgrade** project and the envelope shall also bear on the outside the name of the Bidder and the Bidder’s address. Bidders must acquaint themselves with and comply with applicable state and local regulations on licensing. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the Owner at the above address. A Bidder may forward the Bid, meeting these requirements in an outer, overnight carrier envelope (such as DHL, FedEx, UPS). Subcontractors and major material suppliers shall be listed as required by the Bidding documents. In the event the work is to be self-performed by the Contractor, that fact shall be specifically set forth in the Bid Form and not left blank. All subcontractors shall have a valid South Carolina license. Failure to complete the Bid form will result in a Bid being determined nonresponsive.

2. The Owner may waive any formalities on minor defects or reject any and all Bids per Owner’s Procurement Code. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw a Bid after the actual date of Bid opening except in accordance with § 3-101 et seq. of the Owner’s Procurement Code. Should there be any reasons why the Contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.
3. Preparation of Bid: All Bids must be made on the required Bid Form. All blank spaces for Bid prices must be filled in, in ink or typewritten. The Bid Form must be fully completed and executed when submitted. Only one copy of the Bid Form is required. In addition, the Bidder must submit a copy of all Bids on CD in Microsoft Word, Excel, or PowerPoint Form. Any documents may be submitted in Adobe PDF format. A conditional or qualified Bid will not be accepted.
4. Modification of Bid: Any Bidder may modify his Bid at any time prior to the scheduled closing time for receipt of Bids. The owner will not accept a modification delivered by electronic means or facsimile. All modifications must be submitted in the same manner as Bids pursuant to paragraph 2 above.

5. Addenda and Interpretations: The Contract Documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any conditions of the contract.
6. Interpretation: No interpretation of the meaning of the plans, specifications, or other Contract Document will be made to any Bidder orally. Every request for such interpretation should be in writing addressed to Engineer and, to be given consideration, must be received at least ten (10) days prior to the date fixed for the opening of Bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted on the ReWa website not later than seventy-two (72) hours prior to the time fixed for the opening of Bids. In addition, all Bidders may sign up for enotifications to receive automatic emails when updates are posted on ReWa's website at: <http://www.rewaonline.org/rfp.php>  
**ReWa WILL NOT ENSURE THE RECEIPT OF THE E-MAIL. IT IS BIDDER'S OBLIGATION TO CHECK THE WEB SITE PRIOR TO BID OPENING FOR INTERPRETATIONS. BIDDER IS RESPONSIBLE FOR UPDATING THIS E-MAIL ADDRESS, SHOULD IT CHANGE.** Failure of any Bidder to receive any such addendum or interpretation shall not relieve such Bidder from any obligation under its Bid as submitted. All addenda so issued shall become part of the Contract Documents.
7. Base Bid: The Bidder shall state in the blank space provided on the Bid Form, in **both** figures and words, the total price for the work to be performed under this Contract. A conditional or qualified Bid will not be accepted.
8. Equal Alternative Items: Whenever a product is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, etc., it is intended to establish a standard and any product of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the product so proposed is, in the opinion of the Engineer, of equal substance and function. It shall not be purchased or installed by the Contractor without the Engineer's written approval.
  - a. Whenever a product specification includes minimum experience requirements which the selected manufacturer cannot meet, the manufacturer shall furnish the Owner with a cash deposit or bond, in an amount equal to the cost of the product, which shall remain in effect until the experience requirement has been met.
  - b. Prequalification Requirements: **WHEN THE TERM "OR EQUAL" FOLLOWS THE NAMES OF MANUFACTURERS, THE OTHER MANUFACTURERS DESIRING APPROVAL OF AN "OR EQUAL" SHALL COMPLY WITH SECTION 3-302(2) OF THE PROCUREMENT CODE OF THE OWNER.**

**Section 3-202(2) ("Rejection of Initiation for Bids or Requests for Proposal") of the Procurement Code is quoted below but the Bidder is instructed to review the regulation itself for current provisions.**

- (2) Bidders'/Offerors' Lists and Prequalification of Major Equipment.

a. Bidders'/Offerors' Lists. All sources requesting to be put on a Bidders'/offerors' list shall be so enlisted, unless the Purchasing Manager in conjunction with the Owner's Engineer makes a written determination that the source should not be enlisted in accordance with regulations of the Owner. Decisions to reject enlistment shall be appealable to the Executive Director. The Purchasing Manager shall ensure that the Bidders'/offerors' lists contain all known sources interested in participating in procurement and shall review periodically the Bidders'/offerors' lists and require the addition to such lists of any appropriate sources which are not contained therein.

b. Prequalification of Major Equipment Manufacturers. Until the end of the design phase of a project, the Owner will offer opportunities for major equipment manufacturers to be listed on the Major Equipment Bidders'/Offerors' List for future consideration if they pre-qualify major equipment. An evaluation of the equipment will be made by the Owner at no cost to the manufacturer if submittals are made before the end of the project design phase. (Subject to Owner's right to refuse the certification process). If a manufacturer misses this deadline for prequalification, and the contractor submits an "or equal" substitution during the Bidding process, the manufacturer or contractor shall pay the Owner's consulting engineer directly for the cost of the evaluation. The contractor must obtain the approval of the "or equal" substitution by the Owner prior to the contractor's submission of his Bid, ten (10) days prior to Bid Opening Date, unless otherwise specified. Any submission after the date defined in the Bid will not be allowed. The submittal by the manufacturer or the contractor for an "or equal" before or after that deadline shall include the following:

- (i) Descriptive literature including information on materials used, minimum design standards, standard design features, manufacturing processes and facilities, and similar information which indicate experience and expertise in the manufacture of the product being evaluated including costs, warranty information, electrical requirements and diagrams, and erection requirements and weights;
- (ii) Performance specifications applicable to the manufacturer's standard design which indicates the level of performance to be expected from the product;
- (iii) A complete set of submittal drawings of similar products which have been completed and placed into operation;
- (iv) A list of existing installations of products similar in type and size, information regarding experience at the installations;
- (v) A brochure or equivalent material indicating technical capabilities, field service capabilities and financial information;

(vi) A complete list of all requirements of the Drawings and Specifications with which the manufacturer cannot conform, including reasons why alternate features are considered equivalent;

(vii) References that can independently supply an operational and maintenance history of the equipment, including incidents of failure and repair during the warranty period of the product that will enable the Owner's engineer to develop a chart showing operation and maintenance and carrying costs based upon the above history. If no history is available equal to the time provided for in the warranty, then it should be provided from the time of origin of the product;

(viii) A chart showing the projection of the cost of operation, maintenance and carrying cost until the date the manufacturer estimates the equipment will have to be replaced, together with the documentation upon which the projection is based;

(ix) A list indicating the availability of spare parts and the time necessary for delivery.

(x) Any other information requested in writing by the Engineer.

**BIDS BASED ON PRODUCTS WHICH HAVE NOT RECEIVED THE APPROVAL OF THE ENGINEER MAY BE DETERMINED NON-RESPONSIVE BY THE OWNER AND REJECTED.**

Any Bidder intending to furnish substitute products is cautioned to verify that the item being furnished will perform the same functions and have the same capabilities as the item specified. The Bidder shall include in his Bid the cost of accessory items which may be required by the substitute product and the cost of any architectural, structural, mechanical, piping, electrical or other modifications required to accommodate the substitution.

Approval of the Engineer is dependent on his determination that the product offered is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based, and will require no major modifications to structures, electrical systems, control systems or piping systems.

9. Unit Prices: Each Bidder shall state in the blank spaces provided on the Bid form unit prices requested, and, opposite each unit price the total amount for the estimated quantity of each item of work or type of material. Unit prices shall be indicated in figures while the total Bid shall be indicated in both figures and words. The unit prices shall include all labor, materials, tools, equipment, apparatus, overhead, including home office overhead, and services necessary and required to complete the work in accordance with the Contract Documents. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

10. Rejection of Bids and Qualifications of Bidder:

- a. The Owner may, when in its interest, reject any or all Bids.
  - b. The Owner may make such investigations as it deems necessary to determine the ability of a Bidder to perform the work, and the Bidder shall furnish to the Owner such information as the Owner may request.
  - c. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.
  - d. Conditional Bids will not be accepted.
  - e. THE BIDDER SHALL SUBMIT A LIST OF THE SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS. FAILURE TO SO LIST WILL RESULT IN A BID BEING DETERMINED NONRESPONSIVE.
11. Bid Bond: Each Bid must be accompanied by a Bid bond prepared on the form of Bid Bond attached hereto, duly executed by the Bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of five percent (5 %) of the Bid, if the Bid exceeds \$100,000.

- a. Such Bid bonds will be returned to all except the three lowest responsible Bidders within ten (10) days after the opening of Bids, and the remaining Bid bonds will be returned promptly after the Owner and the accepted Bidder have executed the Contract, or, if no award has been made within ninety (90) days after the date of the opening of Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his Bid.
  - b. The Bid Bond of the successful Bidder will be retained until the Payment Bond and Performance Bond required hereinafter have been executed and approved, after which the Bid Bond will be returned.
  - c. All Bid Bonds, Performance Bonds, and Payment Bonds, Insurance Contracts, and Certificates of Insurance shall be executed by or countersigned by an attorney-in-fact or a South Carolina licensed agent of the surety or insurance company having his place of business in the State of South Carolina. Further, the said surety or insurance company shall be duly licensed and qualified to do business in the State of South Carolina. ***Surety companies signing bonds must appear on the Treasury Department's current list (Circular 570, as amended).***
12. Performance Bond, Payment Bond and Notice to Proceed: A Performance Bond and Payment Bond, each in the amount of one hundred (100%) percent of the contract price, with corporate surety listed on the Treasury Department's most current list (Circular 570, as amended), approved by the Owner, will be required for the faithful performance of the Contract.

- a. The Performance Bond shall remain in full effect through the warranty period specified in the Contract Documents.
  - b. Attorneys-in-Fact who sign Bid Bonds or Payment Bonds and Performance Bonds shall be residents of South Carolina and must file with each bond a certified and effective dated copy of their power of attorney.
  - c. The party to whom the contract is awarded will be required to execute the Agreement and obtain a Performance Bond, a Payment Bond and Certificates of Insurance within fifteen (15) calendar days from the date of the Notice of Award.
  - d. The Notice of Award shall be accompanied by the necessary Agreement and Bond forms. In case of failure by the Bidder to execute the Agreement, the Owner may at his option consider the Bidder in default, in which case the Bid Bond accompanying the Bid shall become the property of the Owner.
  - e. The Owner, within thirty (30) calendar days of receipt of the required Performance Bond, Payment Bond, Certificates of Insurance and Agreement signed by the party to whom the Agreement was awarded, shall sign the Agreement and return to such party an executed duplicate of the Agreement.
  - f. Engineer shall be responsible for verifying the availability and adequacy of the insurance of its subcontractors and/or subconsultants.
  - g. Should the Owner not execute the Agreement within such period, the Bidder may, by written Notice, withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the Notice by Owner.
  - h. The Notice to Proceed shall be issued within fifteen (15) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the fifteen (15) calendar day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.
13. Time of Completion and Liquidated Damage: The Bidder must agree to commence work on or before a date to be specified in the Notice to Proceed.
- a. All work required by the Contract Documents shall be completed within the time for completion specified in the Bid unless modified by Change Order in which case the date for completion of all work shall be as specified therein. Measurement of the time for completion shall commence on the date specified in the Notice to Proceed.
  - b. Bidders must agree also to pay as liquidated damages, the sum of money for each consecutive calendar day thereafter as shown below and as hereinafter provided in the Contract between Owner and Contractor.



<u>Completion Time</u>	<u>Liquidated Damages</u>
480 calendar days substantial completion	See Section 3.4.1 of the Agreement
540 calendar days final completion	Between Owner and Contractor

14. Bidders Duty to Become Informed About Conditions of Work: Each Bidder must inform himself fully of the conditions relating to the construction of this project and the employment of labor therein.
- Each Bidder is responsible for inspecting the site and for reading and being thoroughly familiar with the Contract Documents.
  - Failure to do so will not relieve a successful Bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his contract.
  - Insofar as possible, the Contractor, in carrying out his work must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.
  - After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning quantities of work or concerning the nature of the work to be done.
15. Notice of Special Conditions: Attention is particularly called to relevant parts of the Owner's Procurement Code, the Contract Documents, and Specifications which deal with the following:
- Procurement Procedures including protest procedures.
  - Insurance requirements.
  - Subcontracting.
16. Laws and Regulations: The Bidder's attention is directed to the fact that all applicable Federal, State, county, municipal ordinances, laws, and regulations (and all other authorities having jurisdiction over construction of this project) shall apply to the Contract throughout, and these shall be deemed to be included in the Contract the same as though herein written out in full. When related requirements of the various laws and regulations differ, the more stringent will be required and enforced.
17. State License: Each Bidder must meet the provisions of Section 40-11-10, *et seq.* of the Code of Laws of South Carolina 1976, as applicable.
18. Method of Award: The contract will be awarded to the responsive, responsible Bidder submitting the lowest Bid. The Bidder to whom the award is made will be notified at the earliest possible date. The Owner reserves the right to reject all Bids and to waive any

informality in Bids received whenever such rejection or waiver is in its interest and as provided in Owner's Procured Code.

19. Determination of Bid Amount. In the event of discrepancy between the prices quoted in the Bid in words and those quoted in figures, the words shall control.

20. Basis for Determining Responsiveness and Responsibility:

- a. The Bidder shall submit its Bid on the forms furnished by the Owner. All blank spaces in the Bid forms **must be properly filled in for each and every item.** The Bidder shall state the price (written in ink or typed) for which it proposes to do the work.
- b. The Bidder shall sign the Bid correctly and in ink (*See Article 2 of the General Conditions*).
  - i. If the Bid is made by an individual, his/her name and post office address must be shown. "Owner" must appear after the name.
  - ii. If made by a partnership, the name and post office address for each member of the partnership must be shown. Each partner must sign with the word "Co-Partner" following his/her name.
  - iii. If made by a corporation, the person signing the Bid shall give the name of the state under the laws of which the corporation was chartered and the name, titles and business address of the president, secretary, and the treasurer. A corporation shall seal the document with the corporate seal.
  - iv. Anyone signing a Bid as an agent shall file evidence of his authority to do so and that the signature is binding upon the firm or corporation.
- c. A responsive Bidder or offer or means a person who has submitted a Bid which conforms in all material respects to the Invitation For Bids. A non-inclusive list of reasons that a Bid shall be considered nonresponsive follows:
  - i. If the Bid is on a form other than that furnished by the Owner, or if the Owner's form is altered, or if the Bid form fails to reference the Project Specifications and the Contract Documents.
  - ii. If there are unauthorized additions, conditions, or alternate pay items, or irregularities of any kind which made the Bid incomplete, indefinite, or ambiguous.
  - iii. If the Bid does not contain a unit price for each item listed in the Bid.
  - iv. If the Bids or prices on all or certain Bid items are unreasonably low or unreasonably high.
  - v. If the Bid contains unit prices that are obviously unbalanced.

- vi. If the Bid is not accompanied by the Bid Bond specified by the Owner.
  - vii. If the Bid does not acknowledge addenda received.
- d. Responsibility will be based on the following, non-inclusive factors:
- i. Maintains a permanent place of business.
  - ii. Has adequate plant equipment to do the work properly and within the time limit that is established.
  - iii. Has adequate financial status to meet his obligations contingent to the work.
  - iv. Has a work history which indicates an ability to meet the obligations under the conditions of the Contract.
  - v. Has sufficient skill, judgment and integrity necessary to faithfully perform the Contract.
  - vi. Has sufficient facilities, equipment, personnel, and material necessary to do the job required under the Contract.

The determination by the Owner as to whether any or all of the above items, (c) or (d), are satisfactory shall be conclusive.

- e. Prior to the award of the Contract, the Owner may require any Bidder to furnish evidence of the competency and financial ability of said Bidder to perform the Work and, if after investigation, such evidence is not satisfactory, the Owner reserves the right to reject his Bid.
- f. The Owner reserves the right to reject any irregular Bid(s) and the right to waive informalities, minor defects or technicalities if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts. The Owner reserves the right to reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the Owner and the Bidder.

21. Withdrawal of Bid, Failure to File Bond or Insurance Certificates:

- a. If the successful Bidder, for any reason whatsoever, withdraws from competition after the opening of Bids, or fails or refuses to execute the Contract or provide the Bonds and Insurance Certificates within fifteen (15) calendar days after Contractor has received notice of award, Contractor shall forfeit to the Owner the Bid security as liquidated damages for such withdrawal, failure or refusal, and,

without limitation, shall be subject to any and all other remedies available to the Owner.

- b. Failure on the part of the successful Bidder to execute a Contract and file acceptable bonds and certificates of insurance within fifteen (15) calendar days after Notice of Award shall be just cause for annulment of the award and forfeiture of the Bid security.
  - c. The Owner may then accept the Bid of the next lowest responsible Bidder, or re-advertise for Bids. If the Bid of the next lowest Bidder is accepted, this acceptance shall bind such Bidder as though that Bidder was the original successful Bidder.
22. Obligation of Bidder: At the time of the opening of Bids, each Bidder will be presumed to have visited and inspected the site in sufficient detail to fully acquaint itself with the site, local conditions, surface and subsurface, to have read and be thoroughly familiar with the Contract Documents (including all addenda). The failure or omission of any Bidder to examine any form, instrument, or document to which mention is made, or to which reference is made, in the plans or Contract Documents, or Bidder's failure to sufficiently examine the site, or Bidder's failure to be aware of applicable laws, statutes, ordinances, rules or regulations, whether local, State or Federal, in no way will relieve any Bidder from any obligation in respect to the Bid or from the obligations to be assumed under the Contract.
23. Award: If the Contract is awarded, the Owner will accept the Bid and award the Contract to the successful Bidder within ninety (90) days after the opening of Bids, by written notice to the successful Bidder.
24. Safety: The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).
25. Engineer:
- a. The Engineer is:
  - b. Engineer's address is:
  - c. Engineer's telephone number is:
26. Prequalification Items: Attention is directed to Item No. 8 of Information for Bidders ("Equal Alternative Items"). The following items, if specified therein, require pre-qualification:
- a. \_\_\_\_\_
  - b. \_\_\_\_\_

c. \_\_\_\_\_

27. Two Percent Withholding Nonresident Contractors: **NOTICE**: If the Contractor is a nonresident, compliance must be shown with S. C. Code Ann. §12-8-550, quoted here:

A person hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within this State shall withhold two percent of each payment in which the South Carolina portion of the contract exceeds or could reasonably be expected to exceed ten thousand dollars. This section does not apply to a nonresident which registered with the Secretary of State or the Department of Revenue and by that registration agreed to be subject to the jurisdiction of the department and the courts of this State to determine its South Carolina tax liability, including withholding and estimated taxes, together with any related interest and penalties. Registering with the Secretary of State or the department is not an admission of tax liability nor does it require the filing of an income tax or franchise (license) tax return. If the person hiring, contracting, or having a contract with a nonresident obtains an affidavit from the nonresident stating that the nonresident is registered with the department or with the Secretary of State, the person is not responsible for the withholding.

This is in addition to withholding for employees and state sales tax. Even if the out-of-state contractor has a South Carolina Tax number and is regularly filing state tax returns, this withholding requirement applies. The two percent is over and above the usual 10% retainage.

Under the law the contractor can assure payment to the South Carolina Tax Commission by posting an acceptable bond in the sum of two percent of the total contract in lieu of the withholding. The Tax Commission will then notify the Owner that withholding is not necessary.

**NOTE**: Owner will not bear the burden of withholding and accounting and requires any such out-of-state contractor to seek and obtain such a bond so that withholding will not be necessary. Proof of such a bond must be submitted to the Owner prior to any payments being made to the Contractor and must be submitted prior to certification by Owner's attorney.

Further information concerning this requirement is available from:

South Carolina Department of Revenue and Taxation  
Income Tax Division – Withholding Tax Unit  
P. O. Box 125  
Columbia, South Carolina 29214  
(803) 737-4757

28. Attention Regarding Notice and Claim Procedure: There are two Acknowledgment Forms, #1 and #2, about notices required under the contract document and claim procedures to be followed. Acknowledgement Form #1 is required to be executed at the pre-Bid conference and given to the Engineer. Acknowledgment Form #2 is to be

executed and returned with the Bid package. Both forms are attached to these instructions for your use.

29. Post-Bid Qualifications Submittal: Within twenty-four (24) hours following the Bid opening, the apparent low Bidder shall submit information to substantiate Bidder's qualifications. This submittal shall include (1) name and background of project manager and project superintendent proposed for the Work, (2) experience with critical path project scheduling as described in the Specifications, and (3) documentation demonstrating compliance with the minimum qualifications which shall include satisfactory completion or satisfactory progress, if projects are currently under construction, of at least two projects with similar type construction and with a construction cost of not less than fifty (50%) percent of the Contract Sum proposed in the Bid within the past five years. Experience on projects performed by any of the Bidder's related or affiliated companies will not be considered in the evaluation of the Bidder's experience as required herein.

Every Bidder shall disclose any history where any officer of the Bidder, the Bidder Company or entity, its subsidiaries or affiliates, or predecessor companies held an interest in a construction contract and where that contract was terminated for cause or where there was a failure to perform.

If termination or failure of performance occurred, the time, place, personnel involved, Contract parties and circumstances shall be fully disclosed. These facts may result in a determination the Bidder is not responsible.

Minimum qualifications of the project manager and project superintendent referenced in (1) above shall include 10 years of experience with projects with similar type construction with increasing responsibilities. Project superintendent shall show experience as project superintendent on at least one similar type construction project. Project manager shall show experience as project manager on at least four projects with similar type construction with a Contract value of not less than fifty (50%) percent of the Contract Sum proposed in the Bid. Bidder shall provide the Owner's name, address, telephone number, contact individual, date and project name, including size and Contract value for each project fulfilling the above requirements for the project manager and project superintendent. Any substitutions or replacements for either individual shall meet the same requirements as listed above. References for projects performed for ReWa or as a subcontractor shall not be considered.

30. In addition, in a spirit of good faith and cooperation, the Owner, the Contractor and the Engineer, or their designees, are to meet monthly. At each monthly meeting written minutes shall be kept by the Owner's Engineer showing a monthly discussion of any and all pending claims to ascertain the status of pending claims. If there are not claims the minutes shall reflect the fact. No claim is to be discussed unless it has been presented in writing as required by the Contract Documents. No claim shall be resolved until reviewed by the Engineer and the Engineer's recommendation made to the Executive Director of the Owner. These monthly meeting minutes shall be circulated to the Owner and the Executive Director of the Owner. These monthly meeting minutes shall be

circulated to the Owner and the Contractor for corrections or omissions, signed and returned to the Engineer.

31. The purpose of the notices, procedures and meetings requirement is to provide the Contractor with a means of giving notice and for making claims as they arise, in the belief that the earlier such are presented and considered, the quicker they may be resolved. At the same time, this formal written procedure brings exact knowledge to the Owner and Engineer, so that the Owner may have sufficient time to consider alternatives or methods as means to minimize costs and time delays. Both the parties and the Engineer are expected to expedite all disputes, to not let claims accumulate, and to strictly follow these requirements.
32. Contractor shall file any and every claim in the form and manner required by the Contract Documents. Failure to comply with the time requirements and the claims procedure shall result in the loss of the claim and may result in suspension of the Work or termination of the Contract by the Owner.
33. Claims are not to be held back or allowed to accumulate, but are to be timely presented so that the Owner may respond by appropriate action. The Owner must have an opportunity to consider the nature, extent and full cost of a claim and an opportunity to consider alternatives and options to contain costs.

## 1. GENERAL CONDITIONS GOVERNING AWARD OF CONTRACT

### 1.1 **Award.**

- 1.1.1 The award of the Contract, if it is awarded, will be to the lowest responsible Bidder whose qualifications indicate the award will be in the best interest of the Owner and whose Bid complies with all the prescribed requirements.
- 1.1.2 No Notice of Award will be given until the Owner has concluded such investigations as it deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed.
- 1.1.3 The Owner reserves the right to reject the Bid of any Bidder who does not pass any such investigation as described in 1.1.2 to the Owner's satisfaction. In analyzing Bids, the Owner may take into consideration alternate line items and unit prices, if required by the Bid Schedule. Award decisions on alternate line items, if any as required by the Bid Schedule, shall be in Owner's discretion based on identifying the Bid alternate line items fair and reasonable as compared to the Project Engineer's estimate.
- 1.1.4 If the Contract is awarded, the Owner will give the successful Bidder a Notice of Award within ninety (90) days after the opening of the Bids. The Owner will have the right to waive minor technicalities (in accordance with its Procurement Regulations) and accept a Bid by a qualified Bidder.

### 1.2 **Execution of the Agreement**

- 1.2.1 At least three (3) counterparts of the Agreement and such other Contract Documents as practicable will be signed by the Owner and the Contractor within fifteen (15) calendar days from the date of the Notice of the Award.
- 1.2.2 The Contractor will submit to the Owner, within fifteen (15) calendar days from the date of the Notice of Award,
  - (a) three signed Agreements between Owner and Contractor, including the General Conditions of the Contract;
  - (b) three Performance Bonds;
  - (c) three Payment Bonds;
  - (d) three original Certificates of Insurance governing every policy required under the Contract Documents;



- (e) three original, signed copies of Contractor's Corporate Resolution; and
- (f) Contractor's statement of compliance with S.C. Code § 12-8-550.

1.2.3 The Owner's attorney shall determine if the Bonds, Certificates of Insurance, agreements, and other documentation are acceptable according to the requirements of the Contract Documents and will certify as to their acceptability by signing the Certificate of Owner's Attorney.

1.2.4 If the Owner's attorney determines that the required documents are unacceptable, the provisions of Article 2.5 of the General Conditions shall apply. If the Owner's attorney certifies that the required documents are acceptable, the Owner shall sign the Agreement within fifteen (15) calendar days of receipt of the Agreement and the other required documents from the attorney. The Engineer will identify those portions of the Contract Documents not so signed and such identification will be binding on all parties. The Owner, the Contractor and the Engineer will each receive an executed counterpart of the Contract Documents.

### 1.3 **Execution of Documents by Contractor**

1.3.1 The Contractor shall execute each copy of the Bid, Contract, Performance Bond and Payment Bond as follows:

- (a) If the documents are executed by a sole owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
- (b) If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
- (c) If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
- (d) If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole owner, partnership or corporation, whichever form is applicable to each particular member.

- (e) All signatures shall be properly witnessed as required by the document.
- (f) If the contractor's license is held by a person other than an owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
- (g) The Bonds shall be executed by an attorney in fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
- (h) Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in South Carolina. The title "Licensed Resident Agent" shall appear after the signature.
- (i) The seal of the bonding company shall be impressed on each signature page of the Bonds.
- (j) The Contractor's signature on the performance bond and the payment bond shall correspond with that on the Contract Documents.

#### **1.4 Delivery of Bonds and Insurance Certificates**

- 1.4.1 When the Contractor delivers the executed Agreements to the Owner, the Contractor shall also deliver to the Owner such Bonds and Certificates of Insurance as the Contractor may be required to furnish in accordance with the Contract Documents. Contractor shall submit three original copies of each set of documents.

#### **1.5 Forfeiture of Bid Security**

- 1.5.1 Failure of the successful Bidder to execute and deliver the agreement and deliver the required Bonds within fifteen (15) calendar days of the Notice of the Award shall be just cause for the Owner to annul the Notice of Award and declare the Bid and any security therefore forfeited.

#### **1.6 Copies of Documents**

- 1.6.1 The Owner will furnish to the Contractor up to five (5) copies of the Specifications and Drawings as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request at the cost of reproduction.

#### **1.7 Commencement of Contract, Notice to Proceed**

- 1.7.1 The Notice to Proceed shall be issued within fifteen (15) calendar days of the execution of the Agreement by the Owner. The Contract Time will commence to run on the day indicated in the Notice to Proceed

NOTICE REGARDING CONTRACTUAL OBLIGATIONS AND CONTACT WITH  
OWNER'S EMPLOYEES

(To be signed at Pre-Bid Conference by Contractor's Representative)

A Contractor submitting a Bid for this Project must have a Contractor's representative sign all of the forms listed below. Said Contractor's representative must be authorized to legally bind the Contractor. These forms are considered an indispensable part of the Contract and the omission of one or more of these forms in the Bid package shall be grounds for disqualifying the Bid as non-responsive.

1. Notice and Claim Procedures Acknowledgement Form
2. South Carolina Illegal Immigration Reform Act
3. Compliance with State Revolving Fund Requirements (if applicable)
4. Compliance with ARRA Buy American Requirements (if applicable)
5. Statement of Compliance with SC Code 12-8-550

Further, Renewable Water Resources ("ReWa") seeks to ensure the integrity of the complete procurement process as required by South Carolina Code Section 11-35-50. Toward that end, it is a violation of both state law and ReWa policy for a ReWa employee to discuss the terms and conditions of any pending procurement contract, including the terms and conditions upon which an award of the contract shall be made, with a prospective offeror, Bidder, contractor, or subcontractor ("a Prospective Offeror"). ReWa may have discussions with a Prospective Offeror only to clarify the terms of a request for proposal or an invitation to Bid and then only as authorized by the Executive Director or his delegate, the ReWa Purchasing Manager.

Any requests for interpretation of the Contract Documents must be directed to the ReWa Purchasing Manager as a formal request for interpretation as detailed in Paragraphs 6 and 7 of the Information for Bidders. Any questions regarding the project must be directed to ReWa's Purchasing Department. All communications with Prospective Offerors will occur only in writing and will be preserved. **Please be aware that any communications with Owner may be publicly published.**

Should ReWa become aware that a Prospective Offeror engaged in communications outside of the formal channels provided in these Contract Documents, it shall be grounds for the disqualification of that Prospective Offeror's Bid in accordance with Owner's Procurement Code. If Owner becomes aware of such unauthorized contact after the signing of the Contract, it shall be grounds for immediate termination of the Contract, for cause. Such termination shall be treated as though Contractor had ceased all work as of the day that ReWa became aware of the unauthorized contact.

By signing below, the Prospective Contractor represents that it has read the above disclosure, understands its terms, and assents to the provisions contained herein. Prospective Contractor realizes that unauthorized contact can lead to the disqualification of the Bid, or the termination of the Contract.

**[SIGNATURE PAGE FOLLOWS]**

Read and understood:

\_\_\_\_\_  
Name of Prospective Contractor

Sign: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Notice and Claim Procedure Acknowledgment Form

(To be returned with the Bid)

We, the Contractor (Bidder) and Contractor's/Bidder's project manager acknowledge that we have read and understand the contract document sections about claims procedures, notice requirements for changes, including, but not limited to damage claims, extras, time extensions, etc. and have read and understand the claim procedure and agree to abide by these formal requirements. Further, that we understand failure to follow requirements will result in a complete loss of the claim.

Read and understood:

---

 Name of Contractor

Sign: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

*If above signature is not that of the Project Manager:*

Sign: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: Project Manager

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

## Compliance with State Revolving Fund Requirements

(To be returned with the Bid)

- If this box is checked, this Project may be funded in whole or in part with federal funds through the State Revolving Fund (“SRF”)

### **Guide to Federal Requirements for Federally-Designated SRF Projects**

There are a number of federal laws, executive orders and government-wide policies that apply to projects and activities receiving federal financial assistance, regardless of whether the statute authorizing the assistance makes them applicable. Since federal capitalization grant money was used to seed the State Revolving Fund (SRF) program, any money received through the SRF program is subject to federal authorities. As an example, the environmental evaluation section, covered in the Preliminary Engineering Report (PER) guide, stems from environmental authorities, such as, the Endangered Species Act and Wild and Scenic Rivers Act. In addition, there are social policy and economic authorities that must be complied with in order to receive funding through the SRF program. These authorities include:

- ▶ Uniform Relocation and Real Property Acquisition Act, Pub. L. 91-646, as amended
- ▶ Women’s and Minority Business Enterprise, Executive Orders 11625, 12138 and 12432
- ▶ Section 129 of the Small Business Administration Reauthorization and Amendment Act of 1988, Pub. L. 100-590
- ▶ Equal Employment Opportunity, Executive Order 11246
- ▶ Debarment and Suspension, Executive Order 12549
- ▶ Procurement Prohibitions under Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, including Executive Order 11738, Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans
- ▶ “American Iron and Steel” Provisions
- ▶ Davis-Bacon and Related Acts

This guide discusses, in more detail, the requirements of the federal authorities that apply to SRF projects and explains the actions required of the Project Sponsor, in order to obtain funding from the SRF program. All forms referred to in the text below are found in Attachment B, and on the SRF forms page, <http://www.scdhec.gov/srfforms>.

Bidder agrees to comply with these requirements. By signing below, Bidder understands that a failure to agree to and follow these requirements shall be grounds for rejection of the Bid or termination of the agreement between the Contractor and the Owner, for cause.

Read and understood:

\_\_\_\_\_  
Name of Contractor

Sign: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

Signed this, the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.



## South Carolina Illegal Immigration Reform Act

On June 4th, 2008, Governor Mark Sanford signed into law the South Carolina Illegal Immigration Reform Act (the "Act"), 2008 Act No. 280. Section 3 of this Act added Chapter 14 to Title 8 of the South Carolina Code of Laws. Titled "Unauthorized Aliens and Public Employment," this new Chapter contains the Act's primary restrictions regarding contracts between private businesses and governmental entities. According to the Act's title, Chapter 14 was added in order "to require contractors or subcontractors who contract with public employers for the physical performance of services to register and participate in the federal work authorization program or otherwise verify employees, to define terms, to establish deadlines for compliance by public employers, contractors, and subcontractors, to require that the provisions of the chapter are enforceable without regard to race, religion, gender, ethnicity, or national origin, and to authorize the director of the State Budget and Control Board to prescribe forms and promulgate rules necessary to administer the act and publish the rules and regulations on the Board's website."

### Verification Requirements

In addition to completing and maintaining the federal employment eligibility verification form, more commonly known as the Form I-9, all South Carolina employers must within three business days after employing a new employee verify the employee's work authorization through the E-Verify federal work authorization program administered by the U.S. Department of Homeland Security and the Social Security Administration.

### **Employers shall no longer confirm a new employee's employment authorization with a driver's license or state identification card.**

In addition, the Contractor must require agreement from its subcontractors, and through the subcontractors, the sub-subcontractors, to register and participate in the federal verification of the employment authorization of all new employees. The Act allows contractors to comply with the Act by agreeing to employ only workers whose work authorization has been verified through the E-Verify federal work authorization program administered by the U.S. Department of Homeland Security and the Social Security Administration. To enroll in E-Verify, go to [www.dhs.gov/e-verify](http://www.dhs.gov/e-verify).

By signing its Bid or proposal, Contractor certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the Owner, upon request, any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14.

Pursuant to South Carolina Code Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

The South Carolina Department of Labor, Licensing and Regulation has also posted information on its website regarding implementation of the South Carolina Illegal Immigration Reform Act. (<http://www.llr.state.sc.us/immigration>). Additional information on this topic is available from LLR's Office of Immigrant Worker Compliance. (<http://www.llr.state.sc.us/Immigration/index.asp?file=ContactUs.htm>).

Information about the E-Verify Program is available on the internet from the Department of Homeland Security's U.S. Citizenship and Immigration Services. (<http://www.uscis.gov/e-verify>).

Bidder agrees to comply with these requirements. By signing below, Bidder understands that a failure to agree to and follow these requirements shall be grounds for rejection of the Bid or termination of the agreement between the Contractor and the Owner, for cause.

Read and understood:

\_\_\_\_\_  
Name of Contractor

Sign: \_\_\_\_\_

Print Name: \_\_\_\_\_

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

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

## STATEMENT OF COMPLIANCE WITH S.C. CODE § 12-8-550

(To be returned with the Bid)

*(Contractor must complete one of the two following statements)*

I, \_\_\_\_\_, on behalf of and as authorized by \_\_\_\_\_, Contractor, represent that Contractor is a \_\_\_\_\_<sup>2</sup> organized and existing under the laws of the State of South Carolina. Contractor warrants that it is a South Carolina resident for purposes of S.C. Code Ann. § 12-8-550 (as amended).

**-OR-**

I, \_\_\_\_\_, on behalf of and as authorized by \_\_\_\_\_, Contractor, represent that Contractor is a \_\_\_\_\_<sup>3</sup> organized and existing under the laws of the State of \_\_\_\_\_. Contractor has read and understands the requirements of S.C. Code §§ 12-8-550 and 12-8-560. Contractor has registered with the Secretary of State or the Department of Revenue and by that registration has agreed to be subject to the jurisdiction of the department and the courts of this State to determine its South Carolina tax liability, including withholding and estimated taxes, together with any related interest and penalties. Contractor has assured payment to the South Carolina Tax Commission through compliance with one of the waivers provided in S.C. Code § 12-8-560(B).

**[SIGNATURE PAGE FOLLOWS]**


---

<sup>2</sup> Insert type of business (corporation, limited liability company, partnership, sole-proprietorship).

<sup>3</sup> Insert type of business (corporation, limited liability company, partnership, sole-proprietorship).

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

\_\_\_\_\_  
Signature

Address: \_\_\_\_\_

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

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

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

***(CORPORATE SEAL)***

SWORN to and subscribed before me

this \_\_\_\_ day of \_\_\_\_\_, 2015

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

Notary Public for the State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**First Attest**

Sign: \_\_\_\_\_

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

**Second Attest**

Sign: \_\_\_\_\_

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

BID  
FOR CONSTRUCTION OF

**Richland Creek Trunk Sewer Upgrade  
FOR  
RENEWABLE WATER RESOURCES**

BID SCHEDULE, BID SUMMARY, TABULATION OF MAJOR EQUIPMENT ITEMS  
SELECTED SUBCONTRACTORS

Bid of \_\_\_\_\_ (hereinafter called "Bidder"), a \_\_\_\_\_  
\_\_\_\_\_ <sup>4</sup> organized and existing under the laws of the State of \_\_\_\_\_, to the  
Renewable Water Resources, a special purpose district organized and existing under the laws of  
the State of South Carolina (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all Work<sup>5</sup>  
for the FY 2015 Gravity Sewer and Manhole Rehabilitation Project in strict accordance with the  
Contract Documents, within the time set forth therein, and at the prices stated below.

By submission of this Bid, each Bidder certifies, and in the case of a joint Bid, each party thereto  
certifies as to his own organization, that this Bid has been arrived at independently, without  
consultation, communication, or agreement as to any matter relating to this Bid with any other  
Bidder or with any competitor.

Bidder hereby agrees to commence Work under this contract on a date to be specified in the  
Notice to Proceed and to fully complete the Project within 465 consecutive calendar days  
thereafter. Bidder represents that the Bidder has reviewed the provisions and amounts set forth  
as liquidated damages and agrees that under this Contract that sum is just and reasonable and the  
Bidder agrees to pay as liquidated damages the sums as provided in Section 3.4.1 of the Contract  
between Owner and Contractor, plus any consent order fines imposed by appropriate regulatory  
authority which are incurred by reason of the Contractor's delay in performance of the contract.

Bidder acknowledges receipt of the following Addenda:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

(If Addenda have been issued, they **MUST** be listed herein).

Bidder hereby agrees that preference will be given to domestic construction material and further  
agrees to require subcontractors, material men, and suppliers to also give preference to domestic  
construction material.

<sup>4</sup> Insert type of business. (e.g. sole proprietorship, partnership, corporation, limited liability company).

<sup>5</sup> Capitalized terms make reference to terms more fully defined in the Contract, which follows.

## BID SCHEDULE

The Bidder acknowledges that the Bid submitted herewith is based upon the materials and articles specified by the Engineer and shown in the Tabulation of Major Equipment Items.

The Bidder agrees to perform all work described in the Contract Documents for the following Lump Sum or Unit Prices including all labor, materials, equipment sales, and other applicable taxes and fees.

*NOTE: Bids shall include sales tax and all other applicable taxes and fees.*

Major Equipment Items: In connection with major items of equipment to be furnished and installed on this Project, as described in the Specifications, if any, the undersigned shall agree to the following provisions.

That the Bid stated hereinbefore shall include the furnishing and installing of all Items of Major Equipment of the manufacturers or suppliers listed in the following "Tabulation of Major Equipment Items."

That the equipment listed within the "Tabulation of Major Equipment Items" is of the named acceptable manufacturer or an equal substitute as defined in the Information for Bidders.

That the installed price stated in the Bid on all sub-items includes the preparation and submission to the Engineer by the undersigned of detailed drawings showing all modifications (if any) of the Contract Drawings necessary to accommodate any substitute equipment. Should a substitute unit be selected, all redesign costs required to accommodate such equipment shall be included within the installed cost by the Contractor.

That the installed cost stated in the Bid on all sub-items includes a complete operating installation, including the furnishing and installing of any and all changes or additions in structures, piping, buildings, mechanical and electrical work, accessories, controls, etc., necessary to accommodate the equipment.

That if awarded a Contract on this project, all Items of Major Equipment be guaranteed by the undersigned and his Surety to meet the performance requirements of the Contract specification and General Conditions of Contract and will not affect the ability or efficiency of other systems or equipment to perform their intended purpose.

A list of Major Items must be shown on the attached sheets.

BID SCHEDULE

Renewable Water Resources  
Richland Creek Trunk Sewer  
**BID TABULATION FORM**

December 10, 2015

**UNIT PRICE ITEMS**

Item No.	Quantity	Unit	Description	Unit Price	Extended Total Price
1	180	LF	42" Gravity Sewer, DIP, CL, 10' - 12' Cut	\$	\$
2	0	LF	42" Gravity Sewer, DIP, CL, 12' - 14' Cut	\$	\$
3	180	LF	42" Gravity Sewer, DIP, CL, 14' - 16' Cut	\$	\$
4	15	LF	42" Gravity Sewer, DIP, CL, 16' - 18' Cut	\$	\$
5	15	LF	42" Gravity Sewer, DIP, CL, 18' - 20' Cut	\$	\$
6	15	LF	42" Gravity Sewer, DIP, CL, 20' - 22' Cut	\$	\$
7	20	LF	42" Gravity Sewer, DIP, CL, 22' - 24' Cut	\$	\$
8	10	LF	42" Gravity Sewer, DIP, CL, 24' - 26' Cut	\$	\$
9	0	LF	42" Gravity Sewer, DIP, EL, 10' - 12' Cut	\$	\$
10	0	LF	42" Gravity Sewer, DIP, EL, 12' - 14' Cut	\$	\$
11	0	LF	42" Gravity Sewer, DIP, EL, 14' - 16' Cut	\$	\$
12	290	LF	42" Gravity Sewer, DIP, EL, 16' - 18' Cut	\$	\$
13	515	LF	42" Gravity Sewer, DIP, EL, 18' - 20' Cut	\$	\$
14	145	LF	42" Gravity Sewer, DIP EL,, 20' - 22' Cut	\$	\$
15	310	LF	42" Gravity Sewer, DIP, EL, 22' - 24' Cut	\$	\$
16	95	LF	42" Gravity Sewer, DIP, EL, 24' - 26' Cut	\$	\$
17	20	LF	42" Gravity Sewer, DIP, EL, 26' - 28' Cut	\$	\$
18	10	LF	42" Gravity Sewer, DIP, EL, 28' - 30' Cut	\$	\$
19	35	LF	42" Gravity Sewer, DIP, EL, 30' - 32' Cut	\$	\$
20	330	LF	42" Gravity Sewer, DIP, CL, Installed in Casing	\$	\$
21	0	LF	36" Gravity Sewer, DIP, CL, 6' - 8' Cut	\$	\$
22	0	LF	36" Gravity Sewer, DIP, CL, 8' - 10' Cut	\$	\$
23	35	LF	36" Gravity Sewer, DIP, CL, 10' - 12' Cut	\$	\$
24	600	LF	36" Gravity Sewer, DIP, CL, 12' - 14' Cut	\$	\$
25	1080	LF	36" Gravity Sewer, DIP, CL, 14' - 16' Cut	\$	\$
26	650	LF	36" Gravity Sewer, DIP, CL, 16' - 18' Cut	\$	\$
27	90	LF	36" Gravity Sewer, DIP, CL, 18' - 20' Cut	\$	\$
28	30	LF	36" Gravity Sewer, DIP, EL, 6' - 8' Cut	\$	\$
29	10	LF	36" Gravity Sewer, DIP, EL, 8' - 10' Cut	\$	\$
30	10	LF	36" Gravity Sewer, DIP, EL, 10' - 12' Cut	\$	\$
31	30	LF	36" Gravity Sewer, DIP, EL, 12' - 14' Cut	\$	\$
32	80	LF	36" Gravity Sewer, DIP, EL, 14' - 16' Cut	\$	\$
33	355	LF	36" Gravity Sewer, DIP, EL, Installed in Casing	\$	\$
34	20	LF	30" Gravity Sewer, DIP, CL, 0' - 6' Cut	\$	\$
35	35	LF	30" Gravity Sewer, DIP, CL, 6' - 8' Cut	\$	\$
36	210	LF	30" Gravity Sewer, DIP, CL, 8' - 10' Cut	\$	\$
37	230	LF	30" Gravity Sewer, DIP, CL, 10' - 12' Cut	\$	\$
38	460	LF	30" Gravity Sewer, DIP, CL, 12' - 14' Cut	\$	\$
39	45	LF	30" Gravity Sewer, DIP, CL, 14' - 16' Cut	\$	\$
40	35	LF	30" Gravity Sewer, DIP, CL, 16' - 18' Cut	\$	\$
41	30	LF	30" Gravity Sewer, DIP, CL, 18' - 20' Cut	\$	\$
42	65	LF	30" Gravity Sewer, DIP, CL, 20' - 22' Cut	\$	\$
43	30	LF	30" Gravity Sewer, DIP, CL, 22' - 24' Cut	\$	\$
44	0	LF	30" Gravity Sewer, DIP, CL, 24' - 26' Cut	\$	\$



Renewable Water Resources  
Richland Creek Trunk Sewer

**UNIT PRICE ITEMS**

Item No.	Quantity	Unit	Description	Unit Price	Extended Total Price
45	0	LF	30" Gravity Sewer, DIP, CL, 26' - 28' Cut	\$	\$
46	25	LF	30" Gravity Sewer, DIP, EL, 6' - 8' Cut	\$	\$
47	10	LF	30" Gravity Sewer, DIP, EL, 8' - 10' Cut	\$	\$
48	120	LF	30" Gravity Sewer, DIP, EL, 10' - 12' Cut	\$	\$
49	630	LF	30" Gravity Sewer, DIP, EL, 12' - 14' Cut	\$	\$
50	150	LF	30" Gravity Sewer, DIP, EL, 14' - 16' Cut	\$	\$
51	85	LF	30" Gravity Sewer, DIP, EL, 16' - 18' Cut	\$	\$
52	0	LF	30" Gravity Sewer, DIP, EL, 18' - 20' Cut	\$	\$
53	30	LF	30" Gravity Sewer, DIP, EL, 20' - 22' Cut	\$	\$
54	45	LF	30" Gravity Sewer, DIP, EL, 22' - 24' Cut	\$	\$
55	315	LF	30" Gravity Sewer, DIP, EL, 24' - 26' Cut	\$	\$
56	105	LF	30" Gravity Sewer, DIP, EL, 26' - 28' Cut	\$	\$
57	235	LF	30" Gravity Sewer, DIP, EL, Installed in Casing	\$	\$
58	1650	LF	24" Gravity Sewer, DIP, CL, 6' - 8' Cut	\$	\$
59	1230	LF	24" Gravity Sewer, DIP, CL, 8' - 10' Cut	\$	\$
60	1240	LF	24" Gravity Sewer, DIP, CL, 10' - 12' Cut	\$	\$
61	1090	LF	24" Gravity Sewer, DIP, CL, 12' - 14' Cut	\$	\$
62	240	LF	24" Gravity Sewer, DIP, CL, 14' - 16' Cut	\$	\$
63	160	LF	24" Gravity Sewer, DIP, CL, 16' - 18' Cut	\$	\$
64	75	LF	24" Gravity Sewer, DIP, CL, 18' - 20' Cut	\$	\$
65	45	LF	24" Gravity Sewer, DIP, EL, 6' - 8' Cut	\$	\$
66	30	LF	24" Gravity Sewer, DIP, EL, 8' - 10' Cut	\$	\$
67	15	LF	24" Gravity Sewer, DIP, EL, 10' - 12' Cut	\$	\$
68	15	LF	24" Gravity Sewer, DIP, EL, 12' - 14' Cut	\$	\$
69	10	LF	24" Gravity Sewer, DIP, EL, 14' - 16' Cut	\$	\$
70	10	LF	24" Gravity Sewer, DIP, EL, 16' - 18' Cut	\$	\$
71	15	LF	24" Gravity Sewer, DIP, EL, 18' - 20' Cut	\$	\$
72	50	LF	18" Gravity Sewer, DIP, CL, 0' - 6' Cut	\$	\$
73	260	LF	18" Gravity Sewer, DIP, CL, 6' - 8' Cut	\$	\$
74	55	LF	18" Gravity Sewer, DIP, CL, 8' - 10' Cut	\$	\$
75	30	LF	18" Gravity Sewer, DIP, CL, 10' - 12' Cut	\$	\$
76	45	LF	18" Gravity Sewer, DIP, CL, 14' - 16' Cut	\$	\$
77	30	LF	12" Gravity Sewer, PVC, 6' - 8' Cut	\$	\$
78	25	LF	12" Gravity Sewer, PVC, 8' - 10' Cut	\$	\$
79	0	LF	12" Gravity Sewer, PVC, 10' - 12' Cut	\$	\$
80	80	LF	12" Gravity Sewer, DIP, 18' - 20' Cut	\$	\$
81	25	LF	10" Gravity Sewer, PVC, 10' - 12' Cut	\$	\$
82	60	LF	8" Gravity Sewer, PVC, 0' - 6' Cut	\$	\$
83	280	LF	4" Gravity Sewer Service, PVC, 0' - 6' Cut	\$	\$
84	1	EA	48" x 96" Pre-cast Concrete Vault	\$	\$
85	2	EA	96" Diameter Pre-cast Concrete Manhole Base	\$	\$
86	35	VF	96" Diameter Pre-cast Concrete Manhole Riser	\$	\$
87	8	EA	84" Diameter Pre-cast Concrete Manhole Base	\$	\$
88	200	VF	84" Diameter Pre-cast Concrete Manhole Riser	\$	\$
89	15	EA	72" Diameter Pre-cast Concrete Manhole Base	\$	\$
90	290	VF	72" Diameter Pre-cast Concrete Manhole Riser	\$	\$
91	48	EA	60" Diameter Pre-cast Concrete Manhole Base	\$	\$
92	660	VF	60" Diameter Pre-cast Concrete Manhole Riser	\$	\$
93	3	EA	48" Diameter Pre-cast Concrete Manhole Base	\$	\$

Renewable Water Resources  
Richland Creek Trunk Sewer

**UNIT PRICE ITEMS**

Item No.	Quantity	Unit	Description	Unit Price	Extended Total Price
94	85	VF	48" Diameter Pre-cast Concrete Manhole Riser	\$	\$
95	5	EA	48" Diameter Pre-cast Concrete Doghouse Manhole Base	\$	\$
96	0	VF	4" Drop Invert	\$	\$
97	75	VF	8" Drop Invert	\$	\$
98	10	VF	10" Drop Invert	\$	\$
99	35	VF	12" Drop Invert	\$	\$
100	10	VF	15" Drop Invert	\$	\$
101	15	VF	18" Drop Invert	\$	\$
102	1	EA	Vortex Drop Structure	\$	\$
103	18	EA	Connect to Existing Manhole	\$	\$
104	260	LF	Jack & Bore 54" Steel Casing	\$	\$
105	335	LF	Jack & Bore 48" Steel Casing	\$	\$
106	200	LF	Jack & Bore 42" Steel Casing	\$	\$
107	700	SY	Remove & Replace Asphalt Pavement	\$	\$
108	700	SY	Resurface Asphalt Pavement	\$	\$
109	100	SY	Remove and Replace Concrete Pavement	\$	\$
110	8750	CY	Rock Excavation	\$	\$
111	200	TN	Trench Stabilization	\$	\$

**Subtotal items 1 through 111**

**\$**

**LUMP SUM ITEMS**

Item No.	Unit	Description	Total Price
112	LS	Mobilization	\$
113	LS	Erosion and Sedimentation Control	\$
114	LS	Sewer Bypass Pumping	\$
115	CA	Construction Verification Surveying Cash Allowance	\$
116	CA	Blasting Monitoring Cash Allowance	\$
117	CA	Soils & Materials Testing	\$
118	CA	Owner Controlled Contingency	\$

**Subtotal items 112 through 118**

**\$**

**REHABILITATION ITEMS**

Item No.	Quantity	Unit	Description	Unit Price	Extended Total Price
119	510	LF	10" CIPP	\$	\$
120	1180	LF	12" CIPP	\$	\$
121	370	LF	18" CIPP	\$	\$
122	400	VF	Manhole Rehabilitation	\$	\$
123	2075	LF	8" to 12" Pipe Burst	\$	\$
124	420	LF	10" to 12" Pipe Burst	\$	\$
125	40	EA	Reconnect existing SS lateral to 12" HDPE	\$	\$
126	980	LF	12" HDPE Sliplining	\$	\$

**Subtotal items 119 through 126**

**\$**

**Contingency (10%)**

**\$**

**Total Cost of Unit Price and Lump Sum Items**

**\$**

BID SUMMARY

The Total Bid for all Work is \_\_\_\_\_ and \_\_\_\_\_/100 (\$ \_\_\_\_\_ . \_\_\_\_\_) dollars.

\_\_\_\_\_  
Name of Prospective Contractor

Sign: \_\_\_\_\_

(SEAL)

Print Name: \_\_\_\_\_

Its: \_\_\_\_\_

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
South Carolina General Contractor's License Number

If the Bidder is a Corporation or Limited Liability Company, the seal of the business must be impressed above.

**Witnesses** (the above signature must be witnessed by two individuals).

Sign: \_\_\_\_\_

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

Sign: \_\_\_\_\_

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

## LIST OF MAJOR EQUIPMENT ITEMS

EQUIPMENT/SYSTEM	MANUFACTURER/SUPPLIER
Cured-in-Place Pipe	
Manholes	
Manhole Frame and Covers	
HDPE	
DIP	
Precast Concrete Vaults	
PVC	
Steel Casing Pipe	

LIST OF SELF-PERFORMED WORK BY SPECIALTY

Portion of the Work as identified vital to the Project by Owner and Engineer;

**Please Type Bidder's Name on each of the specified lines, indicating whether all, part or none of this Portion of the Work is to be Self-Performed. Examples:**

- Site Work; XYZ Inc. self-performing all
- Underground Piping; XYZ Inc. self-performing none
- Concrete; XYZ Inc. self-performing part

(1) Portion of the Work: Bypass Pumping \_\_\_\_\_

(2) Portion of the Work: Cured-in-Place Pipe \_\_\_\_\_

(3) Portion of the Work: Pipe Bursting \_\_\_\_\_

(4) Portion of the Work: Surface Restoration/Site Stabilization \_\_\_\_\_

(5) Portion of the Work: Borings \_\_\_\_\_

(6) Portion of the Work: Blasting/Rock Removal \_\_\_\_\_

(7) Portion of the Work: Paving \_\_\_\_\_

(8) Portion of the Work: Slip Lining \_\_\_\_\_

(9) Portion of the Work: Erosion & Sedimentation Control \_\_\_\_\_

(10) Portion of the Work: Manhole Rehabilitation \_\_\_\_\_

(11) Portion of the Work: Site Work \_\_\_\_\_

Bidder Name: _____
Bidder License Number: _____
Signed: _____
By: _____
Its: _____
Dated: _____

## LIST OF SELECTED SUBCONTRACTORS

List Subcontractors' information by specialty for all portions of subcontracted Work where by specialty the subcontracted amount is equal to or greater than 3% of the base Bid amount. Identify the Subcontractor, if any, for any specialty areas identified below as vital to the Project by Owner and Engineer. **Please Type Subcontractor's information on the specified line if all or part of this Portion of the Work is to be subcontracted.**

(1) Portion of the Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

(2) Portion of the Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

(3) Portion of the Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

(4) Portion of the Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

(5) Other Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

(6) Other Work: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Address of Subcontractor: \_\_\_\_\_

Subcontractor's License Number \_\_\_\_\_

Bidder Name: _____
Bidder License Number: _____
Signed: _____
By: _____
Its: _____
Dated: _____

## STATEMENT OF BIDDER'S QUALIFICATIONS

Pursuant to SC Labor Licensing Regulations, the contractor is required to have the following designation(s) to Bid on this Project. WL

In determining a firm's qualifications, the following factors will be considered: Work previously completed by the firm, and whether the firm (a) maintains a permanent place of business, (b) has adequate personnel, plant, and equipment to perform the Work properly and expeditiously, (c) has the financial and management resources to meet obligations incident to the Work, and (d) has appropriate technical experience.

Due to the size and critical nature of the Project, Bidder shall submit evidence that Bidder, under the current company name, has satisfactorily completed, at least two projects with similar type construction and with a construction cost of not less than fifty (50%) percent of the Contract Sum proposed in the Bid within the past five years. Experience on projects performed by any of the Bidder's related or affiliated companies will not be considered in the evaluation of the Bidder's experience as required herein.

Every Bidder shall disclose any history where any officer of the Bidder, the Bidder Company or entity, its subsidiaries or affiliates, or predecessor companies held an interest in a construction contract and where that contract was terminated for cause or where there was a failure to perform.

If termination or failure of performance occurred, the time, place, personnel involved, contract parties and the circumstances shall be fully disclosed. These facts may result in a determination the Bidder is not responsible.

Material misstatements on this questionnaire may be grounds for rejection of the firm's Bid on this Project. Any such misstatement, if discovered after award of the contract to such firm, may be grounds for immediate termination of the contract. Additionally, the firm will be liable to the Owner for any additional costs or damages to the Owner resulting from such misstatements, including the cost of rebidding or increment construction costs between the original and the replacement Bid, and including costs and attorney's fees for collecting such costs and damages.

The apparent low Bidder shall submit supplemental information as required in Section 00320.



QUALIFICATION FORM

INSERT

In determining a firm's qualifications, the following factors will be considered: Work previously completed by the firm (under its current name only), work previously completed by the firm's proposed project manager and superintendent, and whether the firm (a) maintains a permanent place of business, (b) has adequate personnel, plant, and equipment to perform the Work properly and expeditiously, (c) has the financial and management resources to meet obligations incident to the Work, and (d) has appropriate technical experience.

Bidder shall submit evidence that Bidder, under the current company name, has satisfactorily completed, at least five wastewater treatment plant projects at existing, operating facilities similar in scope to the Project, in an amount of at least 50% of project total, within the past ten years. Experience on projects performed by any of the Bidder's related or affiliated companies will not be considered in the evaluation of the Bidder's experience as required herein.

Bidder shall submit evidence that the proposed project manager has satisfactorily completed at least five wastewater treatment plant projects at existing, operating facilities similar in scope to the Project, in an amount of at least 50% of project total, within the past ten years. Experience on projects performed by any of the Bidder's related or affiliated companies will not be considered in the evaluation of the Bidder's experience as required herein.

Bidder shall submit evidence that the proposed project superintendent has satisfactorily completed at least five wastewater treatment plant projects at existing, operating facilities similar in scope to the Project, in an amount of at least 50% of project total, within the past ten years. Experience on projects performed by any of the Bidder's related or affiliated companies will not be considered in the evaluation of the Bidder's experience as required herein.

Every Bidder shall disclose any history where any officer of the Bidder, the Bidder Company or entity, its subsidiaries or affiliates, or predecessor companies held an interest in a construction contract and where that contract was terminated for cause or where there was a failure to perform.

If termination or failure of performance occurred, the time, place, personnel involved, contract parties and the circumstances shall be fully disclosed. These facts may result in a determination the Bidder is not responsible.

Material misstatements on this questionnaire may be grounds for rejection of the firm's Bid on this Project. Any such misstatement, if discovered after award of the contract to such firm, may be grounds for immediate termination of the contract. Additionally, the firm will be liable to the Owner for any additional costs or damages to the Owner resulting from such misstatements, including the cost of rebidding or increment construction costs between the original Bid and the replacement Bid, and including costs and attorney's fees for collecting such costs and damages.

The apparent low Bidder shall submit supplemental information as required in the Request for Bid.

QUALIFICATION FORM

1. How many years has this organization been in business as a construction company under the present business name? \_\_\_\_\_

List any other names this organization has, does, or anticipates operating under, including the names of related companies presently doing business.

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

2. Has any officer or partner of this organization ever been an officer or partner of some other organization that failed to complete a construction contract?  
\_\_\_\_\_

If so, state the name of the individual, current title, other organization, and give full details.

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

3. Has your organization ever failed to complete any work awarded to it? \_\_\_\_\_

If yes, give full details:

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

4. Are there any judgments, claims, arbitration proceedings, or suits pending or outstanding against your organization or its officers? \_\_\_\_\_

If yes, give full details:

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

5. Has your organization filed any lawsuits or requested arbitration with regard to construction contract within the last five years? \_\_\_\_\_

If yes, give full details:

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

6. Has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract, or when it had a project terminated for cause? \_\_\_\_\_

If yes, give full details:

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7. Has this organization ever been released from a Bid or terminated from a project for cause?

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If yes, list the name of the project; Owner's name, address, and phone number; and state the reason for each instance.

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8. Has this organization or a principal or partner in this organization who was with another company been denied Contractor prequalification within the last two years on a project?

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If yes, give full details:

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9. What pump station, water or wastewater treatment plant construction projects (50% of project total) does this organization currently have under contract? Complete a Project Information Form (as included at the end of this Section or an equivalent form with the same data) for each Project. Indicate if Joint Venture and identify Joint Venture Partner.

10. Indicate five wastewater treatment plant projects of 50% of project total or more that your organization has completed during the last 10 years. Complete a Project Information Form (as included at the end of this Section or an equivalent form with the same data) for each Project. The listing of names shall indicate to Renewable Water Resources that your organization has no objection to contacting the named individuals. Indicate if a Joint Venture and identify Joint Venture partner.

11. Indicate five wastewater treatment plant projects of 50% of project total or more that your proposed project manager has completed during the last 10 years. Complete a Project Information Form (as included at the end of this Section or an equivalent form with the same data) for each Project. The listing of names shall indicate to Renewable Water Resources that your organization has no objection to contacting the named individuals. Indicate if a Joint Venture and identify Joint Venture partner. Any substitutions or replacements for the proposed project manager during construction shall meet the same requirements as listed herein and receive prior approval from the Owner.

12. Indicate five wastewater treatment plant projects of 50% of project total or more that your proposed project superintendent has completed during the last 10 years. Complete a Project

Information Form (as included at the end of this Section or an equivalent form with the same data) for each Project. The listing of names shall indicate to Renewable Water Resources that your organization has no objection to contacting the named individuals. Indicate if a Joint Venture and identify Joint Venture partner. Any substitutions or replacements for the proposed project superintendent during construction shall meet the same requirements as listed herein and receive prior approval from the Owner.

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner in verification of the information comprising within this Statement of Bidder's Qualifications.

I, \_\_\_\_\_, certify that I am \_\_\_\_\_ of the Bidder, and that the answers to the foregoing questions and statements contained therein are true and correct.

BIDDER: \_\_\_\_\_

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

*(name signed)*

\_\_\_\_\_

*(name printed or typed)*

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

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

Subscribed and sworn to me this \_\_\_ day of \_\_\_\_\_, 2015.

NOTARY PUBLIC: \_\_\_\_\_

*(name signed)*

\_\_\_\_\_

*(name printed or typed)*

Commission Expires: \_\_\_\_\_

*(Date)*

(SEAL)

Project Information Form

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

Project Description:

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

Bidder's Project Manager: \_\_\_\_\_

Bidder's Project Superintendent: \_\_\_\_\_

Project Owner:

- Owner Name: \_\_\_\_\_
- Contact Person: \_\_\_\_\_
- Phone Number: \_\_\_\_\_

Engineer/Construction Manager:

- Company Name: \_\_\_\_\_
- Contact Person: \_\_\_\_\_
- Phone Number: \_\_\_\_\_

Contract Amount:

- Initial: \_\_\_\_\_
- Final: \_\_\_\_\_

Contract Time

- Initial: \_\_\_\_\_
- Final: \_\_\_\_\_
- Completion Date: \_\_\_\_\_

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

END OF SECTION

COPY OF CONTRACTOR'S LICENCE

INSERT

## RISK ANALYST REVIEW

Coverage	Limits
Workers' Compensation	Statutory
Employers Liability	\$1,000,000
Business Auto Liability	\$1,000,000
General Liability incl. Contractual, Products and Completed Operations	\$1M/\$2M
XCU included	
Umbrella Liability	\$5,000,000
Pollution Liability■	\$2M



INSURANCE DOCUMENTS

*(To be attached following this Cover Page)*

CONTRACTOR’S CORPORATE RESOLUTION (OR EQUIVALENT)  
(To Be Executed if Contractor is a Limited Liability Company, Corporation,  
Limited Liability Partnership, or Partnership)

**NOTE: OWNER’S ATTORNEY MAY REQUIRE ADDITIONAL INFORMATION**

BE IT RESOLVED, we, the board of directors<sup>6</sup>/members<sup>7</sup>/partners<sup>8</sup> (circle one) of \_\_\_\_\_  
\_\_\_\_\_ (the “Contractor”) do hereby authorize and direct \_\_\_\_\_  
\_\_\_\_\_ (the “Authorized Signer”), the \_\_\_\_\_  
<sup>9</sup> of the Contractor, to enter into a contract with Renewable Water Resources (“Owner”) for  
Work relating to the \_\_\_\_\_ Project (the “Project”) in accordance  
with the Contract Documents into which this authorization is incorporated. We further authorize  
and direct the Authorized Signer to provide such information and to take such action as  
necessary to execute such other documents as may be needed in order to perform the  
Contractor’s obligations with regards to the Project or to execute such documents as may be  
required by the Owner, including amendments, rescissions, and revisions thereto. The  
Authorized Signer, by this document, is empowered and authorized to bind the corporation,  
company, or partnership (circle one).

Authorization was granted through an action of the directors/members/partners (circle one)  
at their meeting held on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Date

\_\_\_\_\_  
(Typed or Printed Name)

\_\_\_\_\_  
Secretary

(Corporate Seal)  
Must Be Impressed Here

\_\_\_\_\_  
<sup>6</sup> Circle if a Corporation.  
<sup>7</sup> Circle if a Limited Liability Company.  
<sup>8</sup> Circle if a Partnership.  
<sup>9</sup> Insert title of Authorized Signer.

## STATEMENT OF COMPLIANCE WITH S.C. CODE § 12-8-550

*(Contractor must complete one of the two following statements)*

I, \_\_\_\_\_, on behalf of and as authorized by \_\_\_\_\_, Contractor, represent that Contractor is a \_\_\_\_\_<sup>10</sup> organized and existing under the laws of the State of South Carolina. Contractor warrants that it is a South Carolina resident for purposes of S.C. Code Ann. § 12-8-550 (as amended).

**-OR-**

I, \_\_\_\_\_, on behalf of and as authorized by \_\_\_\_\_, Contractor, represent that Contractor is a \_\_\_\_\_<sup>11</sup> organized and existing under the laws of the State of \_\_\_\_\_. Contractor has read and understands the requirements of S.C. Code §§ 12-8-550 and 12-8-560. Engineer has registered with the Secretary of State or the Department of Revenue and by that registration has agreed to be subject to the jurisdiction of the department and the courts of this State to determine its South Carolina tax liability, including withholding and estimated taxes, together with any related interest and penalties. Contractor has assured payment to the South Carolina Tax Commission through compliance with one of the waivers provided in S.C. Code § 12-8-560(B).

**[SIGNATURE PAGE FOLLOWS]**


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<sup>10</sup> Insert type of business (corporation, limited liability company, partnership, sole-proprietorship).

<sup>11</sup> Insert type of business (corporation, limited liability company, partnership, sole-proprietorship).

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

\_\_\_\_\_  
Signature

Address: \_\_\_\_\_

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

Its: \_\_\_\_\_

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

**(CORPORATE SEAL)**

SWORN to and subscribed before me

this \_\_\_\_ day of \_\_\_\_\_, 2015

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

Notary Public for the State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

**First Attest**

Sign: \_\_\_\_\_

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

**Second Attest**

Sign: \_\_\_\_\_

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

BID BOND

**KNOW ALL MEN BY THESE PRESENTS:** that we, the undersigned:

\_\_\_\_\_, as Principal,

and \_\_\_\_\_, as Surety, are hereby held and firmly bound unto Renewable Water Resources, as Owner in the penal sum of \_\_\_\_\_ for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed this, the \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

The condition of the above obligation is such that whereas the Principal has submitted to Renewable Water Resources a certain Bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the:

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

**NOW, THEREFORE,**

- (a) If said Bid shall be rejected, or
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a Bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its Bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

**IN WITNESS WHEREOF,** the above bounded parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body, the day and year first set forth above.

This Bond being executed in three (3) counterparts.

**PRINCIPAL:**

\_\_\_\_\_  
Signature

Principal: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

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

Its: \_\_\_\_\_

(SEAL)

**SURETY:**

\_\_\_\_\_  
Signature

Surety: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

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

Its: Attorney-in-Fact (SC Resident)

(SEAL)

**ATTEST (2 individuals):**

\_\_\_\_\_  
Signature

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

\_\_\_\_\_  
Signature

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

**ATTEST (2 individuals):**

\_\_\_\_\_  
Signature

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

\_\_\_\_\_  
Signature

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

**NOTE:** If Contractor is partnership, all partners should execute the Bond. **IMPORTANT:** Surety companies executing Bonds must appear on the Treasury Department's most current list.

**NOTE:** If this Bond is executed by way of a power of attorney, an original of the power of attorney must be attached hereto.

NOTICE OF AWARD

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Description: Richland Creek Trunk Sewer Upgrade Project.

The Owner has considered your Bid submitted on the \_\_\_\_ day of \_\_\_\_ 2015 for the above-described Work in response to its Invitation for Bids and Information for Bidders.

The Owner has approved your Bid in the amount of \_\_\_\_\_ (\$ \_\_\_\_\_) for award of the above described Work pending and conditioned upon the following:

- Execution of a written contract by both parties and delivery of the executed contract to the Contractor after approval and certification by ReWa’s legal counsel;
- Delivery of the Contractor’s Performance Bond, Payment Bond, and the required Certificates of Insurance with fifteen (15) calendar days from the date of this Notice of Award;
- Obtaining any and all required regulatory, agency, or governmental approvals; and
- Procurement of all rights-of-way. In this instance, your acceptance of this award will be acknowledgement that you understand no notice to proceed will be issued until final procurements of all rights-of-way for the project. The Contractor and the Owner may agree for the Contractor to begin work in other areas of the Project avoiding unprocured properties.

This Notice of Award is NOT a contract.

If you fail to execute said Agreement and to furnish said Bonds and Certificates of Insurance within fifteen (15) calendar days from the date of this Notice, the Owner may elect to consider all your rights arising out of the Owner’s acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. The Owner may also pursue all other rights and remedies it may have under law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**Renewable Water Resources**

\_\_\_\_\_

By: Ray T. Orvin, Jr.

Title: Executive Director

Acceptance of Notice of Award

Receipt of the above Notice of Award is hereby acknowledged by \_\_\_\_\_

\_\_\_\_\_,<sup>12</sup> this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

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

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

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

\_\_\_\_\_  
<sup>12</sup> Name of business receiving award



MINUTES OF COMMISSION MEETING

*(To be attached following this Cover Page)*

GENERAL CONDITIONS

AIA DOCUMENT A201 (2007) AS MODIFIED BY THE PARTIES

*(To be attached following this Cover Page)*

**THIS AGREEMENT IS SUBJECT TO ARBITRATION PURSUANT TO THE SOUTH CAROLINA  
UNIFORM ARBITRATION ACT.: SC CODE ANN. §15-48-10 ET SEQ. AND THE FEDERAL  
ARBITRATION ACT 9 U.S.C. 1 ET SEQ.**

General Conditions of the Contract for Construction for the following PROJECT:  
(Name and location or address)

**FY 2015 Gravity Sewer and Manhole Rehabilitation Project**

**THE OWNER:**

(Name and address)

Renewable Water Resources d.b.a. ReWa, a special purpose district and political subdivision of the State of South Carolina  
561 Mauldin Road  
Greenville, South Carolina 29607

**THE ENGINEER:**

(Name and address)

Brown and Caldwell  
3800 Fernandina Road  
Suite 100  
Columbia, South Carolina 29210

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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 BASIC DEFINITIONS**

#### **§ 1.1.1 THE CONTRACT DOCUMENTS**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Engineer.

#### **§ 1.1.2 THE CONTRACT**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Engineer or the Engineer's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor except as set forth in Paragraph 5.3 and Paragraph 5.4, (3) between the Owner and the Engineer or the Engineer's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Engineer shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Engineer's duties.

#### **§ 1.1.3 THE WORK**

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

#### **§ 1.1.4 THE PROJECT**

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

#### **§ 1.1.5 THE DRAWINGS**

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

#### **§ 1.1.6 THE SPECIFICATIONS**

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

#### **§ 1.1.7 INSTRUMENTS OF SERVICE**

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

#### **§ 1.1.8 INITIAL DECISION MAKER**

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

#### **§ 1.1.9 KNOWLEDGE**

The terms "knowledge," "recognize," and "discover," their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows (or should know), recognizes (or should recognize), and discovers (or should discover) exercising the care, skill, and diligence required by the Contract Documents. Analogously, the expression "reasonable inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill, and diligence required of the Contractor by the Contract Documents.

## § 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, the Contract shall (i) provide the better quality or greater quantity of Work or (ii) comply with the more stringent requirement; either or both in accordance with the Engineer's interpretation. The terms and conditions of this Subparagraph 1.2.1, however, shall not relieve the Contractor of any of the obligations set forth in Subparagraph 3.2 and 3.7. In case of conflict between the drawings and specifications, the specifications shall govern. Figure dimensions on drawings shall govern over scale dimensions, and detailed drawings shall govern over general drawings. In cases where products or quantities are omitted from the specifications, the descriptions and quantities shown on the drawings shall govern. Any discrepancies found between the drawings and specifications and site conditions or any inconsistencies or ambiguities in the drawings or specifications shall be immediately reported in writing to the Engineer, who shall promptly correct in writing such discrepancies, inconsistencies, or ambiguities. Work done by the Contractor after his discovery of such discrepancies, inconsistencies, or ambiguities and prior to the Engineer's correction shall be done at the Contractor's risk.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Instructions and other information furnished in the Specifications, including, without limitation, items in connection with prefabricated or pre-finished items, are not intended to supersede work agreements between employers and employees. Should the Specifications conflict with such work agreements, the work agreements shall be followed, provided such items are provided and finished as specified. If necessary, such Work shall be performed on the Project site, instead of at the shop, by appropriate labor and in accordance with the requirements of the Drawings and Specifications.

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

- .1 Whenever a product is specified in accordance with a Federal Specification, an ASTM Standard, an American National Standards Institute Specification, an Environmental Protection Agency Standard, a South Carolina Department of Health and Environmental Control Standard, or other Association Standard, the Contractor shall present an affidavit from the manufacturer when requested by the Engineer or required in the Specifications, certifying that the product complies with the particular Standard or Specification. When requested by the Engineer or specified, support test data shall be submitted to substantiate compliance.
- .2 Whenever a product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names, or similar reference, no substitutions may be made unless accepted prior to execution of the Contract or if accepted as a Change in the Work in accordance with Article 7. Where two or more products are shown or specified, the Contractor has the option to use either of those shown or specified so long as Contractor uses the named major equipment and/or manufacturers in accordance with Contractor's Bid.

## § 1.3 CAPITALIZATION

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

#### § 1.4 INTERPRETATION

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

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

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

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

#### § 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

#### § 1.7 CONFIDENTIALITY

§ 1.7.1 The Contractor warrants and represents that the Contractor shall not knowingly, recklessly, or negligently communicate or disclose at any time to any person or entity any information in connection with the Work or the Project, except (i) with prior written consent of the Owner, (ii) information that was in the public domain prior to the date of this Agreement, (iii) information that becomes part of the public domain by publication or otherwise not due to any unauthorized act of omission of the Contractor, or (iv) as may be required to perform the Work or by any applicable law, including the Record set of Drawings, Specifications, and other documents which the Contractor is permitted to retain under Paragraph 1.5 above. Specific information shall not be deemed to fall within the scope of the foregoing exceptions merely because it is embraced by more generic information which falls within the scope of one or more of those exceptions. The Contractor acknowledges and agrees that the existence of the Owner’s particular interests and plans in the geographical area of the Project is a type of such specific information. In the event that the Contractor is required by any court of competent jurisdiction or legally constituted authority to disclose any Owner information, prior to any disclosure thereof, the Contractor shall notify the Owner and shall give the Owner the opportunity to challenge any such disclosure order or to seek protection for those portions that it regards as confidential.

§ 1.7.2 The Contractor, at any time, upon the request of the Owner, shall immediately return and surrender to the Owner all copies of any materials, records, notices, memoranda, recordings, drawings, specifications, and mock-ups and any other documents furnished by the Owner or the Engineer to the Contractor.

§ 1.7.3 The Contractor shall cause all Subcontractors or any other person or entity performing any services, or furnishing any materials or equipment, for the Work to warrant and represent all items set forth in this Paragraph 1.7.

§ 1.7.4 The representations and warranties contained in this Paragraph 1.7 shall survive the complete performance of the Work or earlier termination of the Agreement.

§ 1.7.5 Any and all inventions and discoveries, whether or not patentable, conceived or made by the Contractor as a result of the Contractor’s discussions with the Owner or performance of the Work which are based substantially on

the Owner's proprietary information, shall be and shall become the sole and exclusive property of the Owner. The Contractor agrees to disclose fully and promptly to the Owner all such inventions and discoveries. Upon request by the Owner, the Contractor agrees to assign such inventions and discoveries to the Owner, or cause them to be assigned by its personnel. Further, the Contractor shall execute, or cause to be executed by its personnel, all applications, assignments, or other instruments which the Owner may deem reasonably necessary in order to enable the Owner at its expense to apply for, prosecute, and obtain patents in any country for said inventions and discoveries, or in order to assign and transfer to the Owner the entire right, title, and interest thereto.

#### § 1.8 DEFINED TERMS

§ 1.8.1 **Acceptance.** The taking possession of the Project when completed in accordance with the Contract Documents.

§ 1.8.2 **Acceptance of the Work.** That point in time where the Owner, upon the Engineer's recommendation, accepts the Project, or a portion of the Work.

§ 1.8.3 **Addenda.** Written or graphic instruments issued prior to the opening of Bids or Proposals which clarify, correct or change the Bid Documents or the Contract Documents.

§ 1.8.4 **Agreement.** The written agreements covering the work to be performed. This includes all Contract Documents.

§ 1.8.5 **Application for Payment.** The format furnished by the Owner to be used by the Contractor in requesting progress payments or final payments. THE FAILURE TO USE THE FORM PROVIDED BY OWNER AND APPROVED BY THE ENGINEER SHALL BE REASON FOR OWNER TO REFUSE AN APPLICATION FOR PAYMENT.

§ 1.8.6 **Bid.** The offer of the Bidder submitted on the prescribed form setting forth the prices for the Work to be Performed.

§ 1.8.7 **Bidder.** Any person, firm or corporation submitting a Bid for the Work.

§ 1.8.8 **Bonds.** Bid, proposal, performance, and payments Bonds and other instruments of security, furnished by the Contractor and his Surety in accordance with the Contract Documents.

§ 1.8.9 **Change Order.** A written order upon the form provided herein to the Contractor signed by the Owner authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued after the effective date of the Agreement as provided herein.

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

§ 1.8.11 **The Contract Documents.** The Agreement, Addenda (which pertain to the Contract Documents), the Contractor's Bid or Proposal (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), the Bonds, the Notice of Award, the Notice to Proceed, these General Conditions, the Supplemental Conditions, Renewable Water Resources and EPA Supplemental General Conditions and Special Conditions, the Specifications, the Drawings, together with all Modifications issued after the effective date of the Agreement.

§ 1.8.12 **Contract Price.** The total monies payable to Contractor under the Contract Documents.

§ 1.8.13 **Contract Time.** The number of calendar days stated in the Contract Documents for the completion of the Work.

§ 1.8.14 **Contractor (Construction Contractor or Construction Manager at Risk).** The person, firm or corporation with whom the Owner has executed an agreement for the Work and construction of the Project.

§ 1.8.15 **CPM.** The critical path method giving a detailed scheduling method used to allocate the time required for a construction project, and a means of controlling costs and manpower that has been reviewed by the Engineer and accepted by the Owner.

§ 1.8.16 **Day.** A calendar day of twenty-four (24) hours measured from midnight to the next midnight.

§ 1.8.17 **Default.** The failure of the Contractor to meet the obligations agreed to in the Contract Documents.

§ 1.8.18 **Defective.** An adjective which, when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient (which may be apparent or latent), or does not conform to the Contract Documents or does not meet the requirements of any inspection, test, or approval referred to in the Contract Documents.

§ 1.8.19 **The Drawings.** The Drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the Engineer and which are referred to in the Contract Documents, are included in and are a part of the Contract Documents.

§ 1.8.20 **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 by the last of: the two (2) parties to sign and deliver the agreement, or the execution of the Certificate of Owner’s Attorney.

§ 1.8.21 **Engineer.** The person, firm or corporation named as such in the Agreement, or its replacement.

§ 1.8.22 **Field Order** (sometimes referred to as a “Minor Change in the Work”). A written order issued by the Engineer which clarifies or interprets the Contract Documents in accordance with this Agreement or effects minor no cost changes in the Work in accordance with paragraph 7.4.

§ 1.8.23 **Final Certificate.** Certificate issued by the Owner when the Contractor submits proper evidence that the Contractor has met all obligations for labor, materials and equipment and has also paid all Subcontractors up to date of the previous Application for Payment. The Contractor, by submission of this evidence, certifies that all Work is complete as described in the Contract Documents and all obligations have been met.

§ 1.8.24 **Guaranty.** Guaranty is the liability assumed by the Contractor for the performance of the work and the products used.

§ 1.8.25 **Manufacturer’s Representative.** The person who is a full-time employee of the company supplying the materials, equipment or supplies to the Project. This person will be trained in the operation and use of the materials, equipment or supplies manufactured and used on the Project.

§ 1.8.26 **Modification.** A modification is: (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, (c) a written clarification or interpretation issued by the Engineer in accordance with the Contract Documents, or (d) a written order for minor change or alteration in the Work issued by the Engineer pursuant to paragraph 7.4. A modification may only be issued after the effective date of the Agreement.

§ 1.8.27 **Notice of Award.** The written notice by the Owner to the Contractor that the Contractor is the successful Bidder/Proposer and that upon compliance with the conditions precedent to be fulfilled by the Contractor within the time specified, the Owner will execute and deliver the Agreement with Contractor.



**§ 1.8.28 Notice to Proceed.** A written notice given by the Owner to the Contractor (with a copy to the Engineer) fixing the date on which the Contract Time will commence to run and on which the Contractor will start to perform his obligation under the Contract Documents.

**§ 1.8.29 Owner.** Renewable Water Resources, “ReWa”, the public body for whom the work is to be performed

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

**§ 1.8.31 The Project Manual.** The Project Manual is a volume assembled for the Work which may include the Bidding/proposal requirements, sample forms, Conditions of the Contract and Specifications and all items listed in the Table of Contents.

**§ 1.8.32 Proposal.** The Proposal of the Proposer submitted on the prescribed form setting forth the proposal for the Work to be Performed.

**§ 1.8.33 Proposer.** Any person, firm or corporation submitting a Proposal for the Work.

**§ 1.8.34 Resident Project Representative.** The authorized representative of the Engineer who is assigned to the Project site or any part thereof.

**§ 1.8.35 Resident Project Superintendent.** The on-site representative named by the Contractor who is assigned to the Project to oversee the trades and Subcontractors and has the authority to make decisions affecting the accomplishment of the Work.

**§ 1.8.36 Shop Drawings.** All drawings, diagrams, illustrations, schedules, descriptive literature, prints, test reports, samples, calculations, material lists and other data which are specifically prepared by the Contractor, a subcontractor, manufacturer, fabricator, supplier or distributor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a manufacturer, fabricator, supplier or distributor and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

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

**§ 1.8.38 Subcontractor.** An individual, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site or for the furnishing of materials or equipment.

**§ 1.8.39 Substantial Completion.** The date the project or sectionalized part of the project is sufficiently completed in accordance with the Contract Documents so that it may be used for the purpose for which it was intended; provided, however, if the completed Work is only a part of an integral whole (i.e., a portion of a pipeline which is an integral part of a trunk line designed to serve a whole basin and requiring approval before connection to an existing system before any testing of the flow can be made or is but a part of a treatment process which must function as a whole and must be completed to a point where it may be safely operated), then the Contractor may not claim substantial completion and the percentage of work completed shall have no bearing or relevancy to the determination of whether substantial completion has been reached.

**§ 1.8.40 Warranty.** Warranty is the liability assumed by the Contractor for the quality of work including materials and equipment and other warranties in this Agreement by the Contractor or by others.

**§ 1.8.41 The Work.** The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided

or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

## ARTICLE 2 OWNERS

### § 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Engineer does not have such authority. The term "Owner" refers to Renewable Water Resources, a special purpose district and political subdivision of the State of South Carolina. The Executive Director of Owner and his/her designees (confirmed in writing) are hereby designated by Owner as its representatives and are authorized to act on behalf of the Owner, unless a new representative is subsequently designated in writing by Owner.

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

### § 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

§ 2.2.3 The Owner may furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor should not and will not rely on the accuracy of information furnished by the Owner and shall exercise proper precautions relating to the safe performance of the Work. Any such information shall be obtained by Contractor from third parties, subject to the approval of the Engineer. Information furnished by the Owner regarding surveys, subsurface investigation reports, soil borings, and other material of a similar nature is for general information only and is not a guarantee of the completeness or accuracy of such information, unless specifically noted otherwise herein. Contractor shall verify all existing grades, conditions, and dimensions of existing physical conditions and structures and shall report any inconsistencies in writing to the Engineer. Contractor shall establish all lines and levels required to execute the Work and shall bear all costs involved, and shall be responsible for their accuracy and maintenance.

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

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. The Contractor will be furnished, at its sole cost and expense, any additional copies.

**§ 2.3 OWNER'S RIGHT TO STOP THE WORK**

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

**§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK**

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

**§ 2.5 EXTENT OF OWNER'S RIGHTS**

**§ 2.5.1** The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (i) granted in the Contract Documents, (ii) at law, (iii) under statute, or (iv) in equity.

**§ 2.5.2** In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

**Non-Appropriation:** This Agreement shall be subject to cancellation without damages or further obligation when funds are not appropriated or otherwise made available to support continuation of performance in a subsequent fiscal period or appropriated year.

**ARTICLE 3 CONTRACTOR****§ 3.1 GENERAL**

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

**§ 3.1.2** The Contractor shall perform the Work in accordance with the Contract Documents. All of Contractor's Work shall conform to the Contract Documents. No change therefrom shall be undertaken without the prior review by the Engineer and the approval of the Owner. Contractor shall be responsible for details of the Work necessary to carry out the intent of the drawings and specifications, or which are customarily performed. When more detailed information is required for the performance of the Work or when an interpretation of the Contract Documents is requested, the Contractor shall submit a written request to the Engineer and the Owner, and the Engineer shall furnish such information or interpretation in the form and Engineer's Supplemental Instruction or other written or drawn form or drawing. Where only one part of the Work is indicated, similar parts shall be considered repetitive. Where any detail is shown and components thereof are fully described, similar details not fully described shall be considered to incorporate the fully described details and components. In the case of inconsistency between drawings and specifications or within either document not clarified by Addendum, the better quality or greater quantity shall be provided in accordance with the Engineer's interpretation at no extra cost to the Owner.

**§ 3.1.3** The phrase "or equal" shall be construed to mean that material or equipment will be acceptable only when in the judgment of the Engineer, they are composed of parts of equal quality, or equal workmanship and finish,

designed and constructed to perform or accomplish the desired result as efficiently as the indicated brand, pattern, grade, class, make or model. The Contractor's attention is directed to Paragraph 8 of the Information for Bidders which addresses equal, alternate items and prequalification requirements for submittals.

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

### § 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Prior to the execution of the Agreement, the Contractor and each Subcontractor evaluated and satisfied themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (i) the location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, (iv) availability and cost of materials, tools, and equipment, and (v) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. Except as set forth in Paragraph 10.3, the Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in the Contract Sum, the GMP, or the Contract Time in connection with any failure by the Contractor or any Subcontractor to have complied with the requirements of this Subparagraph 3.2.1.

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

- .1 The exactness of grades, elevations, dimensions, or locations given on any Drawing issued by the Engineer, or the work installed by other contractors, is not guaranteed by the Engineer or Owner.
- .2 The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

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

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

Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### § 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

§ 3.3.4 The Contractor and its Subcontractors may not use the Owner's tools, equipment, or materials unless authorized in advance by the Owner.

### § 3.4 LABOR AND MATERIALS

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

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Engineer in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Engineer and in accordance with a Change Order or Construction Change Directive. If the Contractor desires to submit an alternate product or method in lieu of what has been specified or shown in the Contract Documents, the following provision apply:

- .1 The Contractor must submit to the Engineer and the Owner (i) a full explanation of the proposed substitution and submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information necessary for a complete evaluation of the substitution; (ii) a written explanation of the reasons the substitution is advantageous and necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum, in the event the substitution is acceptable; (iv) the adjustment, if any, in the time of completion of the Contract and the construction schedule in the event the substitution is acceptable; and (v) an affidavit stating that (a) the proposed substitution conforms to and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings, and (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Engineer. Proposals for substitutions shall be submitted in triplicate to the Engineer in sufficient time to allow the Engineer no less than ten (10) working days for review. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated hereinabove.
- .2 Substitutions and alternates may be rejected without explanation and will be considered only under one or more of the following conditions: (i) the proposal is required for compliance with

interpretation of code requirements or insurance regulations then existing; (ii) specified products are unavailable through no fault of the Contractor; (iii) subsequent information discloses the inability to of specified products to perform properly or to fit in the designated space; (iv) the manufacturer/fabricator refuses to certify or guarantee the performance of the specified product as required; and (v) when in the judgment of the Owner or the Engineer, a substitution would be substantially in the Owner's best interests, in terms of cost, time, or other considerations.

- .3 Whether or not any proposed substitution is accepted by the Owner or the Engineer, the Contractor shall reimburse the Owner for any fees charged by the Engineer or other consultants for evaluating each proposed substitute.

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

§ 3.4.4 The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall also use best efforts to minimize the likelihood of any strike, work stoppage, or other labor disturbance.

- .1 If the Work is to be performed by trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage, or cost to the Owner and without recourse to the Engineer or the Owner, any conflict between the Contract Documents and any arrangements or regulations of any kind at any time in force among members or councils that regulate or distinguish the activities that shall not be included in the work of any particular trade.
- .2 In case the progress of the Work is affected by any undue delay in furnishing or installing any items or materials or equipment required under the Contract Documents because of such conflict involving any such labor agreement or regulation, the Owner may require that the other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive.

### § 3.5 WARRANTY

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

§ 3.5.2 The Contractor agrees to assign to the Owner at the time of final completion of the Work any and all manufacturer's warranties relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties. If necessary as a matter of law, the Contractor may retain the right to enforce directly any such manufacturers' warranties during the two (2)-year period following the date of Substantial Completion, referred to in Paragraph 12.2.

§ 3.5.3 The Contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of two (2) years following the date of final acceptance of the Work and shall replace such defective materials or workmanship without cost to the owner.

§ 3.5.4 Where items of equipment or material carry a manufacturer's warranty for any period in excess of the two (2)-year period, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The

contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.

§ 3.5.5 If, after ten (10) days' notice, the Contractor fails to proceed to cure any breaches of these warranties, the Owner may have the defects corrected and the Contractor and its surety shall be liable for all expense incurred. In case of an emergency where, in the opinion of the Owner or the Engineer, delay would cause serious loss or damage, corrective work may be undertaken without advance notice to the Contractor, but the Contractor and its surety shall remain liable for all expenses incurred. The remedies stated in this subparagraph are not exclusive, but are cumulative of any other remedies the Owner may have.

§ 3.5.6 Additionally, the Owner may bring an action for latent defects caused by the negligence of the Contractor which is hidden or not readily apparent to the owner at the time of use or final acceptance in accordance with applicable law.

### § 3.6 TAXES

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

### § 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Except as set forth in Subparagraph 2.2.2, the Contractor shall secure, pay for, and, as soon as practicable, furnish the Owner with copies or certificates of all permits and fees, licenses, and inspections necessary for the proper execution and completion of the Work, including, without limitation, all building permits, construction permits, and certifications. All connection charges, assessments, or inspection fees as may be imposed by any municipal agency or utility company are included in the Contract Sum and shall be Contractor's responsibility.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders and all other requirements of public authorities applicable to performance of the Work. The Contractor shall procure and obtain all bonds required of the Owner or the Contractor by the municipality in which the Project is located or any other public or private body with jurisdiction over the Project.

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

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Engineer before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Engineer will promptly investigate such conditions and, if the Engineer determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Engineer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Engineer shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Engineer's determination or recommendation, that party may proceed as provided in Article 15. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition that does not differ materially from those conditions disclosed or that reasonably should have been disclosed by the Contractor's (i) prior inspections, tests, reviews, and preconstruction services for the Project, or (ii) inspections, tests, reviews, and preconstruction services that the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately

suspend any operations that would affect them and shall notify the Owner and Engineer. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

**§ 3.7.6 Reference Points.** The Owner will establish such general reference points as in its judgment will enable the Contractor to proceed with the Work. The Contractor shall be responsible for the layout of the Work and will protect and preserve the established reference points and will make no changes or relocations without the prior written approval of the Owner. The Contractor shall report to the Engineer whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grade or location. The Contractor shall replace and accurately relocate all reference points so lost, destroyed, or moved, and bear all expenses incurred.

**§ 3.7.6.1 Compliance with S.C. Code § 12-8-550.** Contractor is aware that the South Carolina Code provides “A person hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within this State shall withhold two percent of each payment in which the South Carolina portion of the contract exceeds or could reasonably be expected to exceed ten thousand dollars. This section does not apply to a nonresident which registered with the Secretary of State or the Department of Revenue and by that registration agreed to be subject to the jurisdiction of the department and the courts of this State to determine its South Carolina tax liability, including withholding and estimated taxes, together with any related interest and penalties. Registering with the Secretary of State or the department is not an admission of tax liability nor does it require the filing of an income tax or franchise (license) tax return. If the person hiring, contracting, or having a contract with a nonresident obtains an affidavit from the nonresident stating that the nonresident is registered with the department or with the Secretary of State, the person is not responsible for the withholding.”

**§ 3.7.6.2** This withholding is in addition to withholding for employees and state sales tax. Even if the out-of-state contractor has a South Carolina Tax number and is regularly filing state tax returns, this withholding requirement applies. The two percent is over and above the retainage.

**§ 3.7.6.3** Under the South Carolina Code, the Contractor can assure payment to the South Carolina Tax Commission by posting an acceptable bond in the sum of two percent of the total contract in lieu of the withholding. The Tax Commission will then notify the Owner that withholding is not necessary. ***Owner will not bear the burden of withholding and accounting.***

**§ 3.7.6.4** Contractor must seek and obtain such a bond so that withholding will not be necessary. Proof of such a bond must be submitted to the Owner prior to any payments being made to the Contractor

### **§ 3.8 ALLOWANCES**

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

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor’s costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor’s costs under Section 3.8.2.2.



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

### § 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. A site superintendent shall be at the Site during all times at which Work is being performed. This shall include all times in which Subcontractors and material suppliers are on the Site. In addition, a site superintendent shall be present during all deliveries to the Site. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

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

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

### § 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract (and in a time not to exceed thirty (30) days), shall prepare and submit for the Owner's and Engineer's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

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

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

§ 3.10.4 The construction schedule ("CPM Schedule") shall be in a detailed precedence-style critical path management ("CPM") or primavera-type format satisfactory to the Owner and the Engineer that shall:

- .1 provide a graphic representation of all activities and events that will occur during the performance of the Work;
- .2 identify each phase of construction and occupancy;
- .3 set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as the "Milestone Dates");
- .4 consists of an overall time-scaled Project Schedule (Overall Project Schedule). The Overall Project Schedule ("OPS") shall consist of detailed activities and their restraining relationships, including the milestones and constraints from the Award of Contract date and any interfaces with separate Owner-awarded contracts for the total duration of the project. Also, all temporary construction required for

new construction and/or to maintain existing facilities in operation shall be shown on the OPS. The OPS shall include the Contractor's information relative to shop drawings and other submittal preparation and approval, and fabrication and delivery of all materials and equipment deemed to be significant to the scheduling process. Each activity of the schedule will be assigned an identifying number.

- .5 be drawn or plotted with activities grouped or zoned by Work area or subcontract as opposed to a random (or scattered) format. The CPM Schedule shall be time-scaled on a weekly basis and shall be drawn or plotted at a level of detail and logic which will schedule all salient features of the work to be performed by the Contractor. The Contractor shall allow sufficient time in his schedule for all required inspections. Each Work activity will be assigned a time estimate by the Contractor. One day shall be the smallest time unit used.
- .6 identify and describe each activity, state the duration of each activity, the calendar dates for the early and late start and the early and late finish of each activity, and clearly highlight all activities on the critical path. "Total float" and "free float" shall be indicated for all activities. Float time shall not be considered for the exclusive use or benefit of either the Owner or the Contractor, but must be allocated in the best interest of completing the Work within the Contract time. Extensions to the Contract time, when granted by Change Order, will be granted only when equitable time adjustment exceeds the Total Float in the activity or path of activities affected by the change.
- .7 demonstrate that the Contractor can complete the overall project and meet all required interim milestones. All construction schedules shall be developed using precedence diagramming.

Upon review and acceptance by the Owner and the Engineer of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit C. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Engineer and resubmitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions (sometimes referred to in these Supplementary Conditions and "progress reports") as set forth in Subparagraph 3.10.1 or if requested by either the Owner or the Engineer. In the event any progress payment report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

§ 3.10.5 In the event the Owner determines that the performance of the Work, as of a Milestone Date, has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (hereinafter referred to as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Construction Schedule.

- .1 The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Subparagraph 3.10.5.
- .2 The Owner may exercise the rights furnished to the Owner under or pursuant to this Subparagraph 3.10.5 as frequently as to the Owner deems necessary to ensure that the Contractor's performance of the Work shall comply with any Milestone Date or completion date set forth in the Contract Documents.

§ 3.10.6 The Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenant or invitees thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling, or performance of the Work under this Subparagraph 3.10.6 may be grounds for an extension of the Contract Time, if permitted under Subparagraph 8.3.1., and an equitable adjustment in the Contract Sum if (i) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, and (ii) such rescheduling or postponement is required for the convenience of the Owner.

### § 3.11 DOCUMENTS AND SAMPLES AT THE SITE

§ 3.11.1 The Contractor shall maintain in a safe place at the site for the Owner and Engineer one record each as-built copies of the Drawings, Specifications, Addenda, Change Orders, Field Orders, written interpretations and clarifications, and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Engineer and shall be delivered to the Engineer for submittal to the Owner upon completion of the Work, certified in writing by the Contractor to show complete and exact "as-built" conditions, stating sizes, kind of materials, underground piping, conduit locations, and similar matters.

§ 3.11.2 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible at the Project site to governmental inspectors and other authorized agencies. All approved drawings shall be wrapped, marked, and delivered to the Owner within sixty (60) days of Substantial Completion.

§ 3.11.3 The Contractor must continuously maintain at the Project site all material safety data sheets, safety records, daily logs, and other Contract documentation necessary to immediately ascertain the safety of the Work and to establish compliance with life safety policies, hazardous materials requirements, and the Contract Documents.

### § 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Engineer will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional and who shall comply with reasonable requirements of the Owner regarding qualifications and insurance. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Engineer. The Owner and the Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals. Pursuant to this Section 3.12.10, the Engineer will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

### § 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site, land and areas identified in and permitted by the Contract Documents, other land and areas permitted by Laws, Regulations, rights-of-way, permits and easements. The Contractor shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for all and any damage to any such real property, right-of-way or easement, or to the Owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance or non-performance of the Work. Should any claim be made against the Owner or the Engineer by any such Owner or occupant because of the performance of the Work, the Contractor shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law.

§ 3.13.2 Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage and all adversity is solely the responsibility of the Contractor. The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

§ 3.13.3 The Contractor and any entity for whom the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner which may be withheld in the sole discretion of Owner.

§ 3.13.4 Without limitation of any other provisions of the Contract Documents, the Contractor shall use best efforts to minimize any interference with the occupancy or beneficial use of (i) any areas and buildings adjacent to the site of the Work and (ii) the Building in the event of partial occupancy, as more fully described in Paragraph 9.9. Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner.

§ 3.13.5 Without limitation of any other provision of the Contract Documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and Building, as amended from time to time. The Contractor shall also comply with all insurance requirements applicable to the use and occupancy of the Project site and the Building.

§ 3.13.6 Prior to the commencement of the Work, the Contractor shall review the Project site with the Owner in detail and identify the area of the Work, staging areas, connections or interfacing with existing structures and operations, and restrictions on the work site area. The Contractor will ensure that all forces on the Project site are instructed about the acceptable working and staging areas and restrictions on use of the site. The Contractor, with advance consent of the Owner, will erect such barriers and devices as are necessary to restrict access to the worksite to approved areas and to prevent unauthorized access to non-Work areas.

#### § 3.14 CUTTING AND PATCHING

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

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

#### § 3.15 CLEANING UP

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

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

#### § 3.16 ACCESS TO WORK

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

#### § 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Engineer.

§ 3.17.2 It is the intention of the Contract Documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The Contractor shall protect and save harmless the Owner against suit on account of alleged or actual infringement. The Contractor shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

#### § 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Engineer, Engineer's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent, reckless, or intentional acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

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

§ 3.18.3 The Contractor's indemnity obligations under this Paragraph 3.18 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, without limitation, reasonable attorneys' fees), and punitive damages (if any) arising out of, or in connection with, any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code, or requirement of a public authority that bears upon the performance of the Work by the Contractor, a Subcontractor, or any person or entity for whom either is responsible, (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work, and (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work, by the Contractor, a Subcontractor, or any person or entity for whom either is responsible.

§ 3.18.4 The Contractor shall indemnify and hold harmless all of the Indemnities from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnities in enforcing any of the Contractor's defense, indemnity, and hold-harmless obligations under the Contract. The Contractor shall indemnify and hold harmless all of the Indemnities from and against any costs and expenses (including reasonable attorneys' fees) incurred by any of the Indemnities in defending any action that asserts or alleges Contractor's negligent, reckless, or intentional conduct.

#### ARTICLE 4 ENGINEER

##### § 4.1 GENERAL

§ 4.1.1 The Owner shall retain an Engineer lawfully licensed to practice Engineering or an entity lawfully practicing Engineering in the jurisdiction where the Project is located. That person or entity is identified as the Engineer in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Engineer" refers to the firm identified on the first page of this Agreement. Any reference in the Contract Documents to the Engineer's taking action or rendering a decision with a "reasonable time" is understood to mean no more than two (2) weeks.

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

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

#### § 4.2 ADMINISTRATION OF THE CONTRACT

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

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

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

#### § 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

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

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

§ 4.2.6 The Engineer has authority to reject Work that does not conform to the Contract Documents. Whenever the Engineer considers it necessary or advisable, the Engineer will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Engineer nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Engineer to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Engineer will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Engineer's action will be taken in accordance with the submittal schedule approved by the Engineer or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Engineer's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for

installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Engineer's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Engineer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Engineer, of any construction means, methods, techniques, sequences or procedures. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

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

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

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

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

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

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

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

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 DEFINITIONS

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

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

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

§ 5.2.1 All awards of Subcontractor contracts shall be made in accordance with the Owner's Procurement Code, including, without limitation, Sections 3-101 (Competitive Bidding) and 4-104(5) (Subcontracting under Construction Manager At-Risk Procurement). Unless specified in the Proposal or Bid provided by Contractor, all Subcontractor contracts shall be subject to competitive Bidding. If Contractor was required to provide the names of



Subcontractors in Contractor's Bid or Proposal, those Subcontractors shall be treated as pre-qualified. If Contractor's Bid included work to be done by Subcontractors, those Subcontractors performing Work included in the fixed price Bid shall be treated as pre-qualified. All existing Subcontractors may perform Additional Work pursuant to a Change Order or Change Directive as though pre-qualified.

Should a Subcontractor, identified by name in the Bid, be unable to provide the work, Contractor must comply with Owner's competitive Bidding requirements for re-selection of Subcontractor. No later than thirty (30) days subsequent to the execution of this Agreement, the Contractor, if not previously selected in the Bid, shall begin the selection of entities (including those who are to furnish materials or equipment fabricated to a special design) for each principal portion of the Work in accordance with the provisions of this Subparagraph 5.2.1. Contractor shall furnish the Owner and the Engineer, in writing, with (i) the name, trade, and subcontract amount for each Subcontractor and (ii) the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. Upon submission of the name of the selected Subcontractor, the Engineer may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Engineer has reasonable objection to any such proposed person or entity or (2) that the Engineer requires additional time for review. Failure of the Owner or Engineer to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 In no event shall the Contractor enter into a subcontract or purchase order without the approval of the Owner and without ensuring compliance with Owner's Procurement Code. The Contractor shall not assign any portion of the Work subject to this Contract to any entity without the prior approval of the Owner.

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected without re-Bidding the sub-contract or if the Owner or Engineer makes reasonable objection to such substitution.

### § 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.3.2 All subcontracts shall be in writing in form and substance substantially similar to the Contractor's standard form subcontract, attached to the Agreement and made a part hereof as Exhibit B, and shall specifically provide that the Owner is an intended third-party beneficiary of such subcontract.

#### § 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

§ 5.4.2 If the Work in connection with a subcontract has been suspended for more than thirty (30) days after termination of the Contract by the Owner pursuant to Paragraph 14.2 and the Owner accepts assignment of such subcontract, the Subcontractor's compensation shall be equitably adjusted for any increase in direct costs incurred by such Subcontractor as a result of the suspension.

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

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the Subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

#### ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

##### § 6.2 MUTUAL RESPONSIBILITY

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

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

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

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

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

### § 6.3 OWNER'S RIGHT TO CLEAN UP

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

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 GENERAL

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work. Except as permitted in Paragraphs 7.3 and 9.7, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealing between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claims that Owner has been unjustly enriched by any alteration of or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time provided for in the Contract Documents.

### § 7.2 CHANGE ORDERS

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

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

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustment to the Contract Sum and the construction schedule.

### § 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

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

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

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

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

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

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others. Unless otherwise established in the Contract, (i) the rental value of the Contractor's own equipment shall not be more than seventy-five (75%) percent of the rates in the current edition of "Compilation of Rental Rates for Construction Equipment" prepared by Associated Equipment Distributors, Oak Brook, Illinois (to be supplied by Contractor as evidence of Costs), and (ii) the aggregate amounts charged to the owner for such equipment shall not exceed seventy-five (75%) of the fair market value;

- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.
- .6 Costs shall not include: (i) Payroll costs and other compensation of the Contractor's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, lawyers, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, superintendents, and other personnel employed by the Contractor whether at the site or in his principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications all of which are to be considered administrative costs covered by the Contractor's fee; (ii) expenses of the Contractor's principal and branch offices other than the Contractor's office at the site; (iii) any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work and charges against the Contractor for delinquent payments; (iv) cost of premiums for all Bonds and for all insurance whether or not the Contractor is required by the Contract Documents to purchase and maintain the same (except for additional Bonds and insurance required because of the changes in the Work); (v) costs due to the negligence of the 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; and (vi) Other overhead or general costs of any kind and the costs of any item not specifically and expressly included in Subparagraph 7.3.7

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

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

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

#### § 7.4 MINOR CHANGES IN THE WORK

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

#### § 7.5 AGREED OVERHEAD AND PROFIT RATES

§ 7.5.1 For any adjustments to the Contract Sum that are based on other than the unit prices method, the Contractor agrees to change and accept, as payment for overhead and profit, the following percentages of costs attributable to the change in the Work:

- .1 Ten (10%) percent for Work by the Contractor not involving Subcontractors;
- .2 Five (5%) percent for Work by Subcontractors;
- .3 When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any;

- .4 For additional Work ordered as described above that will be executed by Subcontractors, it is agreed that the Subcontractors will be permitted to charge ten (10%) percent for work not involving Sub-subcontractors and five (5%) percent for work involving Sub-subcontractors;

## ARTICLE 8 TIME

### § 8.1 DEFINITIONS

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

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

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

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

### § 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work. It is further agreed by and between the Contractor and the Owner that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further agreed that the work embraced in this contract shall be commenced on a date to be specified in the Notice to Proceed.

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

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. In the event that the Contractor fails to attain Substantial Completion within the Contract Time, Owner shall be entitled to liquidated damages and more specifically described herein. Further, if Substantial Completion is not attained within the Contract Time, Contractor shall be responsible to Owner for the reimbursement of any additional expenses payable by Owner to Engineer (as determined solely in the Engineer’s discretion) caused by the Contractor’s failure to achieve Substantial Completion within the Contract Time.

### § 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Engineer, or of a designated representatives of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor’s control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Engineer determines may justify delay, then the Contract Time shall be extended by Change Order to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or could not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay (i) is not caused, or could not have been anticipated, by the Contractor, (ii) could not be limited or avoided by the Contractor’s timely notice to the Owner of the delay or reasonable likelihood that a delay will occur, and (iii) is of a duration not less than one (1) day.

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

§ 8.3.3 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted shall be the sole remedy of the Contractor for any (i) delay in the commencement, prosecution,

or completion of the Work, (ii) hindrance or obstruction in the performance of the Work, (iii) loss of productivity, or (iv) other similar claims (collectively referred to in this Subparagraph as "Delays") whether or not such Delays are foreseeable, within the contemplation of the parties, or caused by the acts of the Owner or its agents. In no event shall the Contractor be entitled to any compensation or recovery of any damages, in connection with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the Work.

§ 8.3.4 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.

§ 8.3.5 The Contract Time may only be changed by a written Change Order. Any claim for an extension in the Contract Time shall be in writing delivered to the Owner and the Engineer within thirty (30) days of the occurrence of the event giving rise to the claim. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order. Any outstanding claim shall also be listed upon each "Application for Payment Summary" form. This Paragraph 8.3 applies to all claims for a change in Contract Time for any reason whether or not compensation is sought. Neither the Engineer nor any employee or officer of the Owner has the power or authority to waive this requirement of written notice by any act or failure to act or by any oral or written instruction or consent.

§ 8.3.6 The Contract Time will be extended in an amount equal to time lost or to delays beyond the control of the Contractor if: (1) Contractor gives proper notice, (2) Contractor makes a timely claim therefore as provided in Paragraph 8.3, and (3) the Claim is allowed under the Contract Documents. Such delays shall include, but not be restricted to, acts or neglect by any separate contractor employed by the Owner, fires, floods, labor disputes, epidemics, adverse weather conditions not usually anticipated, or acts of God. The burden to prove such delays will be upon the Contractor. The Contractor must prove that the cause of the delay was beyond Contractor's control. Furthermore, the Contractor must justify the time extension by showing how the critical path of the CPM Schedule was impacted by the delay. This will require clear identification of the CPM activities at the time, the type Work being performed and the effect of the weather or other event on the Work. Claims for time extensions will not be considered unless they can be clearly documented by the Contractor's CPM Schedule.

§ 8.3.7 Claims for delays due to adverse weather not usually anticipated shall be handled on a quarterly basis. The Contractor shall submit a notice of a claim for a weather delay for each particular quarter on the last day of that particular quarter (Jan. 1 to March 31, April 1 to June 30, July 1 to September 30, October 1 to December 31). Failure to submit the notice as required shall constitute a waiver of any claim because of adverse weather for that quarter. The Contractor shall submit the notice to the Engineer. Within seven (7) calendar days after the submission of the weather claim notice, the Contractor will submit to the Engineer evidence to justify the claim. This evidence will include the following: (a) the days of the quarter on which the adverse weather occurred, (b) the hours of the day during which the adverse weather occurred at the job site, (c) a detailed description of the CPM activities that were affected by the adverse weather, (d) a detailed description of claim for the impact of the adverse weather on the critical path of the CPM schedule. The Engineer will review the claim evidence submitted by the Contractor. The Engineer will compare the adverse weather received during the quarter against the weather that could have been anticipated for that quarter. Anticipated weather for a quarter will be defined as the average of the weather conditions that have occurred in that quarter for the years 1962-2000, as documented by the South Carolina State Climatology Office at the Greenville-Spartanburg Airport. Adverse weather in the form of rainfall will be compared by the Engineer against the mean number of days in which the precipitation meets or exceeds 1/10-inch for the years 1962-2000 as follows:

January to March: 24 days  
 April to June: 20 days  
 July to September: 18 days

October to December: 17 days

In the event that Work starts or ends during the pendency of a quarter (an incomplete quarter), the Engineer shall use the above number of expected adverse weather days expected for that quarter and pro-rate the number of allotted adverse weather days by the number of days that Work occurs. This number shall be calculated based on the number of days in the quarter actually Worked by Contractor. The resulting percentage is then multiplied by the above number of expected days in the quarter for the number of allotted adverse weather days for the incomplete quarter. When work begins or ends on the first or last day of a quarter, no pro-rating shall occur. As an example:

Contractor starts November 15, 2008.  
 Number of days from November 15 until December 31, 2008 = 47 days  
 Number of day in the October to December Quarter = 93  
 Percentage of Quarter worked = 51%  
 Number of Adverse Days allotted for quarter = 17 days  
 Pro-Rated Days = 51% x 17 days = 8.67  
 (automatically rounded up in every case) = 9 adverse weather days allotted for incomplete quarter

§ 8.3.8 The Engineer will not approve any claim for delay due to adverse weather if: (a) the Contractor does not submit the evidence as required, (b) the adverse weather had no impact on the critical path of the CPM schedule, or (c) the adverse weather did not exceed the anticipated weather for a quarter as previously defined. Any claims for extensions in time due to adverse weather must be submitted within thirty (30) days of the close of the quarter and as more fully provided in Article 15.

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 CONTRACT SUM

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

### § 9.2 SCHEDULE OF VALUES

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

§ 9.2.2 The Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized form approved the Engineer and the Owner. The form shall be divided in detail sufficient to exhibit areas, floors, and/or sections of the Work, and/or by convenient units and shall be updated as required by either the Owner or the Engineer as necessary to reflect (i) the description of Work (listing labor and material separately), (ii) total value, (iii) percent of the Work completed to date, (iv) value of Work completed to date, (v) percent of previous amount billed, (vi) previous amount billed, (vii) current percent completed, and (viii) value of Work completed to date. Any trade breakdown that fails to include sufficient detail, is unbalanced, is not submitted on Owner's form, or exhibits "front-loading" of the value of the Work shall be rejected. If trade breakdown had been initially approved and subsequently used but later was found improper for any reason, sufficient funds shall be withheld from future Applications for Payment to ensure and adequate reserve (exclusive of normal retainage) to complete the Work.

### § 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least twenty (20) days before the date established for each progress payment, unless otherwise required by the Agreement, the Contractor shall submit to the Owner and Engineer an itemized Application for Payment prepared in accordance with the schedule of values, required under Section 9.2., for completed portions of the Work. Such application shall be notarized, and supported by such data substantiating the Contractor's right to payment as the Owner or Engineer may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect the retainage provided for in the Contract Documents.



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

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

§ 9.3.1.3 Each Application for Payment shall be accompanied by the following, all in the form and substance satisfactory to the Owner and on the form provided by the Owner (including, in electronic form, if applicable): (i) a current Contractor's waiver of all claims and a duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material supplier in the requested progress payment, together with similar sworn statements from all such Subcontractors and material suppliers; (ii) duly executed waivers of claims from all Subcontractors and, when appropriate, from material suppliers and lower tier Subcontractors establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous Application for Payment; and (iii) all information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Engineer.

**The failure to use any such forms provided by Owner for the Application for Payment will be grounds for Owner to reject the Application for Payment.** The Application for Payment must include each of the following documents which must be fully completed:

- (i) Application for Payment using Owner's form;
- (ii) Payment Breakdown using the Owner's form;
- (iii) Stored Materials Log using the Owner's form;
- (iv) Updated CPM schedule;
- (v) Stored material invoices from the preceding Pay Applications which are stamped "PAID" by the vendor. These invoices will also include the vendor's signature, the date of its signature, and the check number used to pay the invoice.
- (vi) An up to date set of "as-built" Drawings that reflect any changes made to the Specification or Drawings since the last Application for Payment.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site. The Contractor shall also comply with the following specific requirements:

- .1 The aggregate costs of materials stored off site shall not exceed one million (\$1,000,000.00) dollars at any time without written approval by Owner;
- .2 Title to such materials shall be vested in the Owner, as evidenced by documentation satisfactory in form and substance to the Owner and Owner's financing/bond sources, including without limitation, recorded financing statements, UCC filings, and UCC searches;
- .3 With each Application for Payment, the Contractor shall submit to the Owner a written list identifying each location where materials are stored, including materials stored off the Project site,

and the value of materials at each location (the “Stored Materials Log”). This Stored Materials Log must be submitted in the manner provided by the Owner. The Contractor shall procure insurance satisfactory to the Owner for materials stored off the Project site in an amount not less than the total dollar value thereof;

- .4 The consent of any surety shall be obtained to the extent required prior to payment for any materials stored off the Project site;
- .5 Representatives of the Owner and Engineer shall have the right to make inspections of the on and off-site storage areas at any time;
- .6 Such materials shall be (i) protected from diversion, destruction, theft, and damage to the satisfaction of Owner and the Engineer, (ii) specifically marked for use on the Project, and (iii) segregated from other materials at the storage facility.

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

- .1 The Contractor further expressly undertakes to defend the Indemnities, at the Contractor’s sole expense, against any actions, lawsuits, or proceedings brought the Indemnities as a result of claims or liens asserted or filed on account of the Work, claims asserted against Work, the site of any Work, the Project site, payments due the Contractor, or any portion of the property of any of the Indemnities. Contractor hereby agrees to indemnify and hold harmless the Indemnities against any such claims and agrees to pay any judgment or lien resulting from any such actions, lawsuits, or proceedings.

#### § 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Engineer will, within seven (7) days after receipt of the Contractor’s Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Engineer determines is properly due, or notify the Contractor and Owner in writing of the Engineer’s reasons for withholding certification in whole or in part as provided in Section 9.5.1.

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

#### § 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Engineer may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Engineer’s opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Engineer is unable to certify payment in the amount of the Application, the Engineer will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Engineer cannot agree on a revised

amount, the Engineer will promptly issue a Certificate for Payment for the amount for which the Engineer is able to make such representations to the Owner. The Engineer may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Engineer's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

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

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

§ 9.5.3 If the Engineer withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Engineer and the Engineer will reflect such payment on the next Certificate for Payment.

## § 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Engineer has issued a Certificate for Payment, and contingent upon the Engineer's issuance of the Certificate for Payment, the Owner shall, subject to reasonable refusal, make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Engineer. Owner shall make progress payment based on Applications for Payment received and approved by the Owner and the Engineer within thirty (30) days of the month following the month in which the Work covered by the Application for Payment was performed.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. Notwithstanding anything in this Subparagraph 9.6.2 to the contrary, the Owner may elect, in Owner's sole discretion, to make any payment requested by the Contractor on behalf of a subcontractor of any tier jointly payable to the Contractor and each subcontractor. The Contractor and such subcontractor shall be responsible for the allocation and disbursement of funds included as party of any such joint payment. In no event shall any joint payment be construed to create any (i) contract between the Owner and a subcontractor of any tier, (ii) obligations from the Owner to such subcontractor, or (iii) rights in such subcontractor against Owner.

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact

Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Engineer shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

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

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

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

#### § 9.7 FAILURE OF PAYMENT

§ 9.7.1 If (i) the Contractor has properly submitted an application for payment, complete and accurate in all respects (as later determined by the Engineer), that meets all of the requirements of the Contract Documents and the Engineer does not issue a Certificate for Payment or a notice of deficiency within fourteen (14) days after receipt of the Contractor's Application for Payment, or (ii) if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Engineer or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Engineer, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up as more fully provided for in the Contract Documents.

§ 9.7.2 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, the Owner shall have an absolute right to offset such amounts against the Contract Sum and may, in the Owner's sole discretion, elect to (i) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due the Contractor from the Owner, or (ii) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.7.3 Any amounts due and unpaid by the Owner under the Contract Documents shall not bear interest or be subject to any penalty of fine.

#### § 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, certifications, inspections, licenses, and other documents from any governmental or regulatory authority or body having jurisdiction thereof necessary for the beneficial use and/or occupancy of the Project.

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

§ 9.8.3 Upon receipt of the Contractor's list, the Engineer will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Engineer's inspection discloses any item, whether or not

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

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

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

#### § 9.9 PARTIAL OCCUPANCY OR USE

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

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

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

#### § 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will promptly make such inspection and, when the Engineer finds the Work acceptable under the Contract Documents and the Contract fully performed, as approved by the Owner, the Engineer will promptly issue a final Certificate for Payment stating that to the best of the Engineer's knowledge, information and belief, and on the basis of the Engineer's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Engineer's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Engineer as part of the final Application for Payment. The final Certificate for Payment will not be issued by the Engineer until all warranties and guarantees have been received and accepted by the Owner.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Engineer (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected

with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees, (6) submission by the Contractor to the Engineer and the Owner of as-built drawings, (7) submission by the Contractor to the Owner of a complete list of Subcontractors and principal vendors on the Project, including addresses and telephone number, (8) submission by the Contractor to the Owner of an indexed, loose leaf binder of complete installation, operation, and maintenance manual, including all manufacturers' literature, of equipment and materials used in the Work, (9) submission by the Contractor to the Owner, in an indexed, loose leaf binder, of all inspection reports, permits and temporary and final certificates of occupancy or use of the Project, (10) any and all other items required pursuant to the Contract Documents..

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Engineer so confirms, the Owner shall, upon application by the Contractor and certification by the 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 for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Engineer prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

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

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

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

## ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

### § 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

### § 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

- 3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by Contractor.

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Engineer or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition. When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down all coverings and protect the Work, as necessary, from injury by any cause.

#### § 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

§ 10.2.8.1 If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.2.8.2 The Contractor shall promptly report in writing to the Owner and the Engineer all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Engineer.

#### § 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a concealed and undisclosed hazardous material or substance (as defined in CERCLA) not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the

Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Engineer in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Engineer the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Engineer will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Engineer has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Engineer have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up. The term "rendered harmless" shall be interpreted to mean that levels of asbestos and polychlorinated biphenyls are less than any applicable exposure standards set forth in OSHA regulations. In no event, however, shall the Owner have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor, any material supplier, or any entity for whom any of them is responsible. The Contractor agrees not to use any fill or other materials to be incorporated into the Work that are hazardous, toxic, or made up of any items that are hazardous or toxic.

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

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

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

#### § 10.4 EMERGENCIES

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

### ARTICLE 11 INSURANCE AND BONDS

#### § 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;



- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations, which coverage shall be maintained for no less than two (2) years following final payment; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The Contractor shall, for the protection and benefit of the Indemnities and the Contractor and as part of the Contractor's efforts to satisfy the obligations set forth in Subparagraph 11.1.1, procure, pay for, and maintain in full force and effect, at all times during the performance of the Work until final acceptance of the Work or for such duration as required, policies of insurance issued by a responsible carrier or carriers acceptable to the Owner, in accordance with the Bidding/proposal requirements, and in form and substance reasonably satisfactory to the Owner, which afford the coverages set forth in the Schedule of Insurance set forth in the Agreement between the Owner and the Contractor. All such insurance shall be written on an occurrence basis. Information concerning reduction of coverage shall be furnished by the Contractor promptly.

§ 11.1.3 The Contractor hereby agrees to deliver to the Owner, within ten (10) days of the date of the Owner-Contractor Agreement and prior to bringing any equipment or personnel onto the site of the Work and the Project site, certified copies of all insurance policies procured by the Contractor under or pursuant to this Paragraph 11.1 or with the consent of the Owner, Certificates of Insurance in form and substance satisfactory to the Owner evidencing the required coverages with limits not less than those specified in the Agreement between the Owner and the Contractor. The coverage afforded under any insurance policy obtained under or pursuant to this Paragraph 11.1 shall be primary to any valid and collectible insurance carried separately by any of the Indemnities. Furthermore, all policies and Certificates of Insurance shall expressly provide on their face that no less than thirty (30) days' prior written notice shall be given the Owner in the event of a material alteration, cancellation, nonrenewal, or expiration of the coverage contained in such policy or evidenced by such certified copy or Certificate of Insurance with endorsements.

§ 11.1.4 In no event shall any failure of the Owner to receive certified copies or certificates of policies required under Paragraph 11.1 or to demand receipt of such certified copies or certificates prior to the Contractor's commencing the Work be construed as a waiver by the Owner or the Engineer of the Contractor's obligations to obtain insurance provided in this Article 11. The obligation to procure and maintain any insurance required by this Article 11 is a separate responsibility of the Contractor and independent of the duty to furnish a certified copy or certificate of such insurance policies.

§ 11.1.5 If the Contractor fails to purchase and maintain, or require to be purchased and maintained, any insurance required under this Paragraph 11.1, the Owner may, but shall not be obligated to, upon five (5) days' written notice to the Contractor, purchase such insurance on behalf of the Contractor and shall be entitled to be reimbursed by the Contractor upon demand.

§ 11.1.6 When any required insurance, due to the attainment of a normal expiration date or renewal date, shall expire, the Contractor shall supply the Owner with Certificates of Insurance and amendatory riders or endorsements that clearly evidence the continuation of all coverage in the same manner, limits of protection, and scope of coverage as was provided by the previous policy. In the event any renewal of replacement policy, for whatever reason obtained or required, is written by a carrier other than that with whom the coverage was previously placed, or the subsequent policy differs in any way from the previous policy, the Contractor shall also furnish the Owner with a certified copy of the renewal or replacement policy unless the Owner provides the Contractor with prior written consent to submit

only a Certificate of Insurance with endorsements for any such policy. All renewal and replacement policies shall be in form and substance satisfactory to the Owner and written by carriers acceptable to the Owner.

§ 11.1.7 Any aggregate limit under the Contractor's liability insurance shall, by endorsement, apply to this project separately.

§ 11.1.8 The Contractor shall cause each Subcontractor to (i) procure insurance reasonably satisfactory to the Owner and (ii) name the Indemnities as additional insureds under the Subcontractor's commercial general liability policy. The additional insured endorsement included on the Subcontractor's commercial general liability policy shall state that coverage is afforded the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor. If the additional insureds have other insurance that is applicable to the loss, such other insurance shall be on an excess or contingent basis. The amount of the insurer's liability under this insurance policy shall not be reduced by the existence of such other insurance.

§ 11.1.9 The commercial general liability and automobile liability insurance policies shall be endorsed to name the Owner and Engineer as additional insured.

§ 11.1.10 The certificates of insurance for Contractual Liability-Residual Coverage Insurance as required under the Contract Document shall include the following statement: "Includes Contractual Liability Coverage for Hold Harmless Agreement in Contract."

§ 11.1.11 The Contractor's Public Liability Policies covering property damage shall include an "Installation Floater or Rigger's Insurance Policy" covering the full amount of any damage to machinery and equipment. Property damage insurance coverage shall include explosion, collapse and underground hazards.

§ 11.1.12 Contractor's policies shall include Blasting Coverage. Blasting insurance shall be provided for the full term of the contract.

§ 11.1.13 The Contractor shall provide All Risk Builder's Insurance, including but not limited to fire, extended coverage, vandalism and malicious mischief, collapse, flood and earthquake to be furnished by the Contractor. This insurance shall be in the name of the Owner, the Engineer, the Contractor, and Subcontractors and shall cover the work, materials and equipment which are on the site and incorporated or to be incorporated in the work to the full extent of their insurable value. Before work is started, the Contractor shall furnish the Owner and the Engineer a Certificate of Insurance and a copy of the endorsement showing evidence that the interests of all parties mentioned above are protected by the policy in a like manner as the Contractor and that they are not subject to subrogation by the insurance company. Any loss caused by hazards insured by this All Risk Builder's Insurance and not covered due to the application of deductibles shall be for the amount of the Contractor. The Owner may elect to provide this All Risk Builder's Insurance through the South Carolina General Services Agency and reserves that right. If Owner so exercises this right, any amounts paid by Owner shall be immediately reimbursed by Contractor.

## § 11.2 OWNER'S LIABILITY INSURANCE

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

## § 11.3 PROPERTY INSURANCE

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

§ 11.3.1.1 Property insurance shall be on an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Engineer’s and Contractor’s services and expenses required as a result of such insured loss. In the event that Owner is to provide property insurance, such property insurance provided by the Owner shall not cover any tools, apparatus, machinery, scaffolding, hoists, forms, staging, shoring, and other similar items commonly referred to as construction equipment that may be on the site and the capital value of which is not included in the Work. The Contractor shall make its own arrangements for any insurance it may require on such construction equipment. Any such policy obtained by the Contractor under this Subparagraph 11.3.1 shall include a waiver of subrogation in accordance with the requirements of Subparagraph 11.3.7

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

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles. Notwithstanding, if the cause of any loss payment under such insurance is the fault of the Contractor, then the Contractor shall pay such deductible.

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

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

#### § 11.3.2 BOILER AND MACHINERY INSURANCE

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

#### § 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused to the extent (i) of actual recovery of any insurance proceeds under policies obtained pursuant to this Subparagraph 11.3.3 and (ii) permitted by the applicable policies of insurance..

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

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section

11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

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

#### § 11.3.7 WAIVERS OF SUBROGATION

If permitted by the Owner's and Contractor's insurance companies, without penalties, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Engineer, Engineer's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner in good faith. The Owner or Contractor, as appropriate, shall require of the Engineer, Engineer's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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

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

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

#### § 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish a Performance Bond and Labor and Material Payment Bond meeting all statutory requirements of the State of South Carolina, in form and substance satisfactory to the Owner and, without limitation, complying with the Bidding/proposal documents and the following specific requirements:

- .1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.

- .2 Bonds shall be executed by a responsible surety licensed in the State of South Carolina, and shall remain in effect for a period not less than two (2) years following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer. All Bonds shall be issued by sureties named in the current 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 Audit Staff Bureau of Accounts, U. S. Treasury Department.
- .3 The Performance Bond and the Labor and Material Bond shall each be in an amount equal to the Contract Sum and all subsequent increases. Multiple sureties will not be permitted for any given bond.
- .4 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.
- .5 Every bond under this Subparagraph 11.4.1 must display the Surety's Bond Number. A rider including the following provisions shall be attached to each Bond:
  - (i) The Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Any addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder, and notice to the Surety of such matters is hereby waived.
  - (ii) The Surety agrees that it is obligated under the bonds to any successor, grantee, or assignee of the Owner.

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

§ 11.4.3 The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of, (i) notice of changes in the Work; (ii) request for reduction or release of retention; (iii) request for final payment; and (iv) any other item required by the Surety. The Owner shall be notified by the Contractor, in writing, of all communications with the Surety. The Owner may, in the Owner's sole discretion, inform the Surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interests, privileges, and benefits under and pursuant to any bond issued in connection with the work.

§ 11.4.4 If Contractor fails to begin the work under the contract within the time specified, or the progress of the work is not maintained on schedule, or the work is not completed within the time specified in the Contract Documents, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the Contractor shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the Owner may give notice in writing, sent by certified mail, return receipt requested, to the Contractor and his surety of such delay, neglect or default, specifying the same, and if the Contractor within a period of fifteen (15) days after such notice shall not proceed in accordance therewith, then Owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified.

§ 11.4.5 In the event the surety shall fail to take over the work to be done under this contract within fifteen (15) days after being so notified and notify the Owner in writing, sent by certified mail, return receipt requested, that surety is

taking the same over and stating that surety will diligently pursue and complete the same, the Owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said Contractor, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in Owner's opinion shall be required for the completion of said contract in an acceptable manner. In such an event, all costs and charges incurred by the Owner, together with the costs of completing the Work under the Contract Documents, shall be deducted from any monies due or which may become due said Contractor and surety. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said Contractor, then the said Contractor and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of said excess pursuant to the General Terms and Conditions.

#### § 11.5 GENERAL REQUIREMENTS

§ 11.5.1 All insurance coverage procured by the Contractor shall be provided by insurance companies having policy holder ratings no lower than "A" and financial ratings not lower than "XII" in the *Best's Insurance Guide*, latest edition in effect as of the date of the Contract, and subsequently in effect at the time of renewal of any policies required by the Contract Documents.

§ 11.5.2 If the Owner or the Contractor is damaged by the failure of the other party to purchase or maintain insurance required under Article 11, then the party who failed to purchase or maintain the insurance shall bear all reasonable costs (including attorneys' fees and court and settlement expenses) properly attributable thereto.

### ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

#### § 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered that the Engineer has not specifically requested to examine prior to its being covered, the Engineer may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

#### § 12.2 CORRECTION OF WORK

##### § 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense. If prior to the date of Substantial Completion the Contractor, a Subcontractor, or anyone for whom either is responsible uses or damages any portion of the Work, including without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to Owner. In addition, the Contractor shall promptly remedy damage and loss arising in conjunction with the Project caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable and for which the Contractor is responsible.

##### § 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within two (2) years after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents,

any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the two (2) year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Engineer, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The two (2) year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 Upon completion of any Work under or pursuant to this Paragraph 12.2, the two (2) year correction period in connection with the Work requiring correction shall be renewed and recommence. The obligations under Paragraph 12.2 shall cover any repairs and replacement to any part of the Work or other property that is damaged by defective Work.

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

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

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two (2) year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### § 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 GOVERNING LAW

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

### § 13.2 SUCCESSORS AND ASSIGNS

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

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender or other entity providing construction financing or credit enhancement for the Project. The Contractor shall execute all consents reasonably required to facilitate such assignment.

### § 13.3 WRITTEN NOTICE

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

### § 13.4 RIGHTS AND REMEDIES

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

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

### § 13.5 TESTS AND INSPECTIONS

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

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

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Engineer's services and expenses shall be at the Contractor's expense. The Contractor also agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work, and costs of testing services related to remedial operations performed to correct deficiencies in the Work, shall be done by the Contractor.

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

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

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

§ 13.5.7 The authorized representative and agents of the Environmental Protection Agency, the South Carolina Department of Health and Environmental Control, and any other interested governmental agency shall have access to the work at all times and shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records. Contractor shall provide proper facilities for the access and inspection of the Work by such persons.



**§ 13.6 INTEREST**

No interest shall be paid by Owner.

**§ 13.7 GENERAL PROVISIONS**

§ 13.7.1 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Titles of articles, paragraphs and subparagraphs are for convenience only and neither limit nor amplify the provisions of this Contract in itself. The use herein of the word “including,” when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters, whether or not non-limiting language (such words as “without limitation,” or “but not limited to,” or word of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term, or matter.

§ 13.7.2 Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable. Should a provision be declared ineffective, the parties agree that such provision will be stricken, replacing it with an effective provision that most nearly effectuates the intent of the ineffective provision.

§ 13.7.3 Each party agrees to do all acts and things and to make, execute, and deliver such written instruments, as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

§ 13.7.4 Any specific requirement in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor’s responsibilities or obligations shall not be construed to diminish, abrogate, or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

**§ 13.8 NO ORAL WAIVER**

§13.8.1 The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified in any respect except by a writing signed by Owner. No person is authorized on behalf of Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents or any of the Contractor’s duties or obligations under or arising out of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters stated in the writing signed by the Owner, and shall not relieve Contractor of any other of the duties and obligations under the Contract Documents. No “constructive” changes shall be allowed.

**§ 13.9 EQUAL OPPORTUNITY CLAUSE**

§13.9.1 Where required by law, the non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the secretary of Labor, are incorporated herein.

**§ 13.10 RECORD KEEPING**

§13.10.1 Contractor shall maintain reasonable records reflecting all financial transactions between the Parties resulting from the Agreement and regarding the performance of the Services.

§13.10.2 Contractor will cooperate with all regulatory audits and will cooperate with Owner in connection with any audits of Owner that relate to the Agreement. Upon five (5) business days advance notice (unless a governmental agency requires that less notice be allowed in a particular circumstance in which case Contractor will use all reasonable efforts to comply with the shortened notice period), Contractor shall provide to Owner, its auditors (including internal audit staff and external auditors), inspectors, regulators and other Owner representatives as Owner may from time to time designate in writing, direct necessary access during regular business days and hours to

any data, books and records directly related to the Project for the purpose of performing audits, inspections or compliance reviews of either Contractor or any of its subcontractors to:

- .1 verify the accuracy of charges and payments and conformity to the commitments and obligations of Contractor under this Agreement; and
- .2 verify the integrity and performance of the materials and installation.

§13.10.3 Contractor shall provide to such auditors, inspectors, regulators, and other Owner representatives such assistance as they reasonably require. Contractor shall cooperate fully with Owner or its designees in connection with audit functions and with regard to examinations by regulatory authorities. Notwithstanding anything to the contrary in this Agreement, Contractor will not be required to provide access to the proprietary data of Contractor that does not relate to the Owner engagement.

### § 13.11 CONFLICTS OF INTEREST

§13.11.1 Except with the Owner's knowledge and consent, the Contractor shall not engage in any activity, or accept any employment, interest or contribution that would reasonably appear to compromise the Contractor's professional judgment with respect to this Project.

§13.11.2 The Contractor warrants and represents that neither the Contractor, nor its principals or employees, shall use information and data relating to this Project or the planning thereof, its location and capacities as well as any other information to or for its own benefit, personal or corporate, either directly or indirectly, and that as near as is practical, such information shall be held in confidence until released to the general public by the Owner. The Contractor warrants and represents that neither the Contractor, nor its principals or employees, shall benefit, directly or indirectly, from the location or siting of any line, adjuncts or treatment facilities involved in this Project, nor from the acquisition of property or rights-of-way necessary to this Project, except as to property owned and purchased prior to knowledge of the location of this Project. The Contractor further warrants and represents that any Ownership interest or financial interest of every kind and nature of any amount which the Contractor, its principals or employees, may have in any property which may be affected by this Project is set forth in a full, written disclosure to Owner.

### § 13.12 ABSENCE OF CERTAIN COMMERCIAL PRACTICES

§13.12.1 Contractor and any Subcontractors or Sub-subcontractors acknowledge that neither they nor any officer, director, employee or agent (nor any person acting on behalf of any of the foregoing), has given or agreed to give any gift or similar benefit, including, without limitation, any contribution, payment or expenditure, of more than nominal value to any customer, supplier, or other governmental employee or official or any other person who is or may be in a position to help or hinder Contractor including in the securing of this contract.

### § 13.13 PUBLIC RECORD

§13.13.1 The Parties understand that Owner is subject to the South Carolina Freedom of Information Act, ("FOIA") S.C. Code Ann. §§ 30-4-10, et seq. However, to the extent that any information disclosed to Owner in connection with this Agreement is exempt from disclosure under, *inter alia*, S.C. Code Ann. §§ 30-4-40 (a)(1) (trade secrets), (a)(2) (information of a personal nature where the public disclosure thereof would constitute unreasonable invasion of personal privacy), (a)(5) (documents incidental to proposed contractual arrangements under consideration) and (a)(5)(c) (confidential proprietary information provided to a public body for economic development or contract negotiations purposes), Owner agrees not to disclose said exempt material.

§13.13.2 Provided, however, that any documents or information provided Owner by Contractor which may fall under any FOIA exemption must be marked on each page (or section thereof) indicating that it is exempt.

§13.13.3 Contractor recognizes that documents subject to the "proposed contractual negotiation" exemption under S.C. Code Ann. § 30-4-40(a)(5) only applies while the Agreement is under consideration, and that after this Agreement becomes effective, documents formerly exempt under this section will no longer be exempt from FOIA.

§13.13.4 Owner is under no duty to withhold documents for which an exemption is erroneously asserted. Contractor shall be responsible for clearly marking any information it deems proprietary based on provisions of the Freedom of Information Act. Owner assumes no responsibility for the release of information not clearly and properly labeled as exempt under the FOIA.

#### § 13.14 PERSONAL LIABILITY/NO THIRD PARTY BENEFICIARIES

§13.14.1 Nothing in the Contract Documents shall be construed as creating any personal liability on the part of any officer or agent of the Owner, nor shall it be construed as giving any rights or benefits hereunder to anyone other than the Owner and the Engineer.

§13.15 **Force Majeure.** Any delays in, or failure of, performance by ReWa or Engineer shall not constitute breach hereunder, if and to the extent such delays or failures of performance are caused by Acts of God or the public enemy; expropriation or confiscation of facilities; compliance with any order or request of, or other action taken by, any governmental (including judicial) authority; act of war; rebellion, sabotage or damage resulting therefrom; fires, floods, hurricanes, ice storms, tornado, and other like storms and disasters, explosions, calamities, accidents; riots, strikes, labor disputes or shortages, or other concerted acts of workmen, whether direct or indirect and whether foreseen or unforeseen; acts or omissions of the other Party in conflict with the terms of this Agreement; or any causes whether or not of the same class or kind as those specifically named, which are not within the control of that, and which by the exercise of reasonable diligence, that Party is unable to prevent (collectively, "Force Majeure").

### ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

#### § 14.1 TERMINATION BY THE CONTRACTOR

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

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

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

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

#### § 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

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

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

#### § 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

#### § 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including without limitation, anticipated profits. The Owner shall be credited for (i) payments previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Owner has against the Contractor under the Contract, and (iii) the value of the materials, supplies, equipment, or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

### ARTICLE 15 CLAIMS AND DISPUTES

**§ 15.1 CLAIMS****§ 15.1.1 DEFINITION**

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

**§ 15.1.2 NOTICE OF CLAIMS**

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Engineer, if the Engineer is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. However, the claimant shall use its best efforts to furnish the Engineer and the other party, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such a claim is recognized, and shall cooperate with the Engineer and the party against whom the claim is made in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of such a Claim. Claims may also be reserved in writing within the time limits set forth in this Subparagraph 15.1.2. If a claim is reserved, the Resolution of Claims and Disputes procedures described in Article 15 shall not commence until a written from the claimant is received by the Engineer. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the claim and include data and information then available to the claimant that will facilitate prompt verification and evaluation of the Claim.

**§ 15.1.3 CONTINUING CONTRACT PERFORMANCE**

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

**§ 15.1.4 CLAIMS FOR ADDITIONAL COST**

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

**§ 15.1.5 CLAIMS FOR ADDITIONAL TIME**

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

**§ 15.1.5.2** If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be addressed pursuant to the provisions of Paragraph 8.3.

**§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES**

Except to the extent covered by the valid and collectible insurance required respectively to be carried by the Contractor or Owner under Article 11, the Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract; provided, however, that in no event shall this mutual waiver be deemed to preclude (i) an award of liquidated damages recoverable under the Agreement; (ii) the use of diminished income stream in the calculation of "diminution of value" of the Work, in the event the Owner exercises its rights under Paragraph 12.3 to reduce the Contract Sum by an appropriate amount; or (iii) the obligation of the Contractor to reimburse the Owner for any fines from governmental entities or additional costs and expenses for the Engineer or other consultants, or separate contractors, arising out of any act or omission of the Contractor. The parties agree that would be difficult to determine the damages sustained by each party. The parties agree that the amounts contained in the Contract Documents as liquidated damages are the parties' good faith estimates of the harm caused by a delay in the completion of the Work or the Project. The above waiver is made upon the parties consent as to the enforceability of the liquidated damages provisions in the Contract Documents.

**§ 15.2 INITIAL DECISION**

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

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

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

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

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

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

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

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

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

§ 15.2.9 The decision of the Engineer in response to a claim shall not be a condition precedent to arbitration in the event (1) the position of the Engineer is vacant, (2) the Engineer has failed to render a decision within the agreed

time limits, (3) the Engineer has failed to take action required under Subparagraph 15.2.5 within thirty (30) days after the Claim is made, or (4) the Claim relates to a Construction lien.

### § 15.3 MEDIATION

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

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

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof. In no event shall any mediator in connection with a Claim be permitted to serve as an arbitrator for that, or any other, Claim that is not resolved pursuant to mediation.

### § 15.4 ARBITRATION

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

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

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

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

§ 15.4.4 The parties shall be entitled to discover all documents and information reasonably necessary for a full understanding of any legitimate issue raised in the arbitration. The parties may use all methods of discovery available under the Federal Rules of Civil Procedure and shall be governed thereby. Prior to the deposition of any expert witness, the party proposing to call such a witness shall provide a full and complete report by the expert, together with the expert's calculations and other data by which the expert reached any opinions concerning the subject matter of the arbitration. The report shall be provided no more than ten (10) days prior to the date set forth

in the expert witness's deposition. The Federal Rules of Evidence shall be applied by the arbitrator but liberally construed to allow for the admission of evidence that is helpful in resolving the controversy.

#### **§ 15.5 CONSOLIDATION OR JOINDER**

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

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

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

§ 15.5.4 LITIGATION To the extent that the prior, binding arbitration shall be deemed unenforceable, the parties agree that any dispute between them, whether or not relating to this Agreement, and whether arising in law, statute, or equity shall be resolved exclusively in the State Court of Common Pleas for the State of South Carolina, Greenville County or in the Federal Courts for the District of South Carolina, Greenville Division. Both parties consent to personal jurisdiction and venue in the selected venue and acknowledge that such location is the most convenient forum for the resolution of any such Claim or dispute.

### **ARTICLE 16 CONTRACTOR'S OBLIGATIONS WITH REGARD TO WORK**

#### **§ 16.1 SEQUENCING OF THE WORK**

§ 16.1.1 When the Work is related to existing wastewater flows, the Contractor shall conduct his work in a manner and sequence that will provide for the continued transportation of wastewater flows during construction. Any bypass, diversion or interruption of any wastewater flows required shall be performed in a manner that will prevent discharge (on the ground directly or indirectly into any water way or water supply) or back-up of the flow into private residences. Any lines, systems, or facilities constructed under this contract shall not be used to transport flow until approval is secured from the S. C. Department of Health and Environmental Control by the Contractor. Prior to beginning construction and when requested by Owner of the Engineer, the Contractor shall submit for the Engineer's review, a proposed construction sequence that outlines the Contractor's plan for maintaining flow and shall be furnished by the Contractor. Upon project completion the Contractor shall remove all temporary structures and equipment and repair all damage caused by such installation.

#### **§ 16.2 EXISTING UTILITIES**

§ 16.2.1 Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the Owner or by public or private utility companies. Contractor shall be solely liable for any damage to Owner's or third-parties' existing utility infrastructure caused by the Work.

§ 16.2.2 With particular respect to existing underground utilities, all available information concerning their location has been shown on the plans. While it is believed that the locations shown are reasonably correct, neither the Engineer nor the Owner can guarantee the accuracy or adequacy of this information.

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



utilities; however, the Contractor shall bear the entire cost of and responsibility for locating and avoiding or repairing damage to said existing utilities.

§ 16.2.4 The Contractor will locate all unknown metallic hazards and all underground utilities, namely buried pipe, metals, cabling etc. by using a locator device. Contractor's use of the locator device shall immediately precede the trench ditching and all hazards located and marked in such manner as to notify the machine operator of such hazard.

§ 16.2.5 When existing utilities or appurtenant structures, either underground or above ground are encountered, they shall not be displaced or molested unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Permanent or temporary relocation and replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense.

§ 16.2.6 Contractor shall advise the Owner and Engineer of all tie-ins that will be completed with existing utilities. In addition, Contractor shall be responsible for securing the approval and arranging for inspections by any utilities that must certify a "tie-in" or connection to existing utility infrastructure. To the extent Contractor will be establishing "tie-ins" to Owner's infrastructure, Contractor must coordinate said "tie-ins" and any necessary certifications with Owner. Contractor and Owner will cooperate on the attachment and location of any planned utility infrastructure. Contractor must meet and confer with the Owner and Engineer at least ninety (90) days before the planned Work.

### § 16.3 WORK TO BE EXECUTED BY CONTRACTOR'S FORCES

§ 16.3.1 Contractor shall execute on site, with Contractor's forces (exclusive of executive, supervisory and clerical forces), actual contract construction work equivalent to not less than fifty percent (50%) of the contract award price.

§ 16.3.2 Construction work shall consist of the Work accomplished on the site by laborers, mechanics, and foremen on Contractor's payroll and under Contractor's direct supervision. Cost of material and equipment installed by such labor may not be included in the above percent of work required to be performed by the Contractor. If, during the progress of the work hereunder, Contractor requests a change in activities of work to be performed by the Contractor's forces and the Owner determines it to be in his best interests, the Owner may, in its sole discretion, authorize a change in such activities of said work. Nothing contained herein shall permit a reduction in the percentage of work to be performed by the Contractor's forces, it being expressly understood that this is a contract requirement without right or privilege of reduction.

§ 16.3.3 In the event Contractor fails or refuses to meet the requirements of Paragraph 16.3, it is expressly agreed that the contract price will be reduced by fifteen percent (15%) of the value of that portion of the percentage requirement which is accomplished by others. For the purposes of this provision, it is agreed that fifteen percent (15%) is an acceptable estimate of the Contractor's overhead and profit, or markup, on that portion of the work which Contractor fails or refuses to perform, with Contractor's forces, in accordance with Paragraph 16.3.

### § 16.4 PROJECT COORDINATION MEETINGS

§ 16.4.1 For projects whose Contract Sum is under \$3,000,000.00, project coordination meetings will be handled as follows. The Contractor and any subcontractors, material suppliers, or vendors whose presence is necessary will attend project coordination meetings when requested by the Engineer for the purpose of discussing the execution of the Work. The Engineer will designate the time and the place for these meetings, which shall be within thirty (30) miles of the Project site. All decisions, instructions, and interpretations given by the Engineer at these meetings will be binding and conclusive on the Contractor and will be confirmed in writing by the Engineer. The proceedings of these meetings will be recorded by the Engineer, and the Contractor will be furnished with a reasonable number of copies for his use.

§ 16.4.2 For projects whose contract amount exceeds \$3,000,000.00, project coordination meetings will be handled as follows. The Contractor and any subcontractors, material suppliers, or vendors whose presence is necessary will attend project coordination meetings to be conducted monthly by the Engineer at the Project site. Project coordination meetings may be held more often than monthly if the Engineer so determines. The purposes of the project coordination meetings are for the Contractor and the Engineer to discuss the execution of the Work and for the Contractor to establish the current status of project completion and revise the construction schedule as necessary.

The Engineer will designate the time of the month when the project coordination will be held. All decisions, instructions, and interpretations given by the Engineer at these meetings will be binding and conclusive on the Contractor and will be confirmed in writing by the Engineer. The proceedings of these meetings will be recorded by the Engineer, and the Contractor will be furnished with a reasonable number of copies for his use. The Owner will attend the project coordination meetings if he so chooses.

**§ 16.4.3** The Contractor will participate in Project Coordination Meetings to be held on the site monthly, or more often if conditions warrant, to establish the current state of completion of the Work and revise the CPM Schedule as necessary. The Project Coordination Meeting will be conducted by the Engineer. Before each Project Coordination Meeting, the Contractor shall develop and refine detailed Near Term Schedules to aid in the short range implementation of the OPS. The Near Term Schedule shall depict day-to-day activities with committed completion dates which must be performed during the upcoming six to ten week period. These detailed schedules shall represent the Contractor's best approach to the work which must be accomplished to maintain progress consistent with Overall Project Schedule.

**§ 16.4.4** At each Project Coordination Meeting, the Contractor shall present and distribute to the Engineer a written report including: (1) job progress relative to the OPS, including an Early/Late Start, Early/Late Finish and Total Report; (2) updated Near Term Schedules, (3) a status review of the project, (4) problems encountered and action being taken to resolve them, (5) a Trend Chart showing project completion dates of significant areas of the project, (6) a listing of critical work to be performed prior to the next Project Coordination Meeting, (7) a listing of behind-schedule materials and equipment procurement activities, (8) a listing of any significant changes in the activities and restraints occurring since the last Project Coordination Meeting, (9) an up-dated relationship report with all activities and restraints shall be furnished if requested by the Engineer, and (10) a safety report in a form or in such a manner as requested by Owner or Engineer.

**§ 16.4.5** Contractor's failure to submit the required reports may be a cause for withholding of payment.

#### **§ 16.5 CONTRACTOR'S SCHEDULING OPERATIONS**

**§ 16.5.1** Contractor shall implement the detailed Near Term Schedule of activities to the fullest extent possible between Project Coordination Meetings.

**§ 16.5.2** If a current activity or series of activities on the OPS is behind schedule and if the late status is not due to an excusable delay for which a time extension would be forthcoming, the Contractor shall attempt to reschedule the activity to be consistent with the Overall Project Schedule so as not to delay any of the Contract milestones. The Contractor agrees that Contractor will attempt to expedite the activity completion so as to have it agree with the OPS. If, within two weeks of identification of such behind-schedule activity, the Contractor is not successful in restoring the activity to an on schedule status, he shall: (1) carry out the activity with the scheduled crew on an overtime basis until the activity is complete or back on schedule without a cost increase to the Owner; or (2) increase the crew size or add shifts so the activity can be completed as scheduled without a cost increase to the Owner; commit to overtime or increased crew sizes for subsequent activities, or some combination of the above as deemed suitable by the Engineer without a cost increase to the Owner. These actions shall be taken at no increase in the Contract amount.

#### **§ 16.6 SILTATION AND EROSION CONTROL**

**§ 16.6.1** Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be graded by Contractor to control erosion within acceptable limits. Temporary erosion and sediment control measures such as berms, dikes, silt fences, or drains, if required to meet the above standards, shall be provided and maintained by Contractor until permanent drainage and erosion control facilities are completed and operative.

**§ 16.6.2** Contractor shall use its reasonable best efforts to keep the area of bare soil exposed at any one time by construction operations to a minimum. Fills and waste areas shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams.

§ 16.6.3 Any land disturbing activity performed by the contractor(s) in connection with the project shall comply with all erosion control measures set forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with federal, state, and local law. Contractor's attention is drawn to the Standards for Stormwater Management and Sediment Reduction as promulgated by the South Carolina Department of Health and Environmental Control pursuant to the authority of S.C. Code § 48-18-10 *et seq.*, and enforced by the respective counties of South Carolina. Contractor shall comply with any additional requirements imposed by a County or other local government governing siltation and erosion control.

#### § 16.7 SALVAGE

§ 16.7.1 Materials indicated on the Drawings to be removed and salvaged for Owner shall be carefully removed and transported to the Owner's appropriate material storage yard. Contractor shall transport these salvage materials to the location specified in the Contract Documents or as specified by Owner or Engineer.

#### § 16.8 WORK INVOLVING EASEMENTS

§ 16.8.1 When the work to be performed is within an easement obtained by the Owner over the property of another, the contractor shall notify such other property owner over whose property the easement was obtained of the following: (i) that this Contractor has been awarded the work, giving the full and proper name of the Contractor and permanent address; (ii) the name, telephone number and address of the Contractor's representative in charge of the job; (iii) an estimate as to when work may be begun in the area; (iv) a description of the Contractor's responsibility as set forth below including a statement that the Contractor is directly responsible to such Owner for damages; and (v) that the Contractor, during and after construction, shall be responsible to such property owner and review any claim of damage to the property, and make such repairs as are required by this Contract.

EXHIBIT A

DESIGNATION OF PROJECT REPRESENTATIVES

*(To be attached following this Cover Page)*

EXHIBIT B

CONTRACTOR'S STANDARD FORM SUBCONTRACT

*(To be attached following this Cover Page)*

EXHIBIT C

CONSTRUCTION SCHEDULE

*(To be attached following this Cover Page)*

DIGITAL DATA PROTOCOL

AIA DOCUMENT E201 (2007) AS MODIFIED BY THE PARTIES

*(To be attached following this Cover Page)*

CONTRACT FOR CONSTRUCTION

AIA DOCUMENT A101 (2007) AS MODIFIED BY THE PARTIES

*(To be attached following this Cover Page)*



**THIS AGREEMENT IS SUBJECT TO ARBITRATION PURSUANT TO THE SOUTH CAROLINA  
UNIFORM ARBITRATION ACT.: SC CODE ANN. §15-48-10 ET SEQ. AND THE FEDERAL  
ARBITRATION ACT 9 U.S.C. 1 ET SEQ.**

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

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

Renewable Water Resources “ReWa”, a special purpose district and political subdivision of the State of South Carolina  
561 Mauldin Road  
Greenville, South Carolina 29607  
Telephone Number: (864) 299-4000

and the Contractor:  
*(Name, address and other information)*

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

Richland Creek Trunk Sewer Upgrade

The Engineer:  
*(Name, address and other information)*

Brown and Caldwell  
3800 Fernandina Rd  
Suite 100  
Columbia, SC 29210  
Telephone Number: (803) 873-9701

The Owner and Contractor agree as follows.

## TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
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9	ENUMERATION OF CONTRACT DOCUMENTS
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## ARTICLE 1 THE CONTRACT DOCUMENTS

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

## ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. Except as expressly provided for in the Contract Documents to the contrary, the Contractor at its sole cost, risk, and expense shall construct, equip, provide, purchase, pay for, and furnish all of the Work in accordance with the Contract Documents and governmental/regulatory codes and regulations as they apply to the performance of the Work.

## ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner to the Contractor in writing, which shall be issued no less than fifteen (15) days prior to the date of commencement..

*(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)*

The commencement date will be fixed in a notice to proceed.

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

§ 3.3 The Contractor shall achieve from the date of commencement, completion of the Work not later than **four hundred eighty** ( **480** ) days for substantial completion and **five hundred forty** ( **540** ) days final completion, or as follows:

*(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)*

§ 3.4 The Contractor acknowledges and recognizes that the Owner is entitled to full and beneficial occupancy an use of the completed Work following expiration of the Contract Time and that the Owner has entered into, or will enter into, binding agreements regarding all of part of the Project where the Work is to be completed based upon the Contractor's achieving Substantial Completion of the Work within the Contract Time. The Contractor further acknowledges and agrees that if the Contractor fails to complete substantially or cause the Substantial Completion of portion of the Work within the Contract Time, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be extremely difficult to ascertain. Therefore, the Owner and the Contractor agree as set forth below in this Paragraph 3.4.

§ 3.4.1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the following per diem amounts commencing upon the first day of the following the expiration of the Contract Time and continuing until the actual Date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner will incur as a result of delayed completion of the Work.

**Substantial Completion Not Achieved:**

**1 or more days after expiration of Contract Time:                    \$1000 per day**

**Final Completion Not Achieved:**

**1 or more days after expiration of Contract Time:                    \$1000 per day**

§ 3.4.2 The Owner may deduct liquidated damages described in Subparagraph 3.4.1 from any unpaid amounts then or thereafter due the Contractor under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner, together with interest from the date of the demand at the lower of the South Carolina post-judgment statutory interest rate or the highest lawful rate of interest payable by the Contractor.

§ 3.4.3 The Contractor shall not be entitled to an extension of time nor to additional compensation until notice of such conduct or delay in the form of a request for information, letter, or other request is first given to Owner and Engineer, and the same remains uncured for forty-eight (48) hours thereafter.

§ 3.4.4 No extension of time shall be granted unless the Contractor shall demonstrate that the delay in completion of the Work was caused by a delay in a portion of the Work that was on the critical path of the Project. The completion time contemplated by this Agreement anticipates a certain number of lost days due to normal weather conditions. Only unusual or severe weather conditions, beyond the contemplation of the Contract Documents, will be considered as justification for a delay in completion of the Work.

**ARTICLE 4 CONTRACT SUM**

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

§ 4.2 The Contract Sum includes the following alternatives, which are described in the Contract Documents and may be accepted by the Owner in Writing; provided, however, that the Contractor shall furnish the Owner with no less than fourteen (14) days' prior written notice of the date upon which any of the alternatives set forth in the Paragraph 4.2 must be accepted by the Owner in order for the Contractor to perform the Work covered by such alternatives for the price set forth in this Paragraph 4.2 and without any adjustment to a Milestone Date or in the Contract Time.

*(State the numbers or other identification of accepted alternates. If the Bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*

N/A

§ 4.3 Unit Prices are set forth in the “Schedule of Unit Prices” attached hereto and made a part hereof as Exhibit A. Such Unit Prices are considered complete and include (i) all materials, equipment, labor, delivery, installation, overhead, and profit and (ii) any other costs or expenses in connection with, or incidental to, the performance of that portion of the Work to which such Unit Prices apply.

§ 4.4 Allowances are set forth in the “Schedule of Allowances” attached hereto and made a part hereof as Exhibit B.

## ARTICLE 5 PAYMENTS

### § 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment, including all required supporting documentation, submitted to the Owner and the Engineer by the Contractor and Certificates for Payment issued by the Engineer, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents, including, but not limited to, Article 9 of the General Conditions of the Contract.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Timing of the submission, approval, certification, and payment of an Application for Payment shall be as provided in the General Conditions and the Contract Documents.

*(Federal, state or local laws may require payment within a certain period of time.)*

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

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. An Application for Payment must comply with all requirements of the General Conditions. Contractor’s failure to comply with the requirements of the Contract Documents shall be grounds for Owner and/or Engineer to refuse the Application for Payment. In addition to the other required items, each Application for Payment shall be accompanied by all of the items required in Subparagraph 9.3.1.3 of the General Conditions of the Contract.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of **Ten percent (10.00%)**. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction, as amended by the parties;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of **Ten percent ( 10.00% )**;
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Engineer has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007, as amended by the parties.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Engineer shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and

*(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)*

- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007, as amended by the parties.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

*(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)*

Except as hereinafter provided, the Owner shall have the option, but not the obligation, to reduce the retainage requirements of this Agreement or release any portion of retainage prior to the date specified in the Contract Documents. Any reduction or release of retainage, or portion thereof, however, shall not be a waiver of (i) any of the Owner's rights to retainage in connection with other payments to the Contractor or (ii) any other right or remedy that the Owner has under the Contract Documents, under statute, at law, or in equity.

If the work is fifty percent (50%) complete (not including the value of stored material), the Contractor may request in writing to the Owner and the Engineer that retainage be reduced on all future Applications for Payment. The Engineer will have fifteen (15) calendar days to review the Contractor's request and to either approve or reject the request in writing. The criteria on which the Engineer will base his decision are as follows:

- (a) The job must be progressing on time and in accordance with the Contractor's CPM schedule.
- (b) The dollar value of work completed must be greater than fifty percent (50%) of the total contract amount. This dollar value of work completed will not include stored material.
- (c) There must be no other specific reason to maintain ten percent (10%) retainage.

If the Engineer approves the request, Engineer will inform the Owner of the suggested amount of the reduction. The reduction will not exceed five (5%) percent. The Owner may or may not grant the request in its sole discretion, however, the Owner will notify the Engineer of his decision in writing within fourteen (14) days of the receipt of the Engineer's recommendation.

If the Owner approves of the retainage reduction, such reduction shall be made and will apply to all Applications for Payment submitted by the Contractor after the date of approval.

The Owner may reinstate up to the original ten percent (10%) withholding if the Owner determines, at its discretion, that the Contractor is not making satisfactory progress towards Substantial Completion or Final Completion or there is another specific cause for such withholding.

Payments will be made in accordance with the terms of the Contract Documents.

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

## § 5.2 FINAL PAYMENT

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment;

- .2 a final Certificate for Payment has been issued by the Engineer;
- .3 all punch list items have been completed to the Owner's satisfaction;
- .4 all certifications and inspections have been completed, passed, and received from any governmental or regulatory body having authority over the Work;
- .5 Contractor has submitted a marked set of field record drawings reflecting "as-built" conditions;
- .6 Contractor has provided all maintenance, service, and operating manuals as required by the General Conditions of the Contract; and
- .7 Contractor has met all of the requirements of Paragraph 9.10 of the General Conditions of the Contract.
- .8 Contractor has resolved any outstanding disputes with subcontractors relating to the Project and as requested by Engineer has obtained claim/bond/lien releases.

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

As provided in Article 9 of AIA Document A201–2007, General Conditions of the Contract, as modified.

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 INITIAL DECISION MAKER

The Engineer will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, as modified, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Engineer.)*

As provided in Section 15.2 of AIA Document A201–2007, General Conditions of the Contract, as modified.

### § 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007 as modified, the method of binding dispute resolution shall be as provided in Article 15 of AIA Document A201–2007 as modified.

## ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007, as modified by the parties.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007, as modified by the parties.

§ 7.3 In addition to any other basis specified in the Contract Documents, the following shall constitute bases for termination by the Owner:

- .1 Contractor's failure to commence the Work in accordance with the terms of the Contract;
- .2 Contractor's failure to prosecute the Work, or any work reflected in a Change Order or Construction Change Directive in writing and agreed to by the Contractor in a diligent, efficient, workmanlike, skillful, and careful manner, and in accordance with the terms of the Contract Documents;
- .3 failure to use an adequate amount of quality personnel or equipment to complete the Project on schedule; or
- .4 failure to make prompt payments to Contractor's Subcontractors, material suppliers, and laborers.

These bases are in addition to those specified in Article 14 of the AIA A201 General Conditions as modified by the parties.

#### ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

*(Insert rate of interest agreed upon, if any.)*

Owner shall not be required to pay any late penalties or interest on any amounts claimed to be overdue.

§ 8.3 The Owner's representative:

*(Name, address and other information)*

As specified in Exhibit A to AIA Document A201–2007, General Conditions of the Contract, as modified.

§ 8.4 The Contractor's representative:

*(Name, address and other information)*

As specified in Exhibit A to AIA Document A201–2007, General Conditions of the Contract, as modified.

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

#### § 8.6 WARRANTIES

§ 8.6.1 The Contractor represents and warrants the following to the Owner (in addition to any other representations and/or warranties contained in the Contract Documents), as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of this Agreement, and the final Completion of the Work:

- .1 that it and its Subcontractors are financially solvent, able to pay all debts as they mature, and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;
- .2 that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;
- .3 that it is authorized to do business in the State of South Carolina and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;
- .4 that its execution of this Agreement and its performance thereof is within its duly authorized powers;
- .5 that its duly authorized representative has visited the site of the Project, familiarized him/herself with the local and special conditions under which the Work is to be performed, and correlated his/her observations with the requirements of the Contract Documents; and
- .6 that it possesses a high level of experience and expertise in the business administration, construction, construction management, and superintendence of projects of the size, complexity,

and nature of this particular Project, and it will perform the Work with the care, skill, and diligence of such a contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations, and performance hereunder. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

#### **§ 8.7 WORKING HOURS**

**§ 8.7.1** No work shall be done between the hours of 5:00 pm ET and 7:00 am ET (Monday through Friday) without the permission of the Owner. No work shall be done from 5:00 pm ET Friday until 7:00 am ET Monday (the weekend) without the permission of Owner. Owner, except as provided in this section 8.7, shall not be responsible for any overtime work performed on the Project. Any requests for overtime shall be received by Owner a minimum of five (5) working days before the requested overtime work is to begin. Nothing herein shall be construed as a prohibition on overtime work during emergencies, as defined herein.

**§ 8.7.2** Night Work (occurring between the hours of 5:00 pm ET and 7:00 am ET) shall not be a regular procedure. However, Night Work may be undertaken as a regular procedure with the express, written permission of the Owner. Owner's permission, however, may be revoked at any time in Owner's sole discretion. Owner shall revoke the permission granted for Night Work if Contractor fails to maintain adequate equipment and supervision for the proper, workmanlike prosecution and control of the Work.

**§ 8.7.3** Except in an emergency, in no event shall Contractor perform Work in any easements that lie within one-quarter (1/4) mile of a residence, during the period from two hours after sunset until one hour before sunrise ("Daylight Hours"), Monday through Saturday. Except in an emergency, in no event shall Work be performed on a Sunday if within one-quarter (1/4) mile of a residence, church, synagogue, temple, mosque, or other place of worship.

**§ 8.7.4** If the Contractor works more than eight (8) hours per day or forty (40) hours per week, Contractor shall reimburse Owner for overtime on account of overtime inspection and supervision costs. Engineer and Owner shall be solely responsible for determining if overtime inspection and supervision is required. In determining the overtime costs that will be passed on to Contractor, they shall be all charged incurred by Owner. For purposes of estimating costs or fixing sums to be paid by Owner to Contractor, the Contractor shall assume that both Engineer and Owner will provide an inspector at all times when the Contractor or any subcontractor is performing any Work or is present on the site of the Project. For estimating purposes, the Contractor shall assume that 1.5 hours of engineer's project representative's time will be charged for each hour of overtime that the Contractor is on the jobsite." Contractor shall insure that a project superintendent is on-site during the performance of any Work by Contractor or any subcontractors, including during Night Work or overtime Work.

#### **ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS**

**§ 9.1** The Contract Documents, except for Modifications issued after execution of this Agreement are enumerated in the sections below.

**§ 9.1.1** The Agreement is this executed, AIA Document A101–2007, as modified, Standard Form of Agreement Between Owner and Contractor.

**§ 9.1.2** The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction as modified by the Parties.

**§ 9.1.3** The entire volume of Contract Documents as bound by the Owner, which includes any Addenda (which pertain to the Contract Documents), the Contractor's Bid or Proposal (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), the Bonds, the Notice of Award, the Notice to Proceed, these General Conditions, the Supplemental Conditions, any Supplemental or Additional Conditions, the Specifications, the Drawings, together with all Modifications issued after the effective date of the Agreement.



§ 9.1.4 The Specifications:

*(Either list the Specifications here or refer to an exhibit attached to this Agreement.)*

Title of Specifications exhibit: Specifications, Exhibit C

§ 9.1.5 The Drawings:

*(Either list the Drawings here or refer to an exhibit attached to this Agreement.)*

Title of Drawings exhibit: Schedule of Drawings, Exhibit D

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- 1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following: N/A

## ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007, as modified.

*(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007, as modified.)*

Type of insurance or bond	Limit of liability or bond amount (\$ 0.00)
Workers' Compensation and Employer's Liability -Workers' Compensation -Employer Liability	Statutory Limits \$1,000,000 per occurrence/\$1,000,000 aggregate
Commercial General Liability -Contractor's Public Liability -Contractor's Protective (contingent) liability -Contractual Liability (broad form) -Broad Form Contractual Coverage -Projects/Completed Operation Liability -Personal Injury and Liability -Property Damage Liability (broad form)	Each Policy, individually: \$1,000,000 per occurrence, \$2,000,000 aggregate.  (NOTE: the above CGL policy shall include coverage for explosion, collapse, and underground (XCU) hazards, and loss arising from nuisance, taking, whether inverse or direct taking or negligence).  Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.
Comprehensive Automobile General Liability including owned, non-owned, and hired vehicles (Business auto liability, symbol 1)	Bodily Injury and Property Damage, \$1,000,000 each occurrence
Umbrella Liability policy	\$5,000,000 per occurrence

(Comprehensive Umbrella—excess of all coverages above)	
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Pollution Liability	\$2,000,000 per occurrence

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

\_\_\_\_\_  
OWNER (*Signature*)  
Ray T. Orvin, Executive Director  
\_\_\_\_\_  
(*Printed name and title*)

\_\_\_\_\_  
CONTRACTOR (*Signature*)  
\_\_\_\_\_  
(*Printed name and title*)

EXHIBIT A

SCHEDULE OF UNIT PRICES

*(To be attached following this Cover Page)*

EXHIBIT B

SCHEDULE OF ALLOWANCES

*(To be attached following this Cover Page)*

EXHIBIT C

SPECIFICATIONS

*(See Sections 01010 et. seq. of the Contract Documents (“Technical Specifications”),  
incorporated herein by reference)*

EXHIBIT D

SCHEDULE OF DRAWINGS

*(See Section 00910 of the Contract Documents (“Schedule of Drawings”),  
incorporated herein by reference)*

SUPPLEMENTAL CONDITIONS

INSERT

ADDENDA

*(To be attached following this Cover Page, As Issued)*



CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned attorney, the duly authorized and acting legal representative of Renewable Water Resources "ReWa", do hereby certify as follows:

I have examined the attached contract(s), surety bonds, and certificate of insurance with endorsements and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

\_\_\_\_\_  
Attorney for Renewable Water Resources

\_\_\_\_\_  
Date

**NOTE:** This Certificate must be obtained prior to final delivery of the executed contract to the Contractor and prior to the issuance of the Notice to Proceed. Allow a minimum of five (5) days for review by the Attorney.

At the time this certificate is presented to the Owner's Attorney, the following shall also be presented for final review:

1. Executed copies of all documents, except plans and specifications.
2. Bid Bond, Performance Bond and Payment Bond which are:
  - a. On the Owner's Forms;
  - b. Not to be dated prior to the date stated as the "Effective Date" of the Contract (applies to the Performance Bond and Payment Bond);
  - c. By a surety listed upon U.S. Treasury Department's most current list (Circular 570, as amended);
  - d. Reflect a Power of Attorney or an Attorney-in-Fact registered in South Carolina.
3. Minutes of the Authority authorizing the execution of the Contract by the person signing.
4. A copy of a corporate resolution, partnership agreement, power of attorney, or other documentation which authorized the Contract and authorizes and identifies the person signing on behalf of the contracting entity. If a sole proprietorship, a certificate by the owner of that fact is to be furnished. If a partnership, a certificate of that fact is to be supplied by every partner.
5. If the Contractor is a non-resident, compliance (including execution of the attached affidavit) must be shown with S.C. Code Ann. §12-8-550, quoted here:

A person hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within this State shall withhold two percent of each payment in which the South Carolina portion of the contract exceeds or could reasonably be expected to exceed ten thousand dollars. This section does not apply to a nonresident which registered with the Secretary of State or the Department of Revenue and by that registration agreed to be subject to the jurisdiction of the department and the courts of this State to determine its South Carolina tax liability, including withholding and estimated taxes, together with any related interest and penalties. Registering with the Secretary of State or the department is not an admission of tax liability nor does it require the filing of an income tax or franchise (license) tax return. If the person hiring, contracting, or having a contract with a nonresident obtains an affidavit from the nonresident stating that the nonresident is registered with the department or with the Secretary of State, the person is not responsible for the withholding.

6. Documentation (including execution of the attached affidavit) demonstrating Renewable Water Resources will not bear the burden of withholding and accounting and requires any such out-of-state contractor to seek and obtain such a bond so that withholding will not be necessary. Proof of such a bond must be submitted to the Owner prior to any payments being made to the Contractor and must be submitted prior to certification by Owner's attorney.

NOTICE TO PROCEED

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Project Description: Richland Creek Trunk Sewer Upgrade Project

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

You are hereby notified to commence Work in accordance with the Agreement dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ on or before the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and you are to complete the Work within 540 consecutive calendar days thereafter.

The date of completion of all Work is therefore the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**Renewable Water Resources**

\_\_\_\_\_  
By: Ray T. Orvin, Jr.  
Title: Executive Director

Acceptance of Notice to Proceed

Receipt of the above Notice to Proceed is hereby acknowledged by \_\_\_\_\_  
\_\_\_\_\_,<sup>13</sup> this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

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

\_\_\_\_\_  
<sup>13</sup> Name of business receiving award

PAYMENT BOND

**KNOWN BY ALL MEN BY THESE PRESENTS** that:

\_\_\_\_\_  
(Name of Contractor)

with an address of:

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

a \_\_\_\_\_,<sup>14</sup> organized and existing under the laws of the state  
of \_\_\_\_\_,<sup>15</sup> hereinafter called the "Principal," and

\_\_\_\_\_  
(Name of Surety)

with and address of:

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

hereinafter called the "Surety," are held and firmly bound unto Renewable Water Resources "ReWa" with an address of 561 Mauldin Road, Greenville, South Carolina 29607, hereinafter called "Owner," in the penal sum of \_\_\_\_\_ (\$ \_\_\_\_\_) dollars in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal entered into a certain contract with the Owner, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of the:

Richland Creek Trunk Sewer Upgrade Project

**NOW, THEREFORE**, if the Principal shall promptly make payment to all persons, firms, subcontractors and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such contract, and any authorized extension or modification thereof, including all amounts due to materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment, and tools, consumed or used in connection with the construction of such

<sup>14</sup> Insert whether business is a sole proprietorship, partnership, limited liability company, corporation, etc.

<sup>15</sup> If sole proprietorship or partnership, insert the primary place of business. If a limited liability company or corporation, insert the state of formation or incorporation.

Work whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

**PROVIDED FURTHER**, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the Work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the Specifications.

**PROVIDED FURTHER**, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**IN WITNESS WHEREOF**, the above bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

This Bond being executed in three (3) counterparts.

**PRINCIPAL:**

**ATTEST (2 individuals):**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Principal: \_\_\_\_\_

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

Address: \_\_\_\_\_

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

\_\_\_\_\_  
Signature

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

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

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

*(CORPORATE SEAL)*

**SURETY:**

**ATTEST (2 individuals):**

\_\_\_\_\_

\_\_\_\_\_

Signature

Signature

Surety: \_\_\_\_\_

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

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

Signature

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

Its: Attorney-in-Fact (SC Resident)

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

*(CORPORATE SEAL)*

**NOTE:** Date of Bond must not be prior to date of Contract. If Contractor is partnership, all partners should execute Bond. **IMPORTANT:** Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of South Carolina. *Please see the detailed requirements of Paragraph 11.4 of the General Conditions.*

**NOTE:** If this Bond is executed by way of a power of attorney, an original of the power of attorney must be attached hereto stating the limits of that authority.

## PERFORMANCE BOND

**KNOWN BY ALL MEN BY THESE PRESENTS** that:

---

(Name of Contractor)

with an address of:

---



---

a \_\_\_\_\_,<sup>16</sup> organized and existing under the laws of the state  
of \_\_\_\_\_,<sup>17</sup> hereinafter called the "Principal," and

---

(Name of Surety)

with and address of:

---



---

hereinafter called the "Surety," are held and firmly bound unto Renewable Water Resources "ReWa" with an address of 561 Mauldin Road, Greenville, South Carolina 29607, hereinafter called "Owner," in the penal sum of \_\_\_\_\_ (\$ \_\_\_\_\_) dollars in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

**THE CONDITION OF THIS OBLIGATION** is such that whereas, the Principal entered into a certain contract with the Owner, dated the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of the:

**Richland Creek Trunk Sewer Upgrade Project**

**NOW, THEREFORE**, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the Owner, with or without notice to the Surety and during the two year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner

---

<sup>16</sup> Insert whether business is a sole proprietorship, partnership, limited liability company, corporation, etc.

<sup>17</sup> If sole proprietorship or partnership, insert the primary place of business. If a limited liability company or corporation, insert the state of formation or incorporation.

from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

**PROVIDED, FURTHER**, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the Work or to the Specifications.

**PROVIDED FURTHER**, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**IN WITNESS WHEREOF**, the above bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

This Bond being executed in three (3) counterparts.

**PRINCIPAL:**

**ATTEST (2 individuals):**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Principal: \_\_\_\_\_

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

Address: \_\_\_\_\_

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

\_\_\_\_\_  
Signature

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

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

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

*(CORPORATE SEAL)*

**SURETY:**

**ATTEST (2 individuals):**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature



Surety: \_\_\_\_\_

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

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Signature

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

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

Its: Attorney-in-Fact (SC Resident)

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

*(CORPORATE SEAL)*

**NOTE:** Date of Bond must not be prior to date of Contract. If Contractor is partnership, all partners should execute Bond. **IMPORTANT:** Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of South Carolina. *Please see the detailed requirements of Paragraph 11.4 of the General Conditions.*

**NOTE:** If this Bond is executed by way of a power of attorney, an original of the power of attorney must be attached hereto stating the limits of that authority.

CHANGE ORDER

**Owner:** Renewable Water Resources "ReWa"

Change Order Number: \_\_\_\_\_

**Project:** Richland Creek Trunk Sewer Upgrade

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

**Engineer:** Brown and Caldwell

Date of Submission to Engineer: \_\_\_\_\_

**The following changes are made to the Contract Documents (explain change and reason for change):**  
*(Attach any drawings or other documentation necessary to explain or demonstrate this change.)*

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

Original Contract Price: \$ \_\_\_\_\_.

Current Contract Price as adjusted by previous Change Orders: \$ \_\_\_\_\_.

Change to Contract Price from Previous Change Orders: \$ \_\_\_\_\_.

The Contract Price due to this Change Order will be (increased)/(decreased) by: \$ \_\_\_\_\_.

The new Contract Price including this Change Order will be: \$ \_\_\_\_\_.

The Contract Time will be (increased)/(decreased) by this many calendar days: \_\_\_\_\_ days

The date of completion of all the Work due under the Contract Documents will therefore be: \_\_\_\_\_, 20\_\_

THE CONTRACTOR AFFIRMS, REPRESENTS AND WARRANTS AS OF THIS DATE THAT THERE ARE NO OTHER OUTSTANDING CHANGE ORDERS REQUIRED BY THE CONTRACTOR, OR OUTSTANDING CLAIMS FOR ANY ADDITIONAL MONEY OR COSTS, INCLUDING IMPACT COSTS OR DAMAGES OR CLAIMS FOR TIME EXTENSION, OR CLAIMS OF ANY OTHER KIND OR NATURE AGAINST THE OWNER, EXCEPT THE FOLLOWING: (Describe separately here each and every claim, state the total dollar amount and/or time extension sought per claim alleged to be due from the Owner, and the status of the claim as of

this date to keep the status of claims current. **This must be done on each change order even though the claim may have been listed on prior change orders or payment requests.**

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**Requested by:** \_\_\_\_\_  
 (Requestor's Signature and Title)

on behalf of the Contractor pursuant to those provisions of the Contract Documents. *Contractor hereby certifies that its Bonding Company will be notified forthwith that the contract has been increased/decreased by the amount of this Change Order, and that a copy of the approved Change Order will be mailed upon Contractor's receipt by Contractor to Contractor's Surety.*

**Recommended by:** \_\_\_\_\_  
 (Engineer's Signature and Title)

on behalf of Brown and Caldwell pursuant to those provisions of the Contract Documents.

- |  |     |    |
|--|-----|----|
| 1.) Can Contractor mitigate this change without requiring a contract time extension?   | Yes | No |
| 2.) Are additional costs indicated by reason of the time extension?  | Yes | No |
| 3.) Is the Contractor's estimate of time and expenses reasonable?  | Yes | No |
| 4.) Does Engineer certify that it has reviewed all aspects of this Change Order and have determined that it is in the best interest of Owner to have the work accomplished? Does Engineer recommend acceptance by the Owner? | Yes | No |

**AGREED.**

**Renewable Water Resources "ReWa"**

**Contractor**

\_\_\_\_\_  
 Signature  
 By: \_\_\_\_\_  
 Its: \_\_\_\_\_  
 Date: \_\_\_\_\_

\_\_\_\_\_  
 Signature  
 By: \_\_\_\_\_  
 Its: \_\_\_\_\_  
 Date: \_\_\_\_\_

CONSTRUCTION CHANGE DIRECTIVE

**Owner:** ReWa

Construction Change Directive Number: \_\_\_\_\_

**Project:** Richland Creek Trunk Sewer Upgrade

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

**Engineer:** Brown and Caldwell

Date of Submission to Engineer: \_\_\_\_\_

**Description of Work Covered by this Directive** *(Attach any drawings or other documentation necessary to explain or demonstrate this change.):*

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

**Reason for the Directive:**

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

**Method of Adjustment:**

- Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation
- Unit prices stated in the Contract Documents or subsequently agreed upon
- Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee
- As provided in 00610 Section 7.3.7

**Details of Adjustment:**

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

**Adjustment Applied to:**

Contract Price

Original Contract Price: \_\_\_\_\_

Change to Contract Price from previous Change Directives: \_\_\_\_\_

Contract Price due to this Change Directive (differential) increased/decreased by: \_\_\_\_\_  
New Contract Price as adjusted by this Change Directive: \_\_\_\_\_

Contingency Allowance  
Original Contingency Amount: \_\_\_\_\_  
Change to Contingency from previous Change Directives: \_\_\_\_\_  
Contingency due to this Change Directive (differential) increased/decreased by: \_\_\_\_\_  
New Contingency as adjusted by this Change Directive: \_\_\_\_\_

**Adjustment to Contract Time:**

Contract time will be increased/decreased by: \_\_\_\_\_  
The date of completion of all the work due under the contract documents for this Subproject will therefore be: \_\_\_\_\_

The Contract Time will be increased/decreased by this many calendar days: \_\_\_\_\_  
The date of completion of all the work due under the contract documents will therefore be: \_\_\_\_\_

**Recommended by:** \_\_\_\_\_  
(Engineer's Signature and Title)

on behalf of Brown and Caldwell pursuant to those provisions of the Contract Documents, the Engineer recommends acceptance by the Owner for the following reasons:

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

**ReWa**

**Contractor**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

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

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

Its: \_\_\_\_\_

Its: \_\_\_\_\_

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

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

## APPLICATION FOR PAYMENT

**THIS IS A SAMPLE, THE PAY APPLICATION, PAYMENT BREAKDOWN, AND STORED MATERIALS LOG MUST BE COMPLETED IN ELECTRONIC FORM**Application for Payment Summary, Payment Breakdown,  
Stored Material Log, and Affidavit of Contractor**Owner:** Renewable Water Resources  
"ReWa"

Application for Payment Number: \_\_\_\_\_

**Project:** Richland Creek Trunk Sewer Upgrade

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

**Engineer:** Brown and Caldwell

Date of Submission to Engineer: \_\_\_\_\_

Total Contract Work Performed to Date: <b>(From Column H)</b>	\$ _____.
Current Value of Stored Materials:	\$ _____.
Total Change Order Work to Date:	\$ _____.
<b>Subtotal to Date:</b>	\$ _____.
Less ten (10%) percent Retainage:	\$ _____.
<b>Subtotal to Date less Retainage:</b>	\$ _____.
Less Previous Payments:	\$ _____.
<b>Amount Due this Payment Request Estimate:</b>	\$ _____.
Previous Retainage withheld to date (including for this Payment Request):	\$ _____.
Remaining Balance Due under Contract:	\$ _____.
<b>Total of Balance Due under the Contract plus Retainage to date (including for this Payment Request):</b>	\$ _____.

THE CONTRACTOR BY PRESENTING THIS PAY ESTIMATE STATES, REPRESENTS AND WARRANTS THAT AS OF THE DATE OF THIS REQUEST THERE ARE NO OUTSTANDING CLAIMS ON HIS BEHALF AGAINST THE OWNER FOR ANY ADDITIONAL MONEY, COSTS, OR DAMAGES, (INCLUDING IMPACT COSTS OR DAMAGES), OR CLAIMS ARISING FROM DELAY OR FROM THE DENIAL OR THE GRANTING OF TIME EXTENSIONS, OR FROM CLAIMS OF ANY OTHER KIND OR NATURE EXCEPT (A) FOR THAT REMAINING BALANCE SHOWN ABOVE TO BE DUE UNDER THIS CONTRACT, AND (B) FOR THE FOLLOWING:

(DESCRIBE HERE THE NATURE OF ANY SUCH CLAIMS, THE DATE EACH CLAIM AROSE, THE DATE NOTICE WAS GIVEN PURSUANT THE GENERAL CONDITIONS

AND SECTION 4 OF THE SUPPLEMENTAL CONDITIONS OF THIS CONTRACT, THE EXACT AND TOTAL DOLLAR AMOUNT CLAIMED, AND/OR WHETHER OR NOT A TIME EXTENSION IS CLAIMED, AND THE STATUS OF EACH CLAIM AS OF THIS DATE:

List here the following: (use supplemental pages if necessary)

	<b>Date Claim Arose</b>	<b>Date Written Notice Given</b>	<b>Requested Change in Price (if any)</b>	<b>Time Extension Requested (if any)</b>	<b>Nature of the Claim</b>	<b>Status of the Claim as of this Date</b>
1.			\$____.____	____ days		
2.			\$____.____	____ days		
3.			\$____.____	____ days		
4.			\$____.____	____ days		
5.			\$____.____	____ days		

Note: Notwithstanding any other provision of the contract and contract documents, the Contractor is required to give written notice of any claim pursuant to the General Conditions and Section 4 of the Supplemental Conditions, and the listing of the claim here and/or upon any change order form does not constitute either compliance with, or a waiver of, the requirement to file such written notice nor a waiver of the requirement that such claims be filed within the time periods specified therein. **Furthermore, the Contractor is again notified, instructed and advised that neither the Engineer nor any employee or officer of the Owner may waive these requirements as to notice. The failure to so list a claim upon this current pay estimate shall constitute a waiver of any claim not listed, and the claim shall be considered abandoned.**

**Application for Payment Number:** \_\_\_\_\_

**Project:** Richland Creek Trunk Sewer Upgrade Project

**Engineer:**

**SUBMITTED**

**Contractor**

\_\_\_\_\_  
Signature

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

Its: \_\_\_\_\_

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

**RECOMMENDED FOR APPROVAL**

**Engineer**

\_\_\_\_\_  
Signature

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

Its: \_\_\_\_\_

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

**APPROVED**

**Renewable Water Resources “ReWa”**

\_\_\_\_\_  
Signature

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

Its: \_\_\_\_\_

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



# PAYMENT BREAKDOWN

(Sample of Electronic Format)

PAYMENT BREAKDOWN

Continuation Sheets

**1**

Totals	Schedule of Value	\$ -	% Complete to Date #DIV/0!	\$ -	Work Previously Completed	\$ -	Work this Month	\$ -	Total Contract Work Performed to Date	\$ -	Balance to Finish	\$ -
Activity Number	Description	Schedule of Value	Complete to Date	\$	Work Previously Completed	\$	Work this Month	\$	Total Contract Work Performed to Date	\$	Balance to Finish	\$
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The following is a description of items required on the payment breakdown and storage material log:

NOTE: CONTRACTOR'S SUBMISSIONS **MUST COMPLY** WITH THESE REQUIREMENTS. A FAILURE TO COMPLY WITH THESE REQUIREMENTS WILL GIVE ENGINEER AND OWNER AN **ABSOLUTE RIGHT TO REJECT THE SUBMISSION** in accordance with the Contract Documents.

- THE PAYMENT BREAKDOWN

- Activity Number with Description: This column is to list activities which will be billed by the Contractor during the course of the project. These activities should be briefly described and should show the number which identifies it on the Contractor's CPM schedule.
- Schedule of Value: The dollar value assigned to each activity by the Contractor. These values are to be approved by the Engineer.
- % Completed To Date: The units completed to date and percentage completed to date.
- Work Previously Completed (\$): The dollar value of work completed as of the previous Application for Payment.
- Work completed This Month (\$): The dollar value of work performed during the month covered by the Application for Payment.
- Total Contract Work Performed to Date (\$): The total dollar value of work previously completed and work completed this month.
- Balance to Finish: The total dollar value of work necessary to complete the Activity (this number is automatically calculated).

- THE STORED MATERIAL LOG

- Item No. (1., 2., 3., etc.): Consecutive number designating each distinct item.
- Site Location: Where the particular material is stored. (E.g., "Site" or other storage facility approved subject to Subparagraph 9.3.2 ("Mauldin Road Warehouse")).
- Billed on Pay App. Num.: List the pay request number on which the particular stored material invoice was billed to and paid for by the Owner.
- Invoice Number: The Vendor's invoice number.
- Invoice Date: The date which the Vendor places on its invoice to the Contractor.

- Description: A brief description of the stored material.
  - Examples: “Tyton Joint DI Pipe” or “Sluice Gates”
- Vendor: The name of the vendor which appears on the invoice.
- Original Value (\$): The dollar value of the material as stated on the vendor's invoice.
- Previous Current Value (\$): The original dollar value of the stored material less the dollar value of material which has been installed prior to the Application for Payment.
- Installed This Month (\$): The dollar value of material that was installed during the month and that is no longer stored.
- Current Value Stored Material (\$): The dollar value of stored material up to the cut-off date for the Application for Payment. This value is arrived at by subtracting the dollar value for material installed during the month from the Previous Current Value.
- Applicable Activity No.: Each stored material invoice **must be assigned to an applicable activity** from the activities listed on the Payment Breakdown. The activity numbers are to be listed here. They are to be the same as shown on the Payment Breakdown.

## AFFIDAVIT OF THE CONTRACTOR

(This MUST accompany each Application for Payment)

Progress payments previously received from the Owner on account of the work for FY 2015 Gravity Sewer and Manhole Rehabilitation Project have been applied by the Contractor to discharge in full all of the Contractor's obligations incurred in connection with the Work covered by all prior Applications for Payment.

As of the date of this Affidavit, there are no: (i) outstanding claims against the Owner for any additional money, costs, or damages (including impact costs or damages), (ii) claims arising from delay or from the denial or the granting of time extensions, or (iii) from claims of any other kind of nature except: (a) for that remaining balance shown in this Application for Payment to be due under this Contract, and (b) for claims listed in the table attached to the Application for Payment.

CONTRACTOR

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

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

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

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

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

SWORN to and subscribed before me

this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_

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

Notary Public for the State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

### SCHEDULE OF DRAWINGS

The following Drawings, prepared by Owner, accompany the Specifications and are a part of the Contract Documents. Drawings are the property of the Owner and shall not be used for any purpose other than as expressly allowed by the Contract Documents.

<u>Drawing Number</u>	<u>DESCRIPTION</u>
000-G-000	Cover
000-G-001	Index of Drawings, Abbreviations and General Notes
000-G-002	Maintenance of Traffic Plan
000-C-001	Sanitary Sewer Details 1
000-C-002	Sanitary Sewer Details 2
000-C-003	Sanitary Sewer Details 3
000-C-004	Stream Crossing Details 1
000-C-005	Stream Crossing Details 2
000-C-006	Erosion & Sediment Control Legend and Notes
000-C-007	Erosion & Sediment Control Details 1
000-C-008	Erosion & Sediment Control Details 2
000-C-009	Overall Layout & Existing Manhole Data
000-C-010	Blow-up Connection Views
100-C-001	Plan & Profile Station 0+00 to 14+60
100-C-002	Plan & Profile Station 21+40 to 35+00
100-C-003	Plan & Profile Station 35+00 to 50+00
100-C-004	Plan & Profile Station 50+00 to 65+00
100-C-005	Plan & Profile Station 65+00 to 78+50
100-C-006	Plan & Profile Station 78+50 to 93+00
100-C-007	Plan & Profile Station 93 to 107+00
100-C-008	Plan & Profile Station 107+00 to 122+50
100-C-009	Plan & Profile Station 122+50 to 136+00
100-C-010	Plan & Profile Station 136+00 to 150+50
100-C-011	Plan & Profile Station 150+50 to 162+00

100-C-012	Plan & Profile Station 162+00 to End of Construction
100-C-013	Plan Station 14+60 to Station 21+40, Profile of MH-400A-432 to MH-400A-636, Plan of Sewer at East Park Ave.
200-C-001	Sediment & Erosion Control Plan – Rehab & Abandonment Plan
200-C-002	Sediment & Erosion Control Plan – Rehab & Abandonment Plan
200-C-003	Sediment & Erosion Control Plan – Rehab & Abandonment Plan
200-C-004	Sediment & Erosion Control Plan – Rehab & Abandonment Plan
200-C-005	Sediment & Erosion Control Plan – Rehab & Abandonment Plan
200-C-006	Sediment & Erosion Control Plan – Rehab & Abandonment Plan

SUBMITTALS

*(To be attached following this Cover Page)*



PERMITS

*(To be attached following this Cover Page)*

EASEMENTS/RIGHT OF WAYS

*(To be attached following this Cover Page)*

## TECHNICAL SPECIFICATIONS



*Renewable Water Resources  
Greenville, South Carolina*

**Technical Specifications  
For the  
Richland Creek Trunk Sewer**

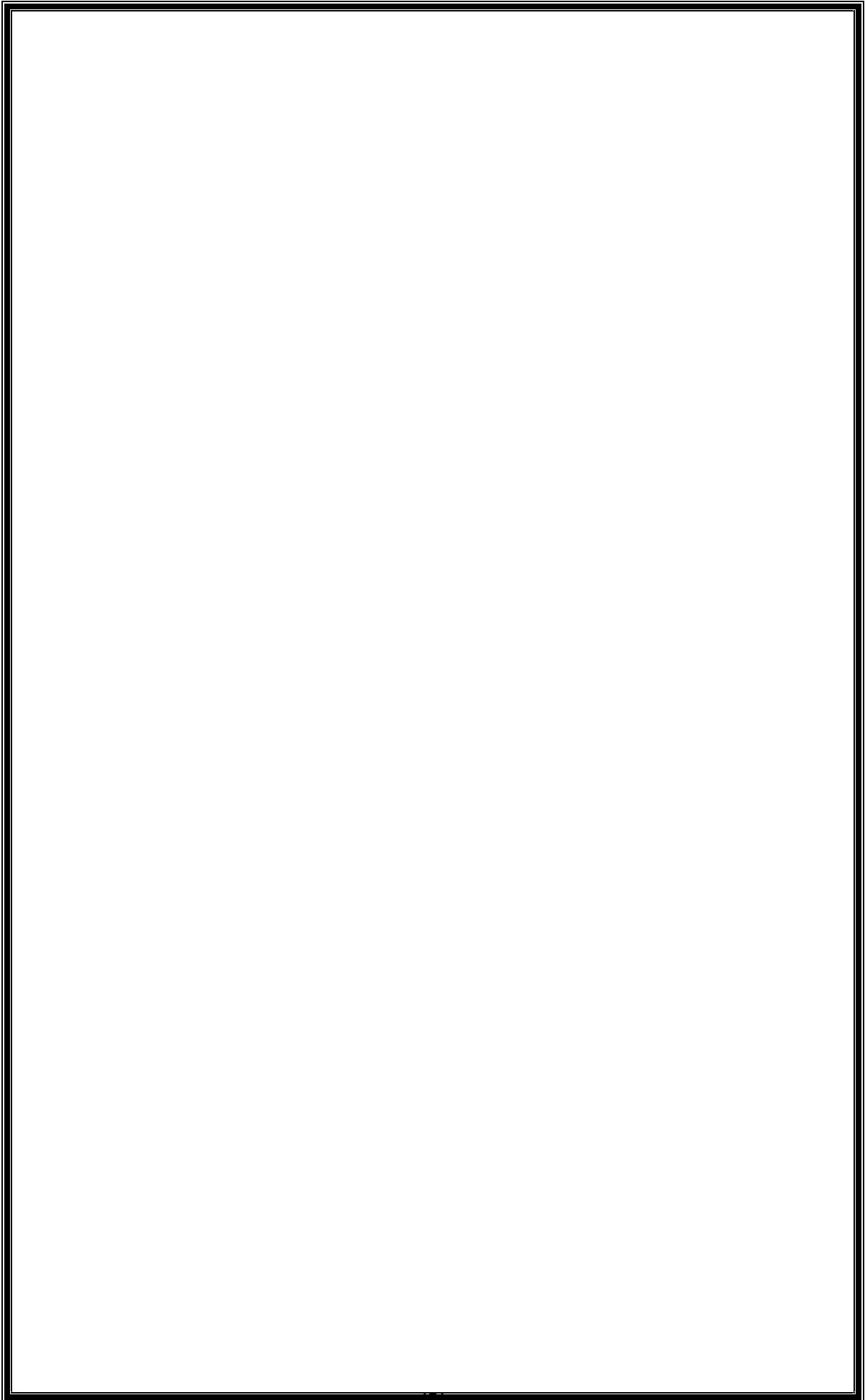
**Project #144953**

**BID DOCUMENTS**

**DECEMBER 2015**

**ReWa CIP # \_\_\_\_\_**





RENEWABLE WATER RESOURCES  
RICHLAND CREEK TRUNK SEWER

LIST OF SPECIFICATION SECTIONS

DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

01010	SUMMARY OF WORK
01014	WORK SEQUENCE
01025	MEASUREMENT AND PAYMENT
01046	DEMOLITION AND SALVAGE
01050	SURVEY INFORMATION
01060	SAFETY AND HEALTH
01071	STANDARD REFERENCES
01152	APPLICATIONS FOR PAYMENT
01153	CHANGE ORDER AND FIELD ORDER PROCEDURES
01300	SUBMITTALS
01310	CONSTRUCTION SCHEDULE
01380	PHOTOGRAPHS
01500	CONTRACTOR'S UTILITIES
01560	ENVIRONMENTAL CONTROLS
01605	SHIPMENT, PROTECTION AND STORAGE
01630	SUBSTITUTIONS AND PRODUCT OPTIONS
01700	RESTORATION OF IMPROVEMENTS
01710	CONTRACT CLOSEOUT
01720	RECORD DRAWINGS
01800	ENVIRONMENTAL CONDITIONS
01999	REFERENCE FORMS

DIVISION 02 – SITEWORK

- 02010 SITE PROTECTION AND RESTORATION
- 02100 SITE PREPARATION
- 02140 DEWATERING
- 02145 SEWER BYPASSING
- 02200 EARTHWORK
- 02211 ROCK EXCAVATION
- 02270 EROSION, SEDIMENTATION AND DUST CONTROL
- 02350 SHEETING, SHORING AND BRACING
- 02450 BORING AND JACKING
- 02500 PAVEMENT REMOVAL AND REPLACEMENT
- 02530 GRAVITY SEWERS, FORCE MAINS, AND ACCESSORIES
- 02603 REHABILITATION OF SANITARY SEWER MANHOLES
- 02651 SEWER TELEVISION INSPECTION
- 02760 SEWER CLEANING
- 02765 CURED-IN-PLACE PIPE LINING
- 02766 SLIPLINING OF EXISTING SEWERS
- 02769 POINT REPAIR OF EXISTING SANITARY SEWER MAINS
- 02777 PIPE BURSTING SEWER LINING
- 02933 TOP SOILING AND SEEDING

DIVISION 03 – CONCRETE

- 03340 FLOWABLE FILL
- 03481 PRECAST CONCRETE VAULTS

GEOTECHNICAL ENGINEERING REPORT

TERRACON CONSULTANTS, #86445008, 2014

LIST OF PERMITS

TO BE ADDED FOR CONSTRUCTION DOCUMENTS

## INDEX OF DRAWINGS

000-G-001	GENERAL
000-C-001	SANITARY SEWER DETAILS 1
000-C-002	SANITARY SEWER DETAILS 2
000-C-003	STREAM CROSSING DETAILS
000-C-004	STREAM CROSSING DETAILS
000-C-005	EROSION & SEDIMENT CONTROL LEGEND AND NOTES
000-C-006	EROSION & SEDIMENT CONTROL DETAILS 1
000-C-007	EROSION & SEDIMENT CONTROL DETAILS 2
000-C-008	OVERALL LAYOUT & EXISTING MANHOLE DATA
000-C-009	BLOW-UP CONNECTION VIEWS
100-C-001	PLAN & PROFILE STA. 0+00 TO STA. 14+60
100-C-002	PLAN & PROFILE STA. 21+39 TO STA. 35+00
100-C-003	PLAN & PROFILE STA. 35+00 TO STA. 50+00
100-C-004	PLAN & PROFILE STA. 50+00 TO STA. 65+00
100-C-005	PLAN & PROFILE STA. 65+00 TO STA. 78+50
100-C-006	PLAN & PROFILE STA. 78+50 TO STA. 93+00
100-C-007	PLAN & PROFILE STA. 93+00 TO STA. 107+00
100-C-008	PLAN & PROFILE STA. 107+00 TO STA. 122+00
100-C-009	PLAN & PROFILE STA. 122+00 TO STA. 136+00
100-C-010	PLAN & PROFILE STA. 136+00 TO STA. 150+50
100-C-011	PLAN & PROFILE STA. 150+50 TO STA. 162+00
100-C-012	PLAN & PROFILE STA. 162+00 TO STA. 168+38
200-C-001	EASEMENTS, SEDIMENT & EROSION CONTROLPLAN, REHAB AND ABANDONMENT PLAN STA. 0+00 TO STA. 35+00
200-C-002	EASEMENTS, SEDIMENT & EROSION CONTROLPLAN, REHAB AND ABANDONMENT PLAN STA. STA. 35+00 TO STA. 65+00
200-C-003	EASEMENTS, SEDIMENT & EROSION CONTROLPLAN, REHAB AND ABANDONMENT PLAN STA. STA. 65+00 TO STA. 93+00
200-C-004	EASEMENTS, SEDIMENT & EROSION CONTROLPLAN, REHAB AND ABANDONMENT PLAN STA. STA. 93+00 TO STA. 122+50
200-C-005	EASEMENTS, SEDIMENT & EROSION CONTROLPLAN, REHAB AND ABANDONMENT PLAN STA. STA. 122+50 TO STA. 151+00

**\*\*END OF SECTION\*\***



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DIVISION 01  
GENERAL REQUIREMENTS

<u>Section</u>	<u>Title</u>
01010	Summary of Work
01014	Work Sequence
01025	Measurement and Payment
01046	Demolition and Salvage
01050	Survey Information
01060	Safety and Health
01071	Standard References
01152	Applications for Payment
01153	Change Order and Field Order Procedures
01300	Submittals
01310	Construction Schedule
01380	Photographs
01500	Contractor's Utilities
01560	Environmental Controls
01605	Shipment, Protection and Storage
01630	Substitutions and Product Options
01700	Restoration of Improvements
01710	Contract Closeout
01720	Record Drawings
01800	Environmental Conditions
01999	Reference Forms

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SECTION 01010

SUMMARY OF WORK

PART 1 – GENERAL

1.01 GENERAL

The work covered under this contract will be performed generally along road rights-of-way, and ReWa utility easements, alongside the Richland Creek corridor from Cleveland Park to Rutherford Road in Greenville, SC.

1.02 DESCRIPTION OF OWNER'S PROJECT

The overall project will consist of the construction of a new gravity trunk sewer, ranging in size between 24 and 42 inches, associated appurtenances, erosion/sedimentation control, and equipment for the installation of the new sewer main. The work for this project includes, but is not limited to, the furnishing of labor, materials, and equipment for the construction of the following:

1. Approximately 2,185 linear feet of 42-inch DIP sewer main, 2,970 linear feet of 36-inch DIP sewer main, 2,910 linear feet of 30-inch DIP sewer main, 5,825 linear feet of 24-inch DIP sewer main, 81 manholes, and all associated fittings, and appurtenances to complete the work.
2. Connections to the existing ReWa and City of Greenville sewer collection system.

1.03 CONTRACTS

The work will be performed by a Single Prime Contractor. The Contractor selected to do the work of this contract shall be solely responsible for the timely completion of this contract.

1.04 WORK HOURS

Normal working hours, 8:00 a.m. to 5:00 p.m., Monday through Friday unless otherwise noted on the Drawings. Work outside of normal working hours requires a 1-week prior approval of the Owner.

1.04 OWNER SUPPLIED MATERIALS (NOT USED)

1.05 WORK TO BE DONE BY OWNER (NOT USED)

1.06 WORK TO BE DONE BY ENGINEER (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01014

### WORK SEQUENCE

#### PART 1 – GENERAL

##### 1.01 CONTINUITY OF SEWAGE COLLECTION AND TRANSMISSION

###### A. GENERAL:

The existing gravity sewer mains are currently and continuously collecting and transmitting sewage, and those functions shall not be interrupted except as specified herein. The Contractor shall coordinate the work to maintain the flow of wastewater by protecting existing facilities, diverting flow between parallel mains, or through temporary portable pumping equipment.

The Contractor shall be responsible for installing, operating and maintaining their own bypassing pumping when needed to connect to existing facilities, or transfer service from existing to proposed lines. Sewage bypass pumping shall be in accordance with Section 02145.

Work to be completed on parcel 0181000506301 owned by Stone Lake Community Club, Inc. shall not be disturbed during “on-season” months. All work on this parcel is to be completed between November 1<sup>st</sup> and March 31<sup>st</sup>.

Work to be completed along Rutherford Road from Station 145+50 to 168+00 shall be done during periods of low flow. The major contributor to this flow (House of Raeford Farms, Inc.) will limit discharge from 3:00 PM to 10:00 PM Sunday through Friday and from 11:00 PM Friday through 4:00 PM Sunday. Wet weather conditions will affect the flow to these lines and construction should be planned accordingly.

###### B. SUBMITTAL:

When the work requires that a connection be made to facilities not constructed under this contract, the Contractor shall notify the Engineer and the Owner 10 days in advance. In accordance with Section 01300, the Contractor shall submit a detailed plan and time schedule for completing each connection. The schedule shall be coordinated with the construction schedule specified in Section 01310 and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe the Contractor's method for connecting and the length of time required to complete said operation.

##### 1.02 RECOMMENDED SEQUENCE OF CONSTRUCTION

The construction schedule required in Section 01310 shall provide for the following specific sequence:

---

ReWa  
Richland Creek Trunk Sewer

01014-1

Bid Documents  
BC PN: 144953

1. Install erosion and sediment control measures. Perform clearing, grubbing and initial grading of pipeline corridor.
2. Submittal and approval of plan for maintaining continuity of sewage flow. Plan shall be implemented throughout the construction period and shall be approved prior to commencement of any pipeline construction.
3. Submittal and approval of plan for maintaining traffic flow. Plan shall be implemented as pertinent throughout the construction period and shall be approved prior to commencement of any pipeline construction.
4. Installation of steel casing via jacking and boring.
5. Construct gravity sewer main and manholes, beginning at the downstream end, working upstream.
6. Test new sewer lines and manholes, and request permission to place new facilities in operation. A partial permit to operate from SCDHEC is required prior to introducing sewage to the new system.
7. Make connections to existing facilities.
8. Provide Engineer record drawing information per Section 01720 for his use in obtaining a final Permit to Operate from SCDHEC.
9. Complete site work, restoration, paving, grassing, and clean up.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01025

### MEASUREMENT AND PAYMENT

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

Measurements of the completed work shall be in accordance with, and by instruments and devices calibrated to United States Standard Measures and the units of measurement for payment, and the limits thereof, shall be made as shown on the Plans, Specifications, General Specifications, and Special Provisions.

Each item for which payment will be made is listed in the Bid Schedule. Work specified or shown on the Drawings for which the Bid Schedule does not provide a separate lump sum or unit price, or which is incidental, is not separately paid. Costs for such work are compensated in the prices bid for other work items.

The Bid Amounts for each Bid Item will be used for comparative bid analysis. The Bid amounts will also form the basis of monthly progress payments. Bid items are not intended to be exclusive descriptions of work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item (work phase) as shown and specified.

##### 1.02 METHODS OF MEASUREMENT

Measure quantities in accordance with standard industry practice, and as specified herein.

Units of measurement are indicated on the Bid Schedule for each unit price item of work. Payment shall be made by multiplying the quantities measured by the unit price bid for the item of work. The costs for performing each item of work shall be included in the price bid for the item in which the work is required.

Payments for lump sum items will be made in accordance with a well-balanced, detailed apportionment of the lump sum, prepared by the Contractor and approved by the Engineer.

Measurements of allowance-based items shall be on the basis of allowable documented costs, as specified herein, for labor, equipment, materials and services, and subcontracts as submitted by the Contractor in the form of time-cards, and invoices.

##### 1.03 REJECTED, EXCESS, AND WASTED MATERIAL

The following quantities will not be included for payment:



- A. Quantities of material wasted or disposed of in a manner not called for under the Contract or as a consequence of the construction method used to perform the work.
- B. Rejected loads of material, including material rejected after it has been placed by reasons of the failure of the Contractor to comply with the provisions of the Contract.
- C. Material not unloaded from the transporting vehicle.
- D. Material placed outside the lines indicated on the Drawings or established by the Engineer.
- E. Material not incorporated into the final Work.
- F. Material remaining on hand after completion of the Work.

No payment will be made for loading, hauling, and disposing of rejected material.

#### 1.04 MOBILIZATION AND DEMOBILIZATION

##### A. MEASUREMENT:

Measurement for this item shall be based on satisfactory progress of mobilization and demobilization of the general contractor and any subcontractors.

##### B. PAYMENT:

Payment for mobilization and demobilization will be made at the lump sum price named. This price shall constitute full payment for mobilization and demobilization, complete as specified. The lump sum price for mobilization and demobilization shall include all costs for obtaining all bonds, permits, and licenses; location and procurement of a staging area/storage yard; moving onto and off of the site of all equipment; furnishing and erecting construction facilities; cleanup; and all preparatory work as required for the proper performance and completion of the project, including all work items not identified in a separate bid item. The Total Price for mobilization and demobilization shall not exceed 5 percent of the total bid price and payment of 66% of this line item shall be made for mobilization and 34% for demobilization.

#### 1.05 CLEARING AND GRUBBING

No separate payment shall be made for clearing and grubbing. The costs for such work shall be included in other bid items.

#### 1.06 CLEAN-UP AND TESTING

No separate payment shall be made for clean-up and testing, the costs of which shall be included in the item to which it pertains.

#### 1.07 TRAFFIC CONTROL

No separate payment shall be made for traffic control. The costs for such work shall be included in other bid items.

#### 1.08 EROSION, SEDIMENTATION AND DUST CONTROL

##### A. MEASUREMENT:

Measurement for this item will be based on the percentage of work necessary to implement temporary and permanent erosion and sedimentation control measures.

##### B. PAYMENT:

Payment will be made at the lump sum price submitted on the Bid Schedule. Payment shall be full compensation for all labor, materials, and equipment required to implement and maintain erosion and sedimentation control measures as specified and on the drawings. This bid price shall constitute full payment for such measures including, but not limited to, grassing, silt fencing, rip rap, stone check dams, sediment tubes, watering for dust control and other measures stipulated.

#### 1.09 TRENCH EXCAVATION AND BACKFILL

No separate payment shall be made for trench excavation and backfill, the costs of which shall be included in the bid item to which it pertains. No separate payment shall be made for any unique method or technique required for the Contractor to complete the work in accordance with the Contract Documents or federal, state and local regulations, permits, laws and requirements.

No separate payment shall be made for trench sheeting, shoring and bracing, the costs of which shall be included in the bid item to which it pertains. No additional compensation shall be made for completion of all planning, design, engineering fees as well as furnishing, constructing, removal, and disposal of such temporary and/or permanent sheeting, shoring, and bracing as required under the provisions of any permits, laws, regulations and in accordance with the requirements of OSHA.

No separate payment will be made for bedding, initial backfill and subsequent backfill. No separate payment will be made for the trench foundation prepared as indicated in Section 02200 and on the Drawings, except for trench stabilization. The costs for bedding, foundation, initial backfill and subsequent backfill shall be included in the item bid for the associated pipeline.

## 1.10 TRENCH STABILIZATION

### A. MEASUREMENT:

Trench stabilization includes the removal and disposal of unsuitable trench foundation material and replacement with crushed stone if, after dewatering, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the pipe. If the trench is determined to be unsuitable by the Engineer, the Contractor shall be required to remove such unstable material and fill the trench to the proper subgrade with crushed stone. Where trench stabilization is provided, the material shall be compacted to at least 90 percent of the maximum dry density, unless specified otherwise. The Contractor shall notify the Engineer when such unsuitable conditions exist to obtain authorization for payment. Trench stabilization shall be measured in tons of crushed stone delivered and installed, measured to the nearest whole number.

### B. PAYMENT:

Payment for trench stabilization will be based on the quantity authorized, measured in tons, at the price indicated in the Bid Schedule for the removal and disposal of unsuitable material and replacement with crushed stone. No additional payment will be made for the specified bedding material. However, the bid item for Trench Stabilization may be used where the Owner or Engineer direct the Contractor to use compacted stone as an alternate material in areas where another bedding or backfill (i.e. Type A or Type C) material is specified.

## 1.11 ROCK EXCAVATION

### A. MEASUREMENT:

Open-cut hard rock for the open trench portion of the sewer installation work shall include, but not be limited to excavation, removal and disposal of rock as defined in Section 02211, replacement with imported backfill and bedding material to replace the volume of hard rock excavated, and all labor, equipment, materials and incidentals required for the work. The top of the trench shall be the ground elevation as determined by the Engineer prior to excavation. The grades of the invert of the pipe shall be as show on the drawings. In computing the amount of rock excavation, the depth of the trench shall be 6 inches below the invert of the pipe, while maintaining 12 inches from the sides of the pipe. The measurement for rock excavation shall be the in-place volume of rock measured within the trench limits shown on the drawings. Quantity of work under this bid item may vary. No adjustments to the unit price will be made regardless of the actual quantity. The Engineer shall be given reasonable notice to measure all rock.

### B. PAYMENT:

Payment for rock excavation will be made for the quantities determined above, measured in cubic yards to the nearest whole number, at the unit price indicated in the Bid Schedule. The

bid price shall be full compensation for excavation, disposal of rock, backfilling, and providing borrow for any deficiency of trench backfill, and all work incidental thereto for which payments not provided under other items.

#### 1.12 GRAVITY SANITARY SEWER MAIN

##### A. MEASUREMENT:

Gravity sewer mains shall be measured in linear feet to the nearest whole number, along a horizontal plane, at the depth of cut indicated on the Bid Schedule. The horizontal distance shall be measured from centerline of manhole to centerline of manhole. The depth of cut shall be measured from the existing ground level to the pipe invert at the pipe centerline. The Contractor shall prepare cut sheets, approved by the Engineer, from which the basis of payment will be made.

##### B. PAYMENT:

Payment for gravity sewer mains shall be made for each linear foot, for the size, material and depth of cut indicated on the Bid Schedule. No separate payment shall be made for cutting and beveling pipe, maintaining existing sewer flows, surveying and preparing cut sheets, and protecting existing utilities.

The Contractor is responsible for locating and marking existing utilities prior to construction. Where horizontal conflicts are encountered in the construction of the gravity sewer, payment shall only be made for additional lengths of sewer main and manholes authorized by the Engineer to avoid the conflict. Where authorized by the Engineer, payment for additional depths will be made to avoid vertical conflicts. No additional payment will be made for any delay or extra cost encountered by the Contractor for the location, protection, avoidance or relocation of existing utilities, mains or services.

#### 1.13 PRE-CAST CONCRETE MANHOLE BASE

##### A. MEASUREMENT:

The Bid item for manhole base includes the work necessary to install a new manhole base section, at the diameter indicated, along with the boots, inverts, frame and covers, and connecting the sewer pipes to the manhole. A manhole base includes the first 6 vertical feet of the manhole, measured from the outgoing invert. The measurement of payment for manhole base will be based on the number of each manhole bases installed.

##### B. PAYMENT:

Payment for pre-cast concrete manhole base will be made for each number installed at the unit price indicated in the Bid Schedule, for the specified size pre-cast manhole base. Additional depth in the form of a manhole riser will be paid for separately.

#### 1.14 PRE-CAST CONCRETE MANHOLE RISER

##### A. MEASUREMENT:

The bid item for manhole riser includes the additional manhole sections, beyond the initial 6 vertical feet included in the Manhole Base bid item, required to bring the manhole to the grade needed. Measurement, in vertical feet to the nearest one-tenth, shall be made from the top of the manhole base to the top of the frame and cover.

##### B. PAYMENT:

Payment for pre-cast concrete riser will be made for each vertical foot at the price indicated in the Bid Schedule.

#### 1.15 BORE AND JACK STEEL CASING

##### A. MEASUREMENT:

The bid item for boring and jacking steel casing includes all work necessary for the installation of a steel casing at the size indicated. The work shall include site preparation, pit excavation, shoring, sheeting and bracing, installing the casing as specified in Section 02450 and on the Drawings, restoration, clean-up and testing. The basis for measurement shall be linear feet, to the nearest whole number, measured along a horizontal plane from the face of the casing to the face of the casing. Installation of the carrier pipe shall be paid separately.

##### B. PAYMENT:

Payment for bore and jack steel casing shall be made at the quantity authorized, in linear feet, for the specified casing diameter at the unit price indicated on the Bid Schedule.

#### 1.16 SEWER MAIN IN STEEL CASING

##### A. MEASUREMENT:

The installation of a sewer main within a steel casing will be measured in linear feet, to the nearest whole number, along a horizontal plane from the face of the casing to the face of the casing. The work shall include installing the pipe, casing spacers and end seals as specified in the Specifications and on the Drawings.

##### B. PAYMENT:

Payment for sewer main in steel casing will be made at the authorized quantity, in linear feet, for the specified diameter at the unit price indicated on the Bid Schedule.

## 1.17 BYPASS PUMPING

### A. MEASUREMENT:

Bypass pumping includes all labor, equipment and materials needed to divert sewer flows around the sewer facilities being replaced, demolished, rehabilitated or connected to. The work shall include providing and maintaining pumps, piping, plugs, etc. necessary for bypass pumping as specified in Section 02145. Measurement for bypass pumping shall be on lump sum basis in accordance with a well-balanced detailed apportionment of the work.

### B. PAYMENT:

Payment for bypass pumping shall be made at the lump sum price indicated on the Bid Schedule.

## 1.18 SEWER CLEANING

### A. MEASUREMENT:

The bid item for Sewer Cleaning includes all labor, equipment and materials needed to clean and remove roots or debris from existing gravity sewer mains prior to closed-circuit television inspection and/or lining. Sewer cleaning shall be in accordance with Section 02760 and, when authorized, will be performed prior to inspection or lining on existing sewers. Measurement for sewer cleaning shall be based on the linear feet distance, to the nearest whole number, between the center of the upstream and downstream manholes.

### B. PAYMENT:

Payment for Sewer Cleaning shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

## 1.19 CCTV INSPECTION

### A. MEASUREMENT:

The bid item for CCTV inspection includes all labor, equipment and materials needed to conduct an inspection of the gravity sewer using closed-circuit television inspection equipment. Inspections may be performed on existing sewers, or recently lined sewer mains. Sewer cleaning, in accordance with Section 02760, will be performed prior to inspection on existing sewers, and shall be paid for as indicated. Measurement for CCTV Inspection shall be based on the linear feet distance, to the nearest whole number, between the center of the upstream and downstream manholes.

B. PAYMENT:

Payment for CCTV Inspection shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

1.20 PIPE BURST EXISTING SEWER AND REPLACE WITH NEW HDPE SEWER

A. MEASUREMENT:

The Bid item for pipe burst existing sewer and replace with new HDPE sewer includes the work necessary to install a new HDPE gravity sewer, at the size indicated, using the pipe bursting method as specified in Section 02777. The work includes preparation, pit excavation, pipe joining, pipe installation, manhole connections, inspection and testing, and other necessary items to install the new pipe, complete in place. The measurement of payment will be based on the linear feet distance, to the nearest whole number, between the center of the upstream and downstream manholes.

B. PAYMENT:

Payment for replace existing sewer with new HDPE sewer via pipe bursting shall be made at the quantity authorized, in linear feet, for the specified size of pipe replaced and installed at the unit price indicated on the Bid Schedule.

1.21 INSTALL HDPE BY SLIPLINING

A. MEASUREMENT:

The Bid item for installing a HDPE liner in a gravity sewer via sliplining includes the work necessary to install a HDPE lining in an existing gravity sewer, at the size indicated as specified in Section 02766. The work includes preparation, cleaning, pipe joining, pipe installation, manhole connections, reinstatement of service connections, testing, bypassing, traffic control, inspection, testing, and other necessary items to install the new pipe, complete in place. The measurement of payment for installing a HDPE liner in a gravity sewer will be based on the linear feet distance, to the nearest whole number, between the center of the upstream and downstream manholes.

B. PAYMENT:

Payment for Install HDPE by Sliplining shall be made at the quantity authorized, in linear feet, for the specified size of pipe replaced and installed at the unit price indicated in the Bid Schedule. Payment for HDPE liner shall be subject to performance requirements as outlined in Section 02766.

## 1.22 SEWER POINT REPAIR

### A. MEASUREMENT:

The bid item for sewer point repair includes all labor, equipment and materials needed to install a sewer main, at the size and material specified, as the location directed by the Engineer. Measurement for sewer point repair shall be based on the centerline distance, to the nearest foot, through fittings, without consideration for location. At a minimum, 10 linear feet shall be approved for payment for each point repair.

### B. PAYMENT:

Payment for sewer point repair shall be made at the quantity authorized at the unit price indicated on the Bid Schedule. A minimum of 10 linear feet will be approved for payment for each point repair.

## 1.23 REHABILITATE EXISTING MANHOLE WITH LINING

### A. MEASUREMENT:

The Bid item for rehabilitate existing manhole with lining includes all work necessary to install a spray applied lining as specified in Section 02603. The work includes preparation, cleaning, plugging active leaks, grouting, lining, and other necessary items to complete the work. Measurement, in vertical feet to the nearest whole number, shall be made from the manhole rim to the outgoing invert.

### B. PAYMENT:

Payment for rehabilitate existing manhole with lining shall be made at the quantity authorized, with specified lining type, in vertical feet, at the unit price indicated on the Bid Schedule.

## 1.24 REPAIR MANHOLE BENCH & INVERT

### A. MEASUREMENT:

The bid item for repair manhole bench includes all labor, equipment and materials needed to remove and dispose of loose material, cleaning, surface preparation, bypassing the flow, forming and installing a smooth concrete invert channel and bench. Measurement for repair manhole bench and invert shall be made at the number installed, without consideration for location.

### B. PAYMENT:



Payment for repair manhole bench and invert shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

#### 1.25 INSTALL VORTEX DROP STRUCTURE

##### A. MEASUREMENT:

The bid item for installing a Vortex Drop Structure includes all labor, equipment and materials needed to install a Vortec Drop Structure in a gravity sewer vault as shown on the Drawings and as specified in Section 02531. Measurement for installation of Vortex Drop Structures shall be made at the number installed, without consideration for location.

##### B. PAYMENT:

Payment for Install Drop Invert shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

#### 1.26 INSTALL DROP INVERT

##### A. MEASUREMENT:

The bid item for installing a drop invert includes all labor, equipment and materials needed to install a drop invert on a gravity sewer manhole as shown on the Drawings and as specified in Section 02530. Measurement for installation of drop inverts shall be based on the vertical feet distance, to the nearest whole number, from top to bottom, without consideration for location.

##### B. PAYMENT:

Payment for Install Drop Invert shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

#### 1.27 INSTALL CIPP LINER IN GRAVITY SEWER

##### A. MEASUREMENT:

The Bid item for installing a CIPP liner in a gravity sewer includes the work necessary to install a Cured In Place Pipe lining in an existing gravity sewer, at the size indicated as specified in Section 02765. The work includes preparation, cleaning, pipe joining, pipe installation, manhole connections, reinstatement of service connections, testing, bypassing, traffic control, inspection, testing, and other necessary items to install the new pipe, complete in place. Pre and post installation television inspection of the pipeline will be measured as a separate bid item. The measurement of payment for installing a CIPP liner in a gravity sewer will be based on the linear feet distance, to the nearest whole number, between the center of the upstream and downstream manholes.

B. PAYMENT:

Payment for Install CIPP Liner in Gravity Sewer shall be made at the quantity authorized, in linear feet, for the specified size of pipe replaced and installed at the unit price indicated in the Bid Schedule. Payment for CIPP liner shall be subject to performance requirements as outlined in Section 02765.

1.28 EXTERNAL SEWER SERVICE CONNECTIONS

A. MEASUREMENT:

The bid item for external sewer service connections includes all labor, equipment and materials needed to install on the sewer main, a wye, compression fitting, or saddle at the size specified. This item does not include service connections reinstated from inside a recently lined (CIPP) sewer main. Measurement for external sewer service connections shall be made at the number of connections installed.

B. PAYMENT:

Payment for external sewer service connections shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

1.29 SEWER SERVICE LATERAL

A. MEASUREMENT:

The bid item for sewer service lateral includes all labor, equipment and materials needed to install a sewer service lateral, at the size and material specified, from the connection to the cleanout. Measurement for sewer service laterals shall be based on the centerline distance, to the nearest foot, through fittings.

B. PAYMENT:

Payment for sewer service laterals shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

1.30 SEWER SERVICE CLEAN-OUT

A. MEASUREMENT:

The bid item for sewer service clean-out includes all labor, equipment and materials needed to remove the existing cleanout (if applicable), connect to the new service lateral from the utility owner's side, connect to the existing service lateral from the property owner's side,

install riser pipe, and install a clean-out cap, plug, and box at grade. Measurement for new sewer service clean-out shall be made at the number installed, as indicated on the bid.

B. PAYMENT:

Payment for new sewer service clean-out shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

1.31 EXISTING MANHOLE CONNECTION

A. MEASUREMENT:

The bid item for external sewer service connections includes all labor, equipment and materials needed to connect to an existing sewerage manhole as shown on the plans and specified in Section 02530. Measurement for connecting to existing manholes shall be made at the number of connections installed.

B. PAYMENT:

Payment for existing manhole connections shall be made at the quantity authorized at the unit price indicated on the Bid Schedule.

1.32 REMOVE AND REPLACE PAVEMENT

A. MEASUREMENT:

Asphalt and/or concrete pavement removal and replacement includes all work necessary to remove existing paving, providing and compacting select backfill, replacing the pavement, restriping the pavement, providing traffic control and providing temporary measures for maintaining traffic. Measurement shall be based on square yards, to the nearest one-tenth, at the type of pavement specified. The allowable quantity for pavement replacement will be limited to the standard cross section shown on the drawings.

B. PAYMENT:

Payment for remove and replace pavement will be made for the quantity authorized at the type indicated, in square yards, at the unit price indicated in the Bid Schedule. No additional payment will be made for repairing damaged pavement adjacent to the saw cut.

1.33 REMOVE AND REPLACE CURB AND GUTTER

A. MEASUREMENT:

Curb and gutter removal and replacement includes all work necessary to remove existing curbing and gutters, providing and compacting select backfill, installing temporary forms,

replacing the curb and gutter with like material, and connecting to existing features and storm drainage structures. Measurement shall be based on linear, to the nearest whole number. The allowable quantity for curb and gutter replacement will be limited to the standard cross section shown on the drawings.

B. PAYMENT:

Payment for remove and replace curb and gutter will be made for the quantity authorized at the type indicated, in linear feet, at the unit price indicated in the Bid Schedule. No additional payment will be made for repairing damaged curb/gutter adjacent to the allowable cross-section.

1.34 RESURFACE ASPHALT PAVEMENT

A. MEASUREMENT:

Asphalt pavement resurfacing will be measured on the basis of square yardage, to the nearest whole number, in accordance with the limits for resurfacing directed by the Engineer.

B. PAYMENT:

Payment for resurface asphalt pavement will be made at the authorized quantity, measured in square yards, at the unit price indicated in the Bid Schedule.

1.35 FLOWABLE FILL

A. MEASUREMENT:

This work consists of the use of flowable fill concrete and its application as required by the Engineer and in accordance with Section 210 of the South Carolina Specifications for Highway Construction, 2000 or latest Edition. Flowable fill will be measured in cubic yards, to the nearest whole number, based on length of cut, at the allowable trench width, at the allowable for installation of the water main.

B. PAYMENT:

Payment for flowable fill will be made at the authorized quantity, measured in cubic yards, at the unit price indicated in the Bid Schedule. Payment will not be made for fill needed due to excessive trench width or depth. Payment for this work shall be considered full compensation for all labor, materials, tools, and incidentals required to complete this work.

1.36 CASH ALLOWANCES

The Contractor shall include in the bid total, the amount shown for each allowance shown on the Bid. The allowances shall cover the net costs of the services provided by a firm selected

by the Owner. The Contractor's costs associated with the items listed, to include labor, overhead, profit and other expenses, shall be included in other items to which the allowance may pertain.

Should the cost of the allowance be greater or less than the amount shown, the Contract will be adjusted as needed, in accordance with provisions in the Contract Documents.

A. CONSTRUCTION VERIFICATION SURVEYING:

This allowance is for the use of an independent surveying firm, selected by the Owner, to perform horizontal and vertical alignment verification at the direction of the Engineer. The allowance is solely for the use of the Engineer, and in no way relieves the Contractor from his responsibility to install reference points, centerlines, and benchmarks, develop cut sheets, or verifying his work.

B. BLASTING MONITORING:

This allowance is for the use of an independent specialty subcontractor, beyond the Contractor's requirements set forth in Section 02211, to monitor the blasting during construction when directed by the Owner or Engineer.

C. SOILS & MATERIALS TESTING:

This allowance is for the use of an independent testing firm and/or laboratory to be retained by the Contractor for testing soil conditions, including trench excavation, backfill and compaction.

D. CONTINGENCY ALLOWANCE:

The contingency allowance is intended to provide adequate budget to cover items not precisely determined by the Owner and unforeseeable conditions prior to bid. The Contractor shall include the amount specified by the Owner in the bid to be used by the Owner for items not specifically identified in the Contract Documents. The Owner will specifically authorize any items to be covered under the Contingency Allowance. The Contractor shall invoice items authorized for payment under the Contingency Allowance with his monthly pay applications. The amount invoiced will be deducted from the lump sum amount.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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## SECTION 01046

### DEMOLITION AND SALVAGE

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

###### A. SCOPE OF WORK:

This section includes materials and equipment to be salvaged and returned to the Owner; or demolished and removed from the site as trash by the Contractor. The sequence in which systems can be worked on shall be as specified in specification Section 01014, Work Sequence.

The Contractor shall furnish all labor, material, equipment, and incidentals required to demolish, modify, and/or remove existing facilities as shown or specified and as required for the installation of new mechanical equipment, piping, architectural features and appurtenances. Existing piping and equipment shall be removed and dismantled as necessary for the performance of structural, architectural, and piping alterations in accordance with the requirements herein specified.

Coordinate with the Owner for all materials required to be turned over to Owner. Dewatering requirements are defined in specification Sections 02140 and 02145.

###### B. PERFORMANCE REQUIREMENTS:

1. EXISTING CONDITIONS: The Owner and the Engineer assume no responsibility for the actual condition of the structures to be demolished or modified. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the maximum extent possible. However, variations within the structures may occur prior to the beginning of the work.

Construction drawings of the existing facilities are available for inspection at the Owner's office. If sets of the construction drawings are requested, the requesting party must pay the cost of reproductions.

2. SALVAGE: Any items designated to be salvaged for Owner's own purposes shall be carefully removed, and be relocated to a designated storage area on the project site. Contractor shall protect salvaged equipment and materials from weather, staining, construction damage, theft, and vandalism. Arrange storage to facilitate inspection by Engineer.

The Contractor shall notify the Engineer fifteen (15) days prior to commencement of demolition work in an area. The Owner shall then tag equipment, piping, valves, control devices, electrical, etc. to designate all items to be salvaged. The Contractor shall provide tags for use by the Owner.

3. DEMOLITION AND DISPOSAL: Except for all items selected by Owner for salvage or scrap metal, the Contractor shall take ownership of all materials removed under the demolition Work, including dismantled equipment and materials, piping, pumps, fittings, valves, machinery, gates, concrete, soils, miscellaneous and structural metals, masonry, and other construction debris and shall be removed from the site as trash. Trash and debris shall be disposed of legally, off the site, by Contractor. The Contractor shall remove and dispose of any hazardous materials, such as, but not limited to asbestos, petroleum-contaminated soils, or lead-based paint, in accordance with all applicable laws. Excavated, contaminated soils must be legally disposed of and cannot be used as backfill. Hazardous or otherwise contaminated debris shall be segregated from clean materials. Demolition and disposal of both clean and contaminated materials shall be conducted in compliance with all applicable, local, state, and federal laws. Upon removal from site, Contractor shall have the rights of salvage of materials. The Contractor shall maintain chain of custody reports for all disposed materials; these records shall be made available for review by the Owner or Engineer upon request.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.01 GENERAL

#### A. CONTROL OF HAZARD AND NUISANCE CONDITIONS:

All demolition and salvage Work shall be conducted in a manner which will protect the environment, promote public health and safety, and preclude nuisance conditions, in strict conformance with the requirements of specification Sections 01060, Safety and Health, and 01560, Environmental Controls. In addition, Contractor shall enforce the following safety requirements:

1. No fires will be permitted on-site.
2. Post "No Smoking" signs in all interior spaces and in hazardous or confined spaces where dismantling operations are to be carried on.



Strictly enforce "No Smoking" restrictions among all personnel employed on the Work.

**B. DEMOLITION OF EXISTING STRUCTURES:**

Structures designated for demolition or removal shall be removed to a point 3 feet below existing grade, or greater if required to provide clearance for new pipelines or other utilities, including allowance for pipe/utility bedding. The portion of the structure that will remain below grade shall be cleaned of rubble and debris including exposed reinforcing steel, backfilled with Type A material in accordance with specification Section 02200 (Earthwork) and graded to match the existing grade around the structure. All mechanical and electrical equipment and piping shall be removed from those structures prior to backfilling and grading.

Structural steel members shall be cut into sections of such weight and size as will permit convenient handling, hauling, and storage. Concrete to be demolished and removed shall be broken into pieces not greater than 24 inches in any dimension by methods reviewed by the Engineer.

**C. ABANDONMENT OF EXISTING PIPING:**

Existing piping designated for abandonment shall be removed from service, dewatered, and, where indicated, filled with flowable fill concrete. Pipe connections to manholes on either end of abandoned pipes, will be plugged with brick and mortar, creating a 12-inch deep plug into the pipe. Where existing piping is in active service by the Owner, the piping shall be decommissioned in accordance with Section 01014, Work Sequence.

**D. GRADING AND BACKFILL:**

All excavation made in connection with work performed under this Section and all openings below permanent ground caused by the removal of a structure shall be backfilled with suitable material and graded to match the existing grade on the site. Top soil and seed shall be placed in each location following backfill and grading in accordance with Section 02933, Top Soiling and Seeding.

**3.02 ITEMS TO BE DEMOLISHED**

Structures and other items to be demolished are indicated on the Drawings; however, the Contractor shall request the Engineer to verify all items to be demolished prior to the start of the Work. Items to be demolished shall include, but not limited to:

1. Existing manholes to be removed where pertinent to install proposed work. Existing manholes to be abandoned will be demolished to first joint below grade and filled with flowable fill concrete.

### 3.03 ITEMS TO BE ABANDONED

Pipelines to be abandoned and filled are indicated on the Drawings; however, the Contractor shall request the Engineer to verify the extent to which existing pipelines will be abandoned prior to the start of the Work. Items to be abandoned shall include, but not limited to, select gravity sewer mains and manholes.

### 3.04 ITEMS TO BE SALVAGED AND RETURNED TO OWNER

Contractor shall request the Engineer and Owner to identify all items to be salvaged prior to the start of the Work. Salvaged items shall be properly disconnected to retain their full salvage value and cleaned before turning over to the Owner. Items to be salvaged from the existing Pumping Station shall include, but are not limited to:

1. Manhole frame and covers

**\*\*END OF SECTION\*\***

SECTION 01050

SURVEY INFORMATION

PART 1 – GENERAL

1.01 DESCRIPTION

The Engineer will establish reference benchmarks and baselines as specified. From the information provided, the Contractor shall develop and make such additional surveys as are needed for construction, such as control lines, slope stakes, batter boards, stakes for pipe locations and other working points, lines, and elevations. Survey work shall be performed under the supervision of a licensed land surveyor. Contractor shall reestablish reference benchmarks and survey control monuments destroyed by his operations at no cost to the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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## SECTION 01060

### SAFETY AND HEALTH

#### PART 1 – GENERAL

##### 1.01 GENERAL

Portions of the work may involve exposure to wastewaters of varying degrees of treatment. The Contractor, in Section 00423, certifies that he is experienced and qualified to anticipate and meet the safety and health requirements of this project.

Workmen involved in the removal, renovation, or installation of equipment within the treatment plant may be exposed to disease-producing organisms in wastewater. The Contractor shall require his personnel to observe proper hygienic precautions.

Solvents, gasoline, and other hazardous materials enter the plant with incoming sewage, and, therefore, certain areas are hazardous to open flame, sparks, or unventilated occupancy. The Contractor shall take measures to assure his personnel observe proper safety precautions when working in these areas.

The Contractor shall take all necessary precautions and provide all necessary safeguards to prevent personal injury and property damage. This protection shall be provided for all persons including but not limited to his employees, employees of other contractors or subcontractors, members of the general public, Owner's employees, Engineer's employees, and regulatory agencies' personnel that may be on or about the work. The Contractor shall also provide protection for all public and private property including but not limited to utilities, pipes, equipment, motor vehicles, and structures.

##### 1.02 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with Safety and Health Regulations for Construction, promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act, as set forth in Title 29, C.F.R. Copies of these regulations may be obtained from Labor Building, 14th and Constitution Avenue N.W., Washington, DC 20013.

The Contractor shall also comply with the provisions of the Federal Occupational Safety and Health Act, as amended.

##### 1.03 EMERGENCY PHONE NUMBERS AND ACCIDENT REPORTS

Emergency phone numbers (fire, medical, police) shall be posted at all telephone locations at the Site of the Work and their locations made known to all.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

SECTION 01071

STANDARD REFERENCES

PART 1 – GENERAL

Wherever used in the project manual, the following abbreviations will have the meanings listed:

AA	Aluminum Association Incorporated P.O. Box 753 Waldorf, MD 20604
AABC	Associated Air Balance Council 1518 K Street N.W. Washington, DC 20005
AAMA	American Architectural Manufacturers Association 1540 East Dundee Road, Suite 310 Palatine, IL 60067
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 249 Washington, DC 20001
ABMA	American Bearing Manufacturers Association 1200 19th Street N.W., Suite 300 Washington, DC 20036
ACI	American Concrete Institute 22400 West Seven Mile Road P.O. Box 19150, Redford Station Detroit, MI 48219
AEIC	Association of Edison Illuminating Companies 600 North 18th Street P.O. Box 2641 Birmingham, AL 35291
AGA	American Gas Association ATTN: Records 1515 Wilson Boulevard Arlington, VA 22209
AGMA	American Gear Manufacturer's Association, Inc. 1500 King Street, Suite 201 Alexandria, VA 22314
AHA	American Hardboard Association 1210 West Northwest Highway Palatine, IL 60067
AISC	American Institute of Steel Construction

	One East Wacker Drive, Suite 3100 Chicago, IL 60601
AISI	American Iron and Steel Institute 1101 Seventeenth Street, NW, Suite 1300 Washington, DC 20036
AITC	American Institute of Timber Construction 7012 South Revere Parkway, Suite 140 Englewood, CO 80112
ALSC	American Lumber Standard Committee P.O. Box 210 Germantown, MD 20875
AMCA	Air Movement and Control Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 11 West 42nd Street, 13th Floor New York, NY 10036
APA	American Plywood Association 7011 South 19th Street Tacoma, WA 98466
API	American Petroleum Institute 1220 "L" Street N.W. Washington, DC 20005
ARI	Air-Conditioning and Refrigeration Institute 4301 North Fairfax Drive, Suite 425 Arlington, VA 22203
ASCE	American Society of Civil Engineers United Engineering Center 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 10 East 40th Street New York, NY 10016
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street



New York, NY 10017

ASTM American Society for Testing and Materials  
100 Barr Harbor Drive  
West Conshohocken, PA 19428

AWPA American Wood-Preservers' Association  
9549 Old Fredrick Road  
Ellicott City, MD 21042  
or  
P.O. Box 286  
Woodstock, MD 21163-0286

AWS American Welding Society  
550 NW LeJeune Road  
P.O. Box 351040  
Miami, FL 33135

AWWA American Water Works Association  
6666 West Quincy Avenue  
Denver, CO 80235

BOCA Building Officials and Code Administrators, International, Inc.  
4051 West Flossmoor Road  
Country Club Hills, IL 60478

CBM Certified Ballast Manufacturers  
2120 Keith Building  
Cleveland, OH 44115

CMAA Crane Manufacturers Association of America, Inc.  
(Formerly called: Overhead Electrical Crane Institute) (OECI)  
8720 Red Oak Boulevard, Suite 201  
Charlotte, NC 28217

CRSI Concrete Reinforcing Steel Institute  
933 N Plum Grove Road  
Schaumburg, IL 60173

CSA Canadian Standards Association  
178 Rexdale Boulevard  
Rexdale, Ontario, M9W 1R3, Canada

DEMA Diesel Engine Manufacturer's Association  
30200 Detroit Road  
Cleveland, OH 44145

DHI Door and Hardware Institute  
14170 Newbrook Drive  
Chantilly, VA 22021

EEl Edison Electric Institute  
90 Park Avenue  
New York, NY 10016

EIA	Electronic Industries Association Order from: Global Engineering Documents 18201 McDermott West Irvine, CA 92714
EJMA	Expansion Joint Manufacturers Association 25 North Broadway Tarrytown, NY 10591
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, DC 20407
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Engineering and Research Corporation 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, MA 02062
HEI	Heat Exchange Institute 1300 Sumner Avenue Cleveland, OH 44115
HI	Hydraulic Institute 9 Sylvan Way, Suite 180 Parsippany, NJ 07054
HPVA	Hardwood Plywood & Veneer Association 1825 Michael Faraday Drive P.O. Box 2789 Reston, VA 22090-2789
IAPMO	International Association of Plumbing and Mechanical Officials 20001 Walnut Drive S Walnut, CA 91789
ICBO	International Conference of Building Officials 5360 Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P.O. Box 440 South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers 445 Hoes Lane

P.O. Box 1331  
Piscataway, NJ 08855

IES	Illuminating Engineering Society of North America 120 Wall Street New York, NY 10017
ISA	Instrument Society of America 67 Alexander Drive P.O. Box 12277 Research Triangle Park, NC 27709
JIC	Joint Industrial Council 7901 West Park Drive McLean, VA 22101
MFMA	Metal Framing Manufacturers Association 401 N. Michigan Avenue Chicago, IL 60611
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 11 South La Salle Street, Suite 1400 Chicago, IL 60603
NACE	National Association of Corrosion Engineers 1440 South Creek Drive Houston, TX 77084
NBC	National Building Code Published by BOCA
NEC	National Electric Code National Fire Protection Association One Batterymarch Park P.O. Box 9101 Quincy, MA 02269
NELMA	Northeastern Lumber Manufacturers Association, Inc. P.O. Box 87A Cumberland Center, ME 04021
NEMA	National Electrical Manufacturer's Association 2101 L Street, NW, Suite 300 Washington, DC 20037
NESC	National Electric Safety Code

American National Standards Institute  
1430 Broadway  
New York, NY 10018

NFOR	National Forest Products Association (Formerly National Lumber Manufacturer's Association) 1111 19 Street NW, Suite 700 Washington, DC 20036
NFPA	National Fire Protection Association One Batterymarch Park P.O. Box 9101 Quincy, MA 02269
NHLA	National Hardwood Lumber Association 6830 Raleigh LaGrange P.O. Box 34518 Memphis, TN 38184-0518
NSF	National Sanitation Foundation 3475 Plymouth Road P.O. Box 130140 Ann Arbor, MI 48113
OSHA	Occupational Safety and Health Act U.S. Department of Labor Occupational and Health Administration Region 4 - Atlanta Regional Office 61 Forsyth St, SW Atlanta, GA 30303
PCI	Precast/Prestressed Concrete Institute 175 West Jackson Blvd., Suite 1859 Chicago, IL 60604
PPIC	The Plumbing & Piping Industry Council, Inc. 510 Shatto Place, Suite 402 Los Angeles, CA 90020
RMA	Rubber Manufacturers Association 1400 K Street NW, Suite 900 Washington, DC 20005
SAE	Society of Automotive Engineers, Inc. 400 Commonwealth Drive Warrendale, PA 15096
SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, DC 20005
SBC	Standard Building Code Published by SBCCI

SBCCI	Southern Building Code Congress International Inc. 900 Montclair Road Birmingham, AL 35213
SCDOT	South Carolina Department of Transportation 955 Park Street Columbia, SC 29201
SCDHEC	South Carolina Department of Health and Environmental Control 2600 Bull Street Columbia, SC 29201
SCMA	Southern Cypress Manufacturers Association 400 Penn Center Boulevard, Suite 530 Pittsburg, PA 15235
SDI	Steel Door Institute 30200 Detroit Road Cleveland, OH 44145
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. P.O. Box 221230 Chantilly, VA 22021
SPI	Society of the Plastics Industry, Inc. 1275 K Street NW, Suite 400 Washington, DC 20005
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway Pensacola, FL 32504
SSPC	Society for Protective Coatings 40 24 <sup>th</sup> Street, 6 <sup>th</sup> Floor Pittsburgh, PA 15222
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 25 North Broadway Tarrytown, NY 10591
TPI	Truss Plate Institute 583 D'Onofrio Drive, Suite 200 Madison, WI 53719
UBC	Uniform Building Code Published by ICBO
UL	Underwriters Laboratories Inc. 333 Pfingsten Road

UMC Northbrook, IL 60062  
Uniform Mechanical Code  
Published by ICBO

UPC Uniform Plumbing Code  
Published by IAPMO

USBR Bureau of Reclamation  
U.S. Department of Interior  
Engineering and Research Center  
Denver Federal Center, Building 67  
Denver, CO 80225

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01152

### APPLICATIONS FOR PAYMENT

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

The Contractor shall submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.

##### 1.02 SUBMITTALS

Contractor shall submit Applications for Payment typed on forms approved by the Owner, with itemized data typed on 8 1/2-inch by 11-inch white paper. The itemized data on continuation sheet shall include:

1. Unit bid items as listed in the Bid, indicating quantities complete, percent complete and remaining quantities.
2. Materials on hand, but not installed, along with supporting documentation from suppliers.
3. Supporting documentation for all cash allowance items.
4. Include partial waiver of lien and consent of surety to partial payment forms with each payment request.
5. Documents required by Owner dictated in Bidding and Contract Documents.

##### 1.03 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

When completing the Application for Payment form, the Contractor shall:

1. Fill in required information, including that for Change Orders and Work Change Directives executed prior to date of submittal of application.
2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

When completing the Continuation Sheets, the Contractor shall:

1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar.
3. List each Change Order or Work Change Directive executed prior to date of submission, at the end of the continuation sheets. List by; Change Order or Work Change Directive Number and description, as for an original component item of work.
4. To receive approval for payment on component material stored on site, submit copies of the original paid in-voices with the application for payment.

#### 1.04 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information with a cover letter identifying:

1. Project name and Owner's project number,
2. Application number and date,
3. Detailed list of enclosures,
4. For stored products:
  - a. Item number and identification as shown on application, and
  - b. Description of specific material,
  - c. Invoices must be included with the Application for Payment for stored material to be paid.
  - d. Invoices marked "paid" must be submitted within 60 days of the first Application for Payment for which payment is requested, or the items removed from the Application for Payment.

Contractor shall submit one copy of data with cover letter for each copy of application. As a prerequisite for payment, Contractor is to submit a "Surety Acknowledgement of Payment Request" letter showing amount of progress payment which the Contractor is requesting signed by an authorized agent of the Surety.



The Contractor is to maintain an updated set of drawings to be used as Record Drawings in accordance with Section 01720. As a prerequisite for monthly progress payments, the Contractor is to exhibit the updated record drawings for review by the Owner and the Engineer.

Contractor's progress schedule will be complete and up-to-date as specified as a prerequisite for payment.

#### 1.05 PREPARATION OF APPLICATION FOR FINAL PAYMENT

Contractor shall complete Application for Payment form as specified for progress payments. The Continuation Sheet shall be used for presenting the final statement of accounting. Contractor shall submit all Project Record Documents in accordance with Section 01720.

#### 1.06 SUBMITTAL PROCEDURE

The Contractor shall submit five (5) copies of all Applications for Payment to the Engineer at the times stipulated in the Agreement. When the Engineer finds Applications properly completed and correct, Engineer will transmit to the Owner with copy to Contractor. Applications for payment will not be paid if the Contractor does not have an approved, updated schedule, as specified in Section 01310, for the basis of payment and all Record Drawings are complete and up-to-date.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION \*\***

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## SECTION 01153

### CHANGE ORDER AND FIELD ORDER PROCEDURES

#### PART 1 – GENERAL

##### 1.01 THE REQUIREMENT

Promptly implement change order procedures as follows:

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of Work done on a time-and-material/force account basis.
3. Provide full documentation on request.

Designate in writing the member of Contractor's organization:

1. Who is authorized to accept changes in the Work.
2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the Work.

Owner will designate in writing the person authorized to execute Change Orders and Work Change Directives.

Forms for Change Orders, Work Change Directives and Field Orders are included in Section 01999.

##### 1.02 PRELIMINARY PROCEDURES

Within 30 days of discovering an issue requiring a change, Contractor may initiate a request to make a change in accordance with Contract Documents, by submitting a written notice (in a form acceptable to the Engineer) containing:

1. Description of the proposed changes;
2. Statement of the reason for making the changes;
3. Statement of the effect on the Contract Price and the Contract Time;
4. Statement of the effect on the work of separate Contractors;
5. Documentation supporting any change in Contract Price or Contract Time.

### 1.03 WORK CHANGE DIRECTIVES

In lieu of a Request for Proposal (RFP), Engineer may issue a Work Change Directive (WCD) for the Contractor to proceed with a change for subsequent inclusion in a Change Order.

A WCD will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Price and any change in Contract Time.

Owner will sign and date the WCD as authorization for the Contractor to proceed with the changes.

Contractor may sign and date the WCD to indicate agreement with the terms therein.

### 1.04 DOCUMENTATION OF PROPOSALS AND CLAIMS

Contractor shall support each quotation for a lump-sum proposal, and for each unit price that has not previously been established, with sufficient substantiating data to allow evaluation of the quotation, in accordance with the General Conditions.

On request, Contractor shall provide additional data to support time and cost computations including, but not limited to, the following:

1. Labor required
2. Equipment required
3. Products required
  - a. Recommended source of purchase and unit cost
  - b. Quantities required
4. Taxes, insurance, and bonds
5. Credit for Work deleted from Contract, similarly documented
6. Overhead and profit
7. Justification for any change in Contract Time

Support each claim for additional costs, and for Work done on a time-and-material/force account basis, with documentation in accordance with the General Conditions, plus additional information as follows:

1. Name of the Owner's authorized agent who ordered the Work, and date of the order.
2. Dates and times Work was performed, and by whom.
3. Time record, summary of hours worked, and hourly rates paid.

4. Receipts and invoices for:
  - a. Equipment used, listing dates and times of use
  - b. Products used, listing of quantities
  - c. Subcontracts

#### 1.05 PREPARATION OF CHANGE ORDERS AND FIELD ORDERS

Engineer will prepare each Change Order and Field Order.

Forms: See forms included in Section 01999.

Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

Change Order will provide an accounting of the adjustment in the Contract Price and in the Contract Time.

Field Order will describe interpretations or clarifications of Contract Documents, order minor changes in the Work, and/or document trade-off agreements.

Field Order Work will be accomplished without change in the Contract Price, Contract Time, and/or claims for other costs.

If in agreement, the Contractor shall sign and return Field Orders for execution by the next working day at which time they will become binding on the Contractor.

#### 1.06 CORRELATION WITH CONTRACTOR'S SUBMITTALS

Revise Schedule of Values and Application for Payment forms to record each change as a separate item of Work and to record the adjusted Contract Price.

Revise the Construction Schedule monthly to reflect each change in Contract Time. Revise sub-schedules to show changes for other items of Work affected by the changes.

Upon completion of Work under a Change Order, enter pertinent changes in Record Documents.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01300

### SUBMITTALS

#### PART 1 – GENERAL

##### 1.0 GENERAL

Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, all mechanical, electrical and electronic equipment and systems, materials, reinforcing steel, fabricated items, and piping and conduit details. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents.

##### 2.0 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner. The Contractor shall coordinate submittals among his subcontractors and suppliers and applicable technical sections.

The Contractor shall coordinate submittals with the work so that work will not be delayed. He shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete. This requires that submittals for review and comment shall be returned to the Contractor stamped "No Exceptions Taken" or "Make Corrections Noted."

The Contractor shall certify on each submittal document that he has reviewed the submittal, verified field conditions, and complied with the contract documents.

The Contractor may authorize in writing a material or equipment supplier to deal directly with the Engineer or with the Owner with regard to a submittal. These dealings shall be limited to contract interpretations to clarify and expedite the work.

### 3.0 CATEGORIES OF SUBMITTALS

#### A. GENERAL:

Submittals fall into two general categories; submittals for review and comment, and submittals which are primarily for information only. Submittals which are for information only are generally specified as PRODUCT DATA in Part 2 of applicable specification sections.

At the beginning of work, the Engineer will furnish the Contractor lists of those submittals specified in the project manual. Two separate lists will be provided: submittals for review and comment and product data (submittals) for information only.

#### B. SUBMITTALS FOR REVIEW AND COMMENT:

All submittals except where specified to be submitted as product data for information only shall be submitted by the Contractor to the Engineer for review and comment.

#### C. SUBMITTALS (PRODUCT DATA) FOR INFORMATION ONLY:

Where specified, the Contractor shall furnish submittals (product data) to the Engineer for Information only. Submittal requirements for operation and maintenance manuals, which are included in this category, are specified in Section 01730.

### 4.0 TRANSMITTAL PROCEDURE

#### A. GENERAL:

Unless otherwise specified, submittals regarding material and equipment shall be accompanied by Transmittal Form 01300-A specified in Section 01999. Submittals for operation and maintenance manuals, information and data shall be accompanied by Transmittal Form 01730-A specified in Section 01999. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

A unique number shall be assigned by the Contractor and shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXXXX-YYY-Z"; where "XXXXX" is the Specification section number for the respective submittals. The Specification number will be followed by "YYY" which shall be a sequential number assigned by the Contractor. Resubmittals shall have the following format: "XXXXX-YYY-Z"; where "YYY" is the originally assigned submittal number and "Z" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd, and 3rd



resubmittals, respectively. Submittal 02530-25-B, for example, is the second resubmittal of submittal 25 for Specification 02530. O&M manual submittals shall include the prefix "OM."

B. DEVIATION FROM CONTRACT:

If the Contractor proposes to provide material, equipment, or method of work which deviates from the project manual, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

C. SUBMITTAL COMPLETENESS:

Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

## 5.0 REVIEW PROCEDURE

A. GENERAL:

Submittals are specified for those features and characteristics of materials, equipment, and methods of operation which can be selected based on the Contractor's judgment of their conformance to the specified requirements. Other features and characteristics are specified in a manner which enables the Contractor to determine acceptable options without submittals. The review procedure is based on the Contractor's guarantee that all features and characteristics not requiring submittals conform as specified. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the project manual) or to safety precautions or programs incident thereto. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.

When the contract documents require a submittal, the Contractor shall submit the specified information as follows:

1. 4 copies of all submitted information plus one digital version of all information shall be transmitted with submittals for review and comment.
2. Unless otherwise specified, 4 copies of all submitted information plus one digital version shall be transmitted with submittals (Product Data) for information only.

B. SUBMITTALS FOR REVIEW AND COMMENT:

Unless otherwise specified, within 10 calendar days after receipt of a submittal for review and comment, the Engineer shall review the submittal and return 2 copies of the marked-up original noted in 1 above. The returned submittal shall indicate one of the following actions:

1. If the review indicates that the material, equipment or work method complies with the project manual, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.
2. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT." Except at his own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
4. If the review indicates that the material, equipment, or work method does not comply with the project manual, copies of the submittal will be marked "REJECTED - SEE REMARKS." Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

#### C. SUBMITTALS (PRODUCT DATA) FOR INFORMATION ONLY:

Such information is not subject to submittal review procedures and shall be provided as part of the work under this contract and its acceptability determined under normal inspection procedures.

#### 6.0 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or the Owner, or by any officer or employee thereof, and the Contractor shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

#### 7.0 EXCESSIVE RE-SUBMITTALS

The Owner and Engineer have allotted for each submittal, a review and a resubmittal review (2 reviews per submittal). The Contractor shall be responsible for compensating the Owner for reviews in excess of the re-submittal. The cost of additional submittal review will be based on an hourly rate of \$150/hr.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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## SECTION 01310

### CONSTRUCTION SCHEDULE

#### PART 1 – GENERAL

##### 1.0 SCOPE

This section specifies the procedures for preparing and revising the critical path method construction schedule used for planning and managing construction activities. The schedule provides a basis for determining the progress status of the project relative to specific dates and completion time.

##### 2.0 DESCRIPTION

The Contractor shall provide a graphic construction schedule prepared by the critical path method of analysis. The critical path schedule shall be prepared from estimates of the required duration and sequence for each item of work and function to be performed. A general guide for preparing such a schedule is contained in "The Use of CPM in Construction, A Manual for Contractors," published by the Associated General Contractors of America. Tabulation and analysis of the work schedule shall be performed by computer using a commercially available critical path software program. In addition to the capability to produce tabular reports, the computer software shall plot the construction schedule after the Contractor has produced it in a draft form as required by paragraph 01310-3.

The schedule shall depict all significant construction activities. The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule.

Time for completion and all specific dates given in the Agreement and sequencing requirements described in Section 01014 shall be shown on the schedule. Activities making up the critical path shall be identified.

No activity on the schedule shall have a duration longer than 14 days or assigned value greater than \$250,000, except activities comprising only fabrication, and delivery may extend for more than 14 days. Activities which exceed these limits shall be divided into more detailed components. The schedule duration of each activity shall be based on the work being performed during the normal 40-hour workweek with allowances made for legal holidays and normal weather conditions.

##### 3.0 SUBMITTAL PROCEDURES

Within 10 days after the date of Notice to Proceed, the Contractor shall complete a construction schedule conforming to paragraph 01310-2.0 and representing in detail all planned

procurement and on-site construction activities. The schedule shall be prepared on reproducible paper and may be in draft form with legible freehand lines and lettering. Upon completion of the schedule, the Contractor shall submit the original and two copies to the Engineer in accordance with Section 01300.

Within 7 days after receipt of the submittal, the Engineer shall review the submitted schedule and return one copy of the marked-up original to the Contractor. If the Engineer finds that the submitted schedule does not comply with specified requirements, the corrective revisions will be noted on the submittal copy returned to the Contractor for corrections and resubmitted as specified in Section 01300.

#### 4.0 SCHEDULE REVISIONS

Revisions to the accepted critical path construction schedule may be made only with written approval of the Contractor and Owner. Changes in timing for activities which are not on the critical path may be modified with written agreement of the Contractor and Engineer. A change affecting the contract value of any activity, the timing of any activity on the critical path, the completion time and specific dates (Agreement), and work sequencing (Section 01014) may be made only in accordance with applicable provisions of the General and Supplemental Conditions.

#### 5.0 PROJECT STATUS UPDATE

Project status review and update shall be provided each month and included with the Contractor's Application for Payment.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01380

### PHOTOGRAPHS

#### PART 1 – GENERAL

##### 1.0 PRECONSTRUCTION PHOTOGRAPHS

The Contractor shall provide preconstruction photographs prior to commencement of work on the site. The photographs shall be digital, and shall indicate the date on the image. The file name shall indicate the date and location where the photograph was taken. Before construction may start, preconstruction photos shall be submitted, in accordance with Section 01300, to the Engineer on a CD or DVD. Samples of prints of acceptable quality and identification are available by the Engineer for examination.

Preconstruction photographs shall be taken at locations to be designated by the Owner/Engineer. The photographer shall be equipped to photograph either interior or exterior exposures, with lenses ranging from wide angle to telephoto. Photographs shall be taken to document the existing condition of the area where work is to be performed; and may be used to support or dispel claims by property owners upon completion of the work.

##### 2.0 CONSTRUCTION PHOTOGRAPHS

The Contractor shall provide construction photographs showing the progress of the work. The photographs shall be taken of such subjects as may be directed, and shall indicate on the front of each image the date. The file name will include the date, job title and brief description of the photograph including the location where the photograph was taken.

##### 3.0 REQUIRED NUMBER OF PHOTOGRAPHS

For the work of this contract, photographs shall be provided as needed to document existing conditions, as well as the post-construction condition.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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## SECTION 01500

### CONTRACTOR'S UTILITIES

#### PART 1 – GENERAL

##### 1.01 OFFICE

The Contractor is not required to maintain a suitable office at the site of the work.

##### 1.02 POWER

The Contractor shall provide power for construction at the site. The Contractor shall make arrangements for portable power and/or with the electrical utility and with the Owner for power takeoff points, voltage and phasing requirements, transformers and metering and shall pay the costs and fees arising therefrom. The Contractor shall provide the special connections required for his work.

The Contractor shall provide sufficient electrical lighting so that all work may be done in an efficient manner when there is not sufficient daylight.

The Contractor shall remove all temporary lighting following installation and proper operation of permanent lighting.

##### 1.03 TELEPHONE

The Contractor shall provide the Engineer and Owner a telephone number for the superintendent or foreman responsible for the day-to-day activities at the site.

##### 1.04 SANITARY FACILITIES

The Contractor shall provide toilet and wash-up facilities for his work force at the site of work. The facilities shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of dwellings and camps.

##### 1.05 STAGING AREAS

Unless otherwise approved by Owner and Engineer, the Contractor shall establish staging areas for construction. The Contractor shall be responsible for fencing and other security measures. Any required grading within the staging areas shall be the responsibility of the Contractor.

##### 1.06 WATER FOR FLUSHING AND TESTING

The Contractor shall coordinate with the local water utility for water suitable for flushing and testing the mains. The Contractor shall be responsible for obtaining an approved backflow and metering device from the utility, paying associated deposits/fees for the device, and paying associated costs for all water used on the project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01560

### ENVIRONMENTAL CONTROLS

#### PART 1 – GENERAL

##### 1.01 SITE MAINTENANCE

The Contractor shall keep the work site clean and free from rubbish and debris. Materials and equipment shall be removed from the site when they are no longer necessary. Upon completion of the work and before final acceptance, the work site shall be cleared of equipment, unused materials, and rubbish to present a clean and neat appearance. Streets shall be swept regularly to remove dirt from the roadway.

##### 1.02 TEMPORARY DAMS

Except in time of emergency, earth dams are not acceptable at catch basin openings, local depressions, or elsewhere. Temporary dams of sand bags, asphaltic concrete, or other acceptable material will be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as they are no longer necessary.

##### 1.03 AIR POLLUTION CONTROL

The Contractor shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the regulations of any legally constituted authority. He shall also abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water, in amounts which result in mud on public streets, is not acceptable as a substitute for sweeping or other methods.

##### 1.04 NOISE CONTROL

Between 7:30 p.m. and 7:30 a.m., noise from Contractor's operations shall not exceed limits established by applicable laws or regulations and in no event shall exceed 86 dBA at a distance of 50 feet from the noise source.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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## SECTION 01605

### SHIPMENT, PROTECTION AND STORAGE

#### PART 1 – GENERAL

##### 1.01 GENERAL

Equipment, products and materials shall be shipped, handled, stored, and installed in ways which will prevent damage to the items. Damaged items will not be permitted as part of the work except in cases of minor damage that have been satisfactorily repaired and are acceptable to the Engineer.

##### 1.02 PIPE

Pipe and appurtenances shall be handled, stored, and installed as recommended by the manufacturer. Pipes with paint, tape coatings, linings or the like shall be stored to protect the coating or lining from physical damage or other deterioration. Pipes shipped with interior bracing shall have the bracing removed only when recommended by the pipe manufacturer.

##### 1.03 EQUIPMENT

###### A. PACKAGE AND MARKING:

All equipment shall be protected against damage from moisture, dust, handling, or other cause during transport from manufacturer's premises to site. Each item or package shall be marked with the number unique to the specification reference covering the item.

Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or subassembled units where possible.

###### B. IDENTIFICATION:

Each item of equipment and valve shall have permanently affixed to it a label or tag with its equipment or valve number designated in this contract. Marker shall be of stainless steel. Location of label will be easily visible.

###### C. SHIPPING:

Bearing housings, vents and other types of openings shall be wrapped or otherwise sealed to prevent contamination by grit and dirt.

Damage shall be corrected to conform to the requirements of the contract before the assembly is incorporated into the work. The Contractor shall bear the costs arising out of dismantling, inspection, repair and reassembly.

D. FACTORY APPLIED COATINGS:

Unless otherwise specified, each item of equipment shall be shipped to the site of the work with the manufacturer's shop applied epoxy prime coating. The prime coating shall be applied over clean dry surfaces in accordance with the coating manufacturer's recommendations. The prime coating will serve as a base for field-applied finish coats. Electrical equipment and materials shall be painted by manufacturer.

E. STORAGE:

During the interval between the delivery of equipment to the site and installation, all equipment, unless otherwise specified, shall be stored in an enclosed space affording protection from weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Manufacturer's recommendations shall be adhered to in addition to these requirements.

Equipment and materials to be located outdoors may be stored outdoors if protected against moisture condensation. Equipment shall be stored at least 6 inches above ground. Temporary power shall be provided to energize space heaters or other heat sources for control of moisture condensation. Space heaters or other heat sources shall be energized without disturbing the sealed enclosure.

F. PROTECTION OF EQUIPMENT AFTER INSTALLATION:

After installation, all equipment shall be protected from damage from, including but not limited to, dust, abrasive particles, debris and dirt generated by the placement, chipping, sandblasting, cutting, finishing and grinding of new or existing concrete, terrazzo and metal; and from the fumes, particulate matter, and splatter from welding, brazing and painting of new or existing piping and equipment. As a minimum, vacuum cleaning, blowers with filters, protective shieldings, and other dust suppression methods will be required at all times to adequately protect all equipment. During concreting, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all grease fittings and similar openings shall be covered to prevent the entry of paint. Electrical switchgear, unit substation, and motor load centers shall not be installed until after all concrete work and sandblasting in those areas have been completed and accepted and the ventilation systems installed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***



## SECTION 01630

### SUBSTITUTIONS AND PRODUCT OPTIONS

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

###### A SCOPE OF WORK:

Furnish and install Products specified, under options and conditions for substitutions stated in this Section and the General Specifications.

Whenever a product, material or item of equipment is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, followed by the phrase “or equal,” the specific item mentioned shall be the basis upon which bids are to be prepared, and shall be understood as establishing the type, function, dimension, appearance and quality desired. Other manufacturer's or vendor's products not named will be considered as substitutions, provided the required information is submitted in the manner set forth in this section and provided the substitution will not require substantial revision to the Contract Documents.

##### 1.02 CONTRACTOR'S OPTIONS

Contractor shall supply specified equipment in conformance with the following guidelines:

1. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
2. For products specified by naming several products or manufacturers, select any one of products and manufacturers named which complies with Specifications.
3. For products specified by naming one or more products or manufacturers and stating “or equal,” submit a request as for substitutions, in accordance with this section, for any product or manufacturer which is not specifically named.
4. For products specified by naming only one product and manufacturer, there is no option and no substitution will be allowed.

### 1.03 SUBSTITUTIONS

In order for substitutions to be considered, the Contractor shall submit, within thirty (30) days of issuance of Notice of Award, complete data as set forth herein to permit complete analysis of all proposed substitutions noted on his/her substitutions list. No substitution shall be considered unless the Contractor provides the required data in accordance with the requirements of this Section and General Specifications within the thirty (30) day period.

Submit separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:
  - a. Product identification, including manufacturer's name and address
  - b. Manufacturer's literature; identify:
    - i. Product description
    - ii. Reference standards
    - iii. Performance and test data
    - iv. Operation and maintenance data
  - c. Samples, as applicable
  - d. Name and address of similar projects on which product has been used and date of each installation
2. Itemized comparison of the proposed substitution with product specified; list significant variations. Substitution shall not change design intent and shall perform equal to that specified.
3. Data relating to impact on construction schedule occasioned by the proposed substitution.
4. Any effect of substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.
  - a. Amount of any net change to Contract Sum.

7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, sources of replacement materials.

Substitutions will not be considered for acceptance when:

1. They are indicated or implied on shop drawings or product data submittals without a formal request from Contractor.
2. They are requested directly by a subcontractor or supplier.
3. Acceptance will require substantial revision of Contract Documents.

Requests for substitutions submitted beyond 30-days after the Notice of Award will not be considered unless evidence is submitted to the Engineer that all of the following circumstances exist:

1. The specified product is unavailable for reasons beyond the control of the Contractor. Such reasons shall consist of strikes, bankruptcy, discontinuance of manufacturer, or acts of God.
2. The Contractor placed, or attempted to place, orders for the specified products within ten (10) days after Notice of Award.
3. Request for substitution is made in writing to the Engineer within ten (10) days of the date on which the Contractor ascertains that he/she cannot obtain the item specified.
4. Complete data as set forth herein to permit complete analysis of the proposed substitution is submitted with the request.

The Engineer's decision regarding evaluation of substitutions shall be considered final and binding. Requests for time extensions and additional costs based on submission of, acceptance of, or rejection of substitutions will not be allowed. All approved substitutions will be incorporated into the Agreement by Change Order.

#### 1.04 CONTRACTOR'S REPRESENTATION

In making formal request for substitution, Contractor represents that:

1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.

2. He will provide same warranties or bonds for substitution as for product specified.
3. He will coordinate installation of accepted substitution into the Work and will make such changes as may be required for the Work to be complete in all respects.
4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
5. Cost data is complete and includes related costs under his/her Contract, but not:
  - a. Costs under separate contracts
  - b. Engineer's costs for redesign or revision of Contract Documents

#### 1.05 ENGINEER DUTIES

Engineer shall review Contractor's requests for substitutions with reasonable promptness and notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION \*\***

## SECTION 01700

### RESTORATION OF IMPROVEMENTS

#### PART 1 – GENERAL

##### 1.01 STRUCTURES

The Contractor shall take all precautions necessary to protect the integrity and usefulness of all existing facilities. If necessary, the Contractor may, with the approval of the Owner, remove such existing structures, including curbs, gutters, pipelines and utility poles as may be necessary for the performance of the work, and shall rebuild the structures thus removed in as good a condition as found with the requirements specified. He shall also repair existing structures which may be damaged as a result of the work under this contract.

##### 1.02 ROADS AND STREETS

Unless otherwise specified, roads and streets in which the surface is removed, broken, or damaged, or in which the ground has caved or settled during the work under this contract, shall be resurfaced and brought to the original grade and section. Roadways used by the Contractor shall be cleaned and repaired. Before resurfacing material is placed, edges of pavements shall be trimmed back far enough to provide clean, solid, vertical faces, and shall be free of loose material. All paved surfaces shall be cut with a pavement saw. Rough cuts are not allowed. Repair work shall conform to the paving specifications.

##### 1.03 CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS

Cultivated or planted areas and other surface improvements which are damaged by actions of the Contractor shall be restored as nearly as possible to their original condition. Restoration shall take place within 1 week or sooner as directed by the Engineer.

Existing guard posts, barricades, and fences shall be protected and replaced if damaged.

##### 1.04 PROTECTION OF EXISTING INSTALLATIONS

The Contractor shall protect all existing operating facilities and structures from damages. However, if damage occurs, the Contractor shall immediately correct or replace existing equipment, controls, systems, structures, or facilities which are damaged in any way as a result of his operations.

#### PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01710

### CONTRACT CLOSEOUT

#### PART 1 – GENERAL

##### 1.01 SCOPE

Contractor shall comply with the requirements stated in the General Conditions and the specifications for administrative procedures in closing out the Work.

##### 1.02 SUBSTANTIAL COMPLETION

At the time at which the Work has progressed to the point where, in the opinion of the Owner and Engineer, the Work is sufficiently complete, in accordance with the Contract, so that the Work can be utilized for the purposes for which it is intended.

When the Contractor considers the Work Substantially Complete, the Contractor shall submit to the Engineer:

1. A written notice that the Work, or designated portion thereof, is Substantially Complete for approval, and,
2. A list of items to be completed or corrected.

Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion. Should the Engineer determine that the Work is NOT Substantially Complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
2. The Contractor shall remedy the deficiencies in the Work, and submit a second written notice of Substantial Completion to the Engineer, and,
3. The Engineer will re-inspect the Work.

When the Engineer finds that the Work IS Substantially Complete, the Engineer shall:

1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion found in Section 01999 (Form 01710-A), with a tentative list of items to be completed or corrected before final payment.
2. After consideration of any objections made by the Owner as provided in the General Conditions, and when the Engineer considers the Work Substantially Complete, the

Engineer will execute and deliver to the Owner and the Contractor a definitive Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

### 1.03 FINAL INSPECTION

When the Contractor considers the Work to be complete, he shall submit written certification that:

1. The Contract Documents have been reviewed.
2. The Work has been inspected for compliance with the Contract Documents.
3. The Work has been completed in compliance with the Contract Documents.
4. All equipment and systems have been tested in the presence of the Owner and Engineer and are operational, and,
5. The Work is completed and ready for final inspection.

The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification. Should the Engineer consider that the Work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
2. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Engineer that the Work is complete, and,
3. The Engineer will re-inspect the Work.

When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer shall request the Contractor to make the closeout submittal.

### 1.04 REINSPECTION FEES

Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor, the Owner will compensate the Engineer for such additional services. The Owner will deduct the amount of such compensation from the final payment to the Contractor.

### 1.05 CONTRACTOR'S CLOSE-OUT SUBMITTAL TO ENGINEER

Prior to final payment, the Contractor shall submit the following:

1. Evidence of compliance with the requirements of governing authorities.



2. Project Record Documents conforming to the requirements of Section 01720.
3. Evidence of payment and release of Leins per the requirements of the General Conditions and Supplementary Conditions.
4. Certificate of Insurance for products and completed operations.
5. Complete Contractor's Affidavit Release and Waiver of Lein on the form found in Section 01999.

#### 1.06 FINAL ADJUSTMENT OF ACCOUNTS

The Contractor shall submit a final statement of accounting to the Engineer reflecting all adjustments to the Contract Amount, including:

1. The original Contract Amount
2. Additions and deductions resulting from:
  - a. Previous Change Orders
  - b. Allowances
  - c. Unit prices
  - d. Deductions for incorrect Work
  - e. Penalties and bonuses
  - f. Deductions for liquidated damages
  - g. Deductions for re-inspection payments
  - h. Other adjustments
3. Total Contract Amount, as adjusted
4. Previous payments
5. Sum remaining due

The Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Amount, which were not previously made by Change Orders.

1.07 FINAL APPLICATION FOR PAYMENT

Contractor shall submit the final payment application in accordance with the requirements in the General Conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

## SECTION 01720

### RECORD DRAWINGS

#### PART 1 – GENERAL

Record drawings refer to those documents maintained and annotated by the Contractor during construction and are defined as (1) a neatly and legibly marked set of contract drawings showing the final location of piping, equipment, electrical conduits, outlet boxes and cables; (2) additional documents such as schedules, lists, drawings, and electrical and instrumentation diagrams included in the specifications; and (3) Contractor layout and installation drawings.

Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition. Record documents shall not be used for construction purposes and shall be available for review by the Owner and Engineer during normal working hours at the Contractor's field office. At the completion of the work, prior to final payment, all record drawings shall be submitted to the Owner and Engineer.

Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed. Annotations to the record documents shall be made with an erasable colored pencil conforming to the following color code:

Additions	Red
Deletions	Green
Comments	Blue
Dimensions	Graphite

*\*\*Legibly mark to record actual depths, horizontal and vertical location of underground raceways, cables, and appurtenances referenced to permanent surface improvements.*

The Contractor shall provide survey information for the new gravity sewer system. Survey points will include rim, invert(s), and adjacent ground shot. Survey datum shall be NAD83/NAVD29 and provided as ASCII point files (PNEZD, comma delimited).

Information regarding the rehabilitation of sanitary sewer manholes shall include at a minimum:

- Manhole ID
- Date rehabilitation occurred
- Rim to invert depth
- Number, location and size of pipes connected to manhole

- Type of rehabilitation performed (e.g. lined w/ cementitious liner, replaced frame & cover)
- Additional pertinent information
- Information regarding the rehabilitation of sanitary sewer main lines shall include at a minimum:
  - Upstream and downstream manhole ID
  - Date rehabilitation occurred
  - Rim to invert depth (upstream and downstream)
  - Type of rehabilitation performed (e.g. lined w/ CIPP, conducted CCTV inspection)
  - Number and location of services renewed
  - Additional pertinent information

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

SECTION 01800

ENVIRONMENTAL CONDITIONS

PART 1 – GENERAL

This section describes the environmental conditions which have been observed at the site of the work and which may reasonably be anticipated throughout the life of the project.

The site of the work is at an elevation between 800 and 1100 feet above mean sea level. Climate conditions are described as follows:

Description	JAN	FEB	MAR	APR	MAY	JUN
Average Max. Temperature (°F)	49.9	53.1	61.6	71.7	79.1	85.6
Average Min. Temperature (°F)	31.2	33.7	39.8	48.5	57.9	67.0
Average Total Precipitation (in)	4.11	4.01	4.61	3.61	3.79	4.62
Description	JUL	AUG	SEP	OCT	NOV	DEC
Average Max. Temperature (°F)	88.8	87.9	81.1	71.4	61.7	51.7
Average Min. Temperature (°F)	70.4	69.4	61.8	50.7	41.7	34.0
Average Total Precipitation (in)	4.9	4.66	4.32	3.78	4.15	4.21

*South Carolina State Climate Office*

Additional conditions which may be applicable are specified in other sections.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

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SECTION 01999

REFERENCE FORMS

PART 1 – GENERAL

The forms listed below and included in this section are referenced from other sections of the project manual:

Form No.	Title
EJCDC C-942	Field Order Form
01153-A	Work Change Directive
01300-A	Submittal Transmittal Form
01710-A	Certificate of Substantial Completion Form
01710-B	Contractor's Final Affidavit and Waiver of Lien





01153-A.

**WORK CHANGE DIRECTIVE**

WCD No. \_\_\_\_\_

**Project:** Richland Creek Trunk Sewer

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

**Owner:** Renewable Water Resources

**Design Engineer:** Brown and Caldwell

**To:** \_\_\_\_\_  
**Contractor**

**From:** \_\_\_\_\_  
**Program/Engineer**

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

**You are directed to proceed promptly with the following change(s):**

If a claim is made that the above change(s) have affected Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

**Method of determining change in Contract Price:**

- \_\_\_ Time and materials
- \_\_\_ Unit Prices
- \_\_\_ Cost plus fixed fee
- \_\_\_ Other: \_\_\_\_\_

**Method of determine change in Contract Time:**

- \_\_\_ Contractor's records
- \_\_\_ P/CA's records
- \_\_\_ Other: \_\_\_\_\_

**Estimated change in Contract Price:**

\$\_\_\_\_\_. This estimated change in Contract Price is not to be exceeded without further authorization.

**Recommended By:**

\_\_\_\_\_  
P/CM Date  
cc: Owner, P/CM, Design Engineer and Contractor

01300-A.

**SUBMITTAL TRANSMITTAL**

Submittal Description: \_\_\_\_\_ Submittal No.:<sup>1</sup> \_\_\_\_\_

Spec Section: \_\_\_\_\_

	Routing	Sent	Received
OWNER:	Contractor/CM		
PROJECT:	CM/Engineer		
	Engineer/CM		
CONTRACTOR:	CM/Contractor		

We are sending you  Attached  Under separate cover via \_\_\_\_\_  
 Submittals for review and comment  Product data for information only

Remarks: \_\_\_\_\_

Item	Copies	Date	Section No.	Description	Review action <sup>a</sup>	Reviewer initials	Review comments attached

<sup>a</sup>Note: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit; R = Rejected Attach additional sheets if necessary.

**Contractor**

Certify either A or B:

- A. We have verified that the material or equipment contained in this submittal meets all the requirements, including coordination with all related work, specified (no exceptions).
- B. We have verified that the material or equipment contained in this submittal meets all the requirements specified except for the attached deviations.

No.	Deviation

Certified by: \_\_\_\_\_  
Contractor's Signature

<sup>1</sup>See paragraph 01300-4.0 A, Transmittal Procedure

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

Project: **Richland Creek Trunk Sewer**

This Certificate of Substantial Completion applies to all Work under the Contract Documents or the following specified parts thereof:

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

To: **Renewable Water Resources (ReWa)**  
(OWNER)

And to: \_\_\_\_\_  
(CONTRACTOR)

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR, DESIGN ENGINEER, and P/CA and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on:

\_\_\_\_\_  
(DATE)

A tentative list of items to be completed or corrected will be issued as the punch list. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities and warranties shall be as follows:

**RESPONSIBILITIES:**

OWNER \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

This certificate does not constitute an acceptance of Work that is not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by PROGRAM/CONTRACT MANAGER:

**Program Manager** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Title** \_\_\_\_\_

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

Concurred by ENGINEER:

**Brown and Caldwell**

**Signature** \_\_\_\_\_

**Title** \_\_\_\_\_

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

CONTRACTOR accepts this Certificate of Substantial Completion:

**Contractor** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Title** \_\_\_\_\_

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

OWNER accepts this Certificate of Substantial Completion:

**Renewable Water Resources**

**Signature** \_\_\_\_\_

**Title** \_\_\_\_\_

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

---

cc: Owner, P/CM, Engineer, Contractor

*Page 2 of 2*

ReWa  
Richland Creek Trunk Sewer

01999-6

Bid Documents  
BC PN: 144953

CONTRACTOR'S FINAL AFFIDAVIT & WAIVER OF LIEN

Project: Richland Creek Trunk Sewer

Contract Amount:

Contractor:

State of:

Contract Date:

County of:

Date:

This is to certify that all claims for labor, material, services and nay other just claims arising out of the performance of this Contract have been satisfied, except for payments to subcontractors to be made out of the retainage presently being held by the Owner, and that no claims or liens exist against this Contractor in connection with this Contract; that to the best of our knowledge no claims or liens exist, and if any such claims or liens appear after payment of the retained amount due on the Contract, this Contractor shall save the Owner Harmless on account thereof. After payment of the retained amount the undersigned does hereby waive, release and relinquish any and all claims or rights of lien presently held or hereafter accruing upon the above project.

Contractor:

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

Title:

Sworn to and subscribed before me this

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

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

My Commission expires:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

**\*\*END OF SECTION\*\***

DIVISION 2

SITework

<u>Section</u>	<u>Title</u>
02010	Site Protection and Restoration
02100	Site Preparation
02140	Dewatering
02145	Sewer Bypassing
02200	Earthwork
02211	Rock Excavation
02270	Erosion, Sedimentation and Dust Control
02350	Sheeting, Shoring and Bracing
02450	Boring and Jacking
02500	Pavement Removal and Replacement
02530	Gravity Sewers, Force Mains, and Accessories
02603	Rehabilitation of Sanitary Sewer Manholes
02651	Sewer Television Inspection
02760	Sewer Cleaning
02765	Cured-in-Place Pipe Lining
02766	Sliplining of Existing Sewers
02769	Point Repair of Existing Sanitary Sewer Mains
02777	Pipe Bursting Sewer Lining
02933	Top Soiling and Seeding

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# SITE PROTECTION AND RESTORATION

## SECTION 02010

### PART 1 – GENERAL

#### 1.1 SECTION INCLUDES

A. Specific descriptions of actions to be performed to protect the sites of the construction work, to protect adjacent sites, and to restore all disturbed areas to a condition acceptable to the Owner and the Engineer. Every reasonable effort shall be made to minimize the disturbances that may be caused by the construction work and to restore all disturbed areas to a condition similar to that existing prior to the construction work.

#### 1.2 RELATED SECTIONS

- A. Section 02200 – Earthwork.
- B. Section 02270 – Sediment and Erosion Control.

#### 1.3 GENERAL

A. Differing types of protection and restoration activities are required for the differing areas of the work that will be encountered. In general, the following areas of the work will be encountered:

1. Permanent easements, of varying width.
2. Temporary construction easements of varying width.
3. Encroachment permits or approvals for work located within public rights-of-way or utility easements.

B. Until the time of contract award, easement plats will be available for review at the office of \_\_\_\_\_, in \_\_\_\_\_, S.C. These documents may be reviewed by appointment only during normal working hours. At the pre-construction conference, two (2) copies of the easement plats and/or Easement Documents will be furnished.

#### 1.4 PAYMENT

A. Include payment for Site Protection and Restoration associated with the installation of pipe and appurtenances in the contract unit price for corresponding sewer line or other corresponding payment items.

B. No separate measurement or payment will be made for Site Protection and Restoration.

C. Restoration and clean-up activities must keep pace with actual installation of pipe

and appurtenances.

PART 2 PRODUCTS (NOT USED)

### PART 3 – EXECUTION

#### 3.1 PERMANENT EASEMENT WORK

- A. Clear and grub an area extending to the limits of the permanent easement, remove all trees and undesirable vegetation, and perform the necessary construction work.
- B. After construction is completed, restore the disturbed area of the permanent easement to its original shape and grade with topsoil cover, and seed the disturbed area as described in SECTION 02933- SEEDING.

#### 3.2 TEMPORARY EASEMENT WORK

- A. Use and occupy temporary construction easements, but only to the extent necessary to properly perform the needed construction work. Trees and undesirable vegetation may be removed, but only when they interfere with the course of the work. Any trees that are removed shall be replaced as directed by the Engineer. Any trees that are damaged shall be pruned, trimmed, and/or treated with an appropriate tree dressing, as directed by the Engineer.
- B. After the construction work is finished, restore the temporary easements to original shape and grade complete with topsoil cover. Seed the easement areas, where disturbed, as described in SECTION 02933 - SEEDING. Adjust fertilization, liming, and seeding rates to assure an acceptable stand of grassing, which will reasonably duplicate the previous condition of the easement.

#### 3.3. RIGHT-OF-WAY WORK

- A. For all practical purposes, follow the provisions of the paragraph within this Section entitled "PERMANENT EASEMENT WORK" for all work performed on public and utility rights-of-way.
- B. Additionally, strictly follow all requirements of the agency or utility associated with any particular right-of-way, and shall contact the affected agency or utility prior to performing work in rights-of-way.

#### 3.4. OTHER CONSIDERATIONS

- A. The acquired easements provide the right of ingress and egress across private property. However, do not occupy or disturb any private property located outside of either the temporary or the permanent easements, unless determined essential to the progress of construction with written permission of Engineer.

B. Immediately repair any damage to non-easement private property during the construction period or make such settlement as may be agreed by the property owner at no expense to the Owner.

C. In general, strictly adhere to several rules concerning open excavations, as follows:

1. No open excavations shall be left unattended.
2. No excavations shall be left open overnight.
3. In areas in or adjacent to paths of vehicular and pedestrian traffic, take special precautions (such as fencing, barricades, warning signs, area lighting, flashing safety lights, etc.) to insure that any person present at the site is made aware of the construction work and is reasonably protected from injury. Comply with all provisions of the General Conditions with respect to safety and protection.

D. Take special precautions to insure that permanent structures, wherever they may be located, are not damaged by the construction work and associated activities.

E. Immediately repair any damage to permanent structures during the construction period or the warranty period or make such settlement, as shall be agreed by the owner of the damaged structure, at no expense to the Owner. Submit a written summary of the damage repairs or settlement for approval by the Engineer prior to final payment.

**\*\*END OF SECTION\*\***

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SECTION 02100  
SITE PREPARATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies site preparation which consists of clearing, grubbing and demolition.

B. EXISTING CONDITIONS:

The Contractor shall determine the actual condition of the site as it affects this portion of work.

C. PROTECTION:

Site preparation shall not damage structures, landscaping or vegetation adjacent to the site. The Contractor shall repair, or replace any damaged property.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CLEARING AND GRUBBING

Unless otherwise specified, the Contractor shall remove obstructions such as brush, trees, logs, stumps, roots, heavy sod, vegetation, rock, stones larger than 6 inches in any dimension, broken or old concrete and pavement, debris, and structures where the completion of the work require their removal.

Material that is removed and is not to be incorporated in the work shall be disposed of off the site.

Drawings indicate limits of permanent and temporary easements. Clearing and grubbing shall be limited to areas needed for construction, not necessarily the entire easement width.

### 3.02 DEMOLITION AND REMOVAL

#### A. STRUCTURES:

Demolition and removal of structures consist of removal of abandoned superstructures, foundation walls, footings, slabs and any other structures. Excavations caused by existing foundations shall be cleared of waste, debris and loose soil, and refilled as specified.

#### B. PAVEMENT:

When portions of asphalt pavements and concrete pads are to be removed and later construction is to be connected, edges shall be saw cut, on a neat line at right angles to the curb face.

#### C. SALVAGE:

The Owner has the right to salvage any items scheduled for removal. The Contractor shall notify the Engineer 15 days prior to any salvage or demolition work to determine the disposition of items to be removed. The Engineer will mark items to be salvaged. Such items shall be properly disconnected, removed from their foundations, cleaned, and stored at a location on the plant site as specified.

### 3.03 UTILITY INTERFERENCE

Where existing utilities interfere with the prosecution of the work, the Contractor shall relocate them in accordance with the General Specifications and Supplementary Conditions.

**\*\*END OF SECTION\*\***

## SECTION 02140

### DEWATERING

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

The Contractor shall design, furnish, operate, and remove temporary dewatering systems to lower and control water to maintain stable, undisturbed subgrades.

Dewatering includes but is not limited to the lowering of the water table, the lowering of the hydrostatic pressure, preventing surface water from entering the excavation during construction, preventing ground water from entering the excavation during construction, installation of recharging systems and/or disposing of discharge water, and installing and monitoring observation wells and settlement markers. Common dewatering methods include sump pumping, deep wells, well points or combinations thereof.

##### 1.02 QUALITY ASSURANCE

Contractor shall prepare dewatering design including calculations and drawings under the direction of a South Carolina Registered Professional Engineer. All dewatering design drawings, calculations, and details shall be stamped and signed by a South Carolina Registered Professional Engineer.

When the use of well points, deep wells, recharge systems, or equal systems are required to design the groundwater control, the Contractor shall employ the services of a dewatering specialist that has the following qualifications:

1. A minimum of 10 years' experience in the design and construction of well points, deep wells, recharge systems, or equal systems.
2. Have completed at least five successful dewatering projects of equal size and complexity and with equal systems.
3. Retains the services of a South Carolina Registered Professional Engineer with a minimum of 10 years' experience in the design of well points, deep wells, recharge systems, or equal systems.
4. Retain the services of a field representative having a minimum of 5 years' experience in the design and installation of well points, deep wells, recharge systems, or equal systems.

The Contractor shall notify the Engineer immediately if any settlement or movement is detected of survey points on structures adjacent to excavations being dewatered. If settlement or

movement is deemed to be related to the dewatering, discontinue dewatering and submit a modified dewatering plan to the Engineer within 24 hours. Do not continue dewatering until the modified dewatering plan has been approved. Implement the approved modified plan and repair any damage incurred to the adjacent structures at no additional cost to the Owner.

If the dewatering system does not maintain the groundwater level so as to maintain the specified subgrade condition and density requirements, notify the Engineer and modify system to perform as specified at no additional cost to the Owner.

The Contractor shall obtain and comply with permits, laws, regulations, rules and codes required.

### 1.03 SUBMITTALS

Submit the following in accordance with Section 01300:

#### A. QUALIFICATIONS OF DEWATERING SPECIALIST:

List of at least five successful dewatering projects. Contact information shall include names, current addresses, and telephone numbers of the Owner or persons who were in charge of representing the Owner of those five construction projects during the time of the dewatering.

Contractor shall submit qualifications of specialist's or firm's South Carolina Registered Professional Engineer who shall stamp and seal shop drawings of dewatering plan. Contractor shall submit qualifications of specialist's or firm's field representative who shall oversee the installation, operation and maintenance of the dewatering system.

#### B. DEWATERING PLAN:

Shop drawings and calculations stamped and signed by a South Carolina Registered Professional Engineer. Drawings shall indicate the locations and sizes of berms, dikes, ditches, all deep wells, observation wells, sand and gravel filters, piezometers, settlement points, well points, sumps, recharge systems, and discharge lines, including their relation to sedimentation ponds.

Dewatering plan shall also include a description of the capacities of the pumps, prime movers, and standby equipment. The plan shall also include a detailed description of the sequence of dewatering activities, maintenance requirements and system removal procedures and a list of all applicable laws, regulations, rules, and codes to which dewatering design conforms.

#### C. DEWATERING SYSTEM MONITORING REPORTS:

Contractor shall submit to Engineer observation well data, daily piezometric levels shall be identified by date, time, well number, and system (subsystem if multiple pumps are used) pumping rate. Piezometric levels shall be reported in feet of drawdown and groundwater elevation.



Contractor shall submit to Engineer dewatering well data, suspended material test results shall be identified by date, time, well number, well pumping rate (if monitored) and system (subsystem if multiple pumps are used) pumping rate.

#### D. MODIFIED DEWATERING PLAN:

A modified dewatering plan shall be submitted to the Engineer within 24 hours, if open pumping from sumps and ditches results in boils, loss of fines, softening of the ground or instability of the slopes.

### 1.04 SITE CONDITIONS

The project geotechnical report (s) include existing geotechnical data of the site, including boring logs, laboratory and field test results. Locations of the borings shall be as indicated on the drawings.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.01 DEWATERING

Contractor shall design, furnish, install, and maintain dewatering system in accordance with approved dewatering plan. Contractor shall follow guidelines recommended by Terracon in their Geotechnical Engineering Report dated March 31, 2014. Locate dewatering system components so that they do not interfere with construction under this or other contracts. Dewatering program shall be conducted in such a manner as to prevent undermining or disturbing foundations of existing structures or of work ongoing or previously completed.

Contractor shall not begin excavation until the dewatering system is fully operational and the excavation may proceed without disturbance to the final subgrade. Dewatering should continue until backfilling of excavation reaches a level above original groundwater level. Dewatering shall continue uninterrupted until the structures, pipes, and appurtenances to be built there have been completed such that they will not be floated or otherwise damaged by an increase in groundwater elevation.

Contractor shall discontinue open pumping from sumps and ditches, if such pumping is resulting in boils, loss of fines, softening of the ground, or instability of the slopes. The dewatering plan will be modified and submitted to the Engineer within 24 hours at no additional cost to the Owner. Where subgrade materials are unable to meet the subgrade density requirements due to improper dewatering techniques, remove and replace the materials in accordance with Section 02200 at no additional cost to the Owner.

### 3.02 DEWATERING DISCHARGE

Contractor shall install sand and gravel filters in conjunction with well points and deep wells to prevent the migration of fines from the existing soil during the dewatering operation. Water from the dewatering operation shall be transported without interference to other work, damage to existing pavement, other surfaces or property. Pumped water shall be discharged to a sedimentation pond or drainage system as indicated or specified. Contractor to install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified and as part of the overall dewatering plan. Discharge water shall not be pumped into any storm, plant waste, or sanitary sewer system. Engineer reserves the right to sample the discharge water at any time to ensure environmental laws and permits are being adhered to.

Contractor shall not pump water found to be contaminated with oil or other hazardous material into indicated or specified sedimentation ponds or drainage systems without treatment.

### 3.03 MONITORING DEVICES AND RECORDS

Contractor shall install, maintain and take measurements at least once a day and three times a day for 3 days after dewatering startup or during failure of dewatering system, from observation wells during the period of time that the dewatering system is in operation. Contractor shall extend observation wells below the earth retention system and install them around the perimeter of the excavation. Observation wells shall not be spaced more than 100 feet apart around the perimeter of the excavation. Observation wells shall be installed midway between, multiple stage well point systems and/or deep well shafts. Contractor shall modify the dewatering system in order to maintain the specified water level.

Contractor shall install, maintain and take measurements from the geotechnical instruments, including settlement markers (reference points on surrounding structures) and piezometers, as part of the overall dewatering plan. Settlement markers shall be placed on all structures within a distance equal to twice the depth of the excavation, from the closest edge of the excavation. Settlement survey measurements shall be taken and reported to 0.001 feet.

### 3.04 REMOVAL OF DEWATERING SYSTEM

Contractor shall not remove the dewatering system without written approval from the Engineer. Contractor shall backfill and compact sumps or ditches with screened gravel or crushed rock in accordance with Section 02200.

Contractor shall remove well points and deep wells. Well holes shall be abandoned in accordance with local and state regulations.

If an equal system has been used, Contractor shall remove and backfill in accordance with approved dewatering plan.

**\*\*END OF SECTION\*\***

SECTION 02145  
SEWER BYPASSING

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section describes the existing conditions for temporary bypassing and dewatering of sewers during the removal of existing sanitary sewer facilities and the construction of new sewer mains and structures, including pumping stations.

B. REQUIREMENTS:

1. Contractor shall provide labor, materials, and supervision to bypass flow around the Contractor's work in accordance with the needs of the project. All references to the bypass pumping and/or bypass pumping system include, but are not limited to, all pumps, piping, plugs, valves and other equipment needed to move the intended flow from one location to another.

2. The actual design of the bypass arrangement and alignment shall be prepared by the Contractor, and shall be submitted to the Engineer to determine conformance to project objectives. Means and methods of accomplishing the bypassing shall be the responsibility of the Contractor.

3. Sanitary sewer mains shall remain in service at all times throughout the duration of the project. Contractor shall be responsible for diverting flow away from the limits of construction through the use of bypass pumping or flow diversions with prior written approval by the Engineer.

4. Service to laterals shall be disrupted for a period of no more than 8 hours. Laterals within residential areas shall only be out of service between the hours of 8:00 am to 5:00 pm, Monday through Friday. Laterals within business areas shall be addressed on a case by case basis. If Contractor feels that it is necessary to disrupt lateral services for a period longer than 8 hours, Contractor shall provide alternate means of service without disrupting use of the service by the owner/resident.

5. Contractor shall maintain pedestrian and vehicular traffic and comply with ADA regulations for access to all residential and commercial property unless written approval is otherwise obtained from the property owner allowing for reduced access.

6. It is the Contractor's responsibility to arrange all necessary access and temporary construction agreements with all affected parties for the location of the bypass pumping system.

7. The bypass pumping system shall be designed to normally maintain the wastewater flow below the top of the pipe, without surcharging.

8. The Contractor shall have the complete bypassing system in place and successfully pressure tested at 1.5 times the maximum operating pressure of the system before bypassing any sewage.

9. The Contractor shall notify the Engineer 48 hours prior to shutting down or bypassing the pipeline.

10. The bypassed flow shall be continuously monitored by Contractor personnel.

11. Contractor is responsible for immediate and proper cleanup should any spill occur, regardless of amount.

#### C. EXPERIENCE:

Contractor shall utilize staff and/or a subcontractor that has been directly responsible for completion of a sewer bypass that required the bypass pumping of sewage flows in excess of 20 mgd.

#### 1.02 SUBMITTALS

At the Preconstruction Conference the Contractor shall submit, in accordance with Section 01300, drawings and complete design data showing methods and equipment he proposes to utilize in sewer bypassing for approval by the Engineer. The submittal shall include the following information:

1. Drawings indicating the scheme and location of temporary sewer plugs and bypass discharge lines. The drawings shall also show the method and location for discharging the bypass lines.
2. Capacities of pumps, prime movers, and standby equipment.
3. Design calculations proving adequacy of the system and selected equipment.
4. Standby power source.
5. Staffing plan.

6. Show suction and discharge points with elevations & stationing on the design plans.
7. Provide pump performance curves.
8. Submit calculations to verify suction lift of pumps has not been exceeded.
9. Contractor shall submit proposed noise control and exhaust control plans for pumping equipment.
10. Contractor shall submit a proposed plan for disruption of sewer service laterals, if applicable.
11. Contractor shall submit bypass piping inspection plan.

The actual design of the bypass arrangement shall be prepared by the Contractor or Subcontractor performing the work, and shall be submitted to the Engineer to determine conformance to project objectives. The Contractor shall be responsible for any Subcontractors design (if used) on this Project. Means and methods of accomplishing the bypassing shall be the responsibility of the Contractor.

Approval of submitted plans for sewer connection and temporary rerouting shall in no way relieve the Contractor of their responsibility for the protection of adjacent properties, downstream drainage systems and water tributaries against sewage spill. Any litigation, claims, fines, etc. associated with any sewage spill shall be the responsibility of the Contractor.

### 1.03 JOB CONDITIONS

#### A. AVAILABLE FLOW DATA:

Estimated flow data for the influent sewers at the project site is located in 3.01 of this section.

#### B. PROTECTION:

In areas where flows are bypassed, all bypass flows shall be discharged as approved by the Engineer. No bypassing to the ground surface, receiving waters, storm drains, or bypassing which results in soil or groundwater contamination or any potential health hazards shall be permitted.

#### C. SCHEDULING:

The bypassing system shall not be shut down between shifts, on holidays or weekends, or during work stoppages. The bypass system will be monitored and maintained at all times until the bypassing is no longer required.

## PART 2 – PRODUCTS

### 2.01 PUMPING SYSTEMS

Contractor shall maintain on site, the following minimum requirements for all bypass pumping systems:

1. Sufficient equipment and materials to ensure continuous and successful operation of the bypass and dewatering systems. The COMPLETE bypass system, including all piping, shall be continuously monitored by Contractor personnel.
2. A system of pumps and piping operating on site to maintain a minimum 50 percent over capacity of the anticipated maximum flow (as determined by the Contractor). In addition, the Contractor shall have a standby pump, equal in capacity to the largest pump in the system, piped, plumbed and ready for operation. Standby pumps shall be fueled and operational at all times.
3. The Contractor shall maintain on site a sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, hoses and other parts of system hardware to ensure immediate repair or modification of any part of the system as necessary.
4. All bypass piping shall be fused HDPE piping.
5. The bypass piping system shall include multiple pipelines to convey 200 percent of the maximum anticipated flow (as determined by the Contractor).

## PART 3 – EXECUTION

### 3.01 ESTIMATED FLOWS AND SEWER CAPACITY PROJECT PIPELINE

#### A. DAILY FLOW DATA:

The following paragraph provides estimated daily flow information for the project pipeline. The information was estimated from the data provided by the Owner. For additional information contact the Owner, during normal business hours. Use of this flow data in no way relieves the Contractor from his responsibilities for design, construction and operation of an adequate and properly functioning bypass system. Any additional monitoring or gathering of flow data is the responsibility of the Contractor.

The estimated average day and peak hourly flows for the project are presented below.

Average Day And Peak Hour Sewage Flows			
Location	Line Size (in.)	Average Daily Flow (MGD)	Peak Hourly Flow (MGD)
Cleveland Park	30/30	3.2	17.8
Wade Hampton Blvd	18/18	2.3	10.1
Mohawk Drive	12	0.3	3.6
Chick Springs Drive	10/10	0.9	2.8
Rutherford Road	15	0.4	1.0

Abbreviations: MGD – million gallons per day

#### B. FLOW CONDITIONS:

The Contractor is responsible for obtaining current flow condition information at the time of construction. The Owner is not responsible for any deviations in quantity of sewage flow at any time during the construction period. Higher flows may be encountered depending on weather and other upstream conditions.

#### 3.02 INSPECTION

The Contractor shall regularly inspect the entire bypass pumping and piping system for leaks for spills. The Contractor shall also create an inspection log and shall enter the time of the inspections and the condition of the piping and the name of the inspector into the log for review by the Engineer.

#### 3.03 DAMAGES

The Contractor shall repair, without cost to the owner, any damage that may result from his negligence, inadequate or improper installation, maintenance and operation of bypassing system, including mechanical or electrical failures.

**\*\*END OF SECTION\*\***

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## SECTION 02200

### EARTHWORK

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

###### A. REQUIREMENTS:

Furnish all labor, materials, equipment and incidentals necessary to perform all excavation, backfill, fill and grading required to complete the work shown on the Drawings and specified herein. The work shall include, but not necessarily be limited to: excavation for structures, culverts, footings, manholes, pipes, vaults, ducts and paving; backfilling, fill and required borrow; embankment and grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing, dewatering and water handling.

###### B. CONTENTS AND RELATED WORK:

This section includes the following:

1. Preparation of subgrade for structure foundations, general fill placement, embankment construction, sidewalks and pavement.
2. Placement and compaction of structural fill in soil embankments, and beneath structures, sidewalks and pavements/
3. Excavation and backfill of trenches within construction lines.
4. Excavating and backfilling for underground utilities.
5. Related work:
  - a. Demolition and Salvage: Section 01046
  - b. Site Preparation: Section 02100
  - c. Dewatering: Section 02140
  - d. Erosion Sediment and Dust Control: Section 02270
  - e. Topsoil and Seeding: Section 02933
  - f. Pavement Removal and Replacement: Section 02500

- g. Gravity Sewers, Force Mains and Accessories: Section 2530
- h. Rock Excavation: Section 02211

C. DEFINITIONS:

1. **COMPACTION:** The construction activities required to obtain a specified percentage of the maximum dry density (MDD) at the measured moisture content determined in accordance with applicable ASTM D1556, ASTM D2937, and ASTM D698. The minimum required percent compaction beneath structures, piping, and pavement is provided in Table A in this section.

2. **EARTH EXCAVATION:** Excavation consists of removal of materials encountered to subgrade elevations indicated, which in the opinion of the Engineer, using guidelines listed below is not classified as rock excavation.

3. **EARTH EXCAVATION BELOW SUBGRADE:** Same as Earth Excavation except excavation is performed below elevations given as subgrade on the Drawings.

4. **ROCK EXCAVATION:** To be completed in compliance with Section 02211 of the Specifications.

5. **STRUCTURAL FILL MATERIAL:** Material placed and compacted beneath structures, footings, foundations, slabs and roadways. Structural fill material shall be Type A, B, C or D as determined by the Engineer or as shown on the Drawings.

6. **UNSUITABLE MATERIAL:** Materials which do not meet the requirements of structural fill or common fill and cannot meet the compaction requirements shall be classified as unsuitable material.

7. **ADDITIONAL EXCAVATION:** When excavation has reached the required subgrade elevations, notify the Engineer, who will make an inspection of conditions. If the Engineer determines that bearing materials at the required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered, and replace excavated material as directed by the Engineer with suitable material.

8. **SUBGRADE:** The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials which are shown on the Project Drawings as the planned bottoms for footings, foundations, slabs and/or trench excavations.

9. **STRUCTURE:** Buildings, foundations, slabs, junction chambers, curbs, or other man-made stationary features occurring above or below ground surface.

## 1.02 QUALITY ASSURANCE

### A. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In case of conflict between the requirements of this section and the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM C136	Standard Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D422	Test Method for Particle-Size Analysis of Soils
ASTM D1556	Test Method for Density of Soil in Place by the Sand-Cone Method
ASTM D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods
ASTM D2937	Test Method for Density of Soil in Place by Drive Cylinder Method
ASTM D2216	Test Method for Moisture Content of Soils
ASTM D698	Moisture Density Relationship of Soils Using 5.5-lb Rammer and 12-in. Drop (Standard Proctor Method of Density Measurement)
ASTM D422	Grain Size Analysis for Soils
ASTM 4318	Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D3017	Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

Reference	Title
SCDOT	Standard Specifications for Highway Construction

**B. QUALITY ASSURANCE TESTING:**

1. An independent quality assurance testing laboratory, under the direction of the Engineer and the Owner, will take soil/aggregate samples and perform moisture content, gradation, compaction, and density tests during placement of backfill materials to check compliance with these specifications. The Contractor shall provide access and remove surface material at locations designated by the Engineer and provide such assistance as necessary for sampling and testing. The Engineer may direct the Contractor to construct inspection trenches in compacted or consolidated backfill to determine that the Contractor has complied with these specifications..

Tests will be made by an independent testing laboratory in accordance with the following test methods:

Test	Standard Procedure
Moisture content	ASTM D3017 or ASTM D2216
Gradation	ASTM C136 or D422
Density in-place	ASTM D1556, 2922 or D2937
Moisture-density relationships	ASTM D698

2. Prior to the general placement of fill, and during such placement, the Engineer may select areas within the limits of the fill for testing the degree of compaction obtained.

3. In-place density testing of trenches shall be a minimum of 75 and a maximum of 125 linear feet of trench and at vertical intervals of 2 feet or less as the fill is being placed, or as determined by the Engineer.

4. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

**1.03 SUBMITTALS**

Submittals shall be made in accordance with Section 01300. In addition, the following specific information shall be provided:

1. Samples of fill materials proposed for use shall be submitted, per Section 01300, to the Engineer 2 weeks in advance of use. Samples shall consist of 0.5 cubic foot or a 20-lb sample of each type of material, whichever is greater.

2. **FIELD AND LABORATORY TEST REPORTS:** Independent testing laboratory shall furnish the Engineer and Contractor two copies of the field and laboratory test

reports. Passing field test report of in-place density and compaction will be required as evidence of acceptance of materials represented.

3. AGGREGATE MATERIAL CONFORMANCE TEST RESULTS: Prior to acceptance of aggregate materials for use as fill material conduct aggregate quality tests in accordance with the requirements of this Section and appropriate reference standards. The Engineer and Owner reserve the right to accept or reject materials based on certification from the supplier that the aggregate meets the requirements of this specification.

4. BORROW SOURCE MATERIAL TEST RESULTS: Prior to acceptance borrow source for soil fill materials conduct quality tests in accordance with the requirements of this Section and appropriate reference standards. The Engineer and Owner reserves the right to accept or reject soil fill materials based on conformance with the materials properties outlined in Section 2.01 of this specification.

#### 1.04 FIELD MEASUREMENTS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

#### 1.05 GENERAL

A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonably accurate information about the existing elevations. They are not precise. Become satisfied as to the exact quantities of excavation and fill required.

B. Perform earthwork operations in a safe and proper manner with appropriate precautions being taken against all hazards.

C. Maintain all excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels in good condition at all times until final acceptance by the Owner. Repair all damage caused by erosion or other construction operations using material of the same type as the damaged material.

D. Perform earthwork within the rights-of-way of the SCDOT in accordance with requirements and provisions of the permits issued by this agency for the construction within its rights-of-way. Such requirements and provisions, where applicable, will take precedence and supersede the provisions of these Specifications.

E. Control grading in a manner to prevent surface water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains or temporary drains. Free access must be provided to all parts of project.

F. No classification of excavated materials will be made. Excavation work will include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the work, regardless of the type, character, composition or condition thereof.

G. Ensure that all earthwork operations comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles, Mechanized Equipment, and Marine Operations. Conduct operations in a manner acceptable to the Engineer.

H. Make a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. Provide all services, labor, equipment and materials necessary or convenient for completing the work within the time specified in these Contract Documents.

#### 1.06 COORDINATION

A. Coordinate work with ReWa and other Contractors as required.

B. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

### PART 2 – MATERIALS

#### 2.01 FILL MATERIALS

A. TYPE A – SELECT FINE-GRAINED FILL MATERIAL:

Type A material shall be a clean gravel/sand mixture free from organic matter and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
¾-inch	100
3/8-inch	70-100
No. 4	55-100
No. 10	35-95
No. 20	20-80
No. 40	0-55
No. 100	0-2

B. TYPE B – SELECT COARSE GRAINED FILL MATERIAL:

Type B material shall be a select granular material free from organic matter and of such size and gradation that the specified compaction can be readily attained. Material shall have a sand equivalent value determined in accordance with ASTM D2419 of not less than 20 and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
3-inch	100
No. 4	35-100
No. 30	20-100

The coefficient of uniformity shall be 3 or greater.

The material may be an imported quarry screenings, clean natural sand or gravel, select trench excavation or a mixture thereof.

C. TYPE C – GENERAL BACKFILL MATERIAL:

Type C material shall be unclassified material which is free from topsoil, peat, wood, roots, bark, debris, lumber, garbage, rubbish or other extraneous material. The maximum size of rock and/or stone shall not exceed 6 inches. Type C material will have a plasticity index less than 25 percent and the rock to soil ratio shall not exceed one part rock to three parts soil. If the material excavated from the site meets these requirements, it may be classified as Type C.

D. TYPE D – AGGREGATE BACKFILL:

Type D material shall be free-draining granular material or commonly known as pea gravel and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
1/4-inch	100
No. 8	0-5

E. TYPE E – SURGE STONE BACKFILL:

Type E material shall be crushed rock commonly known as drain rock and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
1-1/2-inches	100
3/4-inch	30-75
1/2-inch	15-55
1/4-inch	0-5

Type E material shall be composed of hard, durable, sound pieces having a specific gravity of not less than 2.65.

F. TYPE F – AGGREGATE BASE COARSE (ABC) STONE:

Type F material shall be crushed rock and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
1-1/2-inch	87-100
3/4-inch	45-90
No. 4	20-50
No. 30	6-29
No. 200	0-12

Type F material shall be composed of hard, durable, sound pieces having a specific gravity of not less than 2.65.

G. TYPE G – COARSE AGGREGATE BACKFILL:

Type G material shall be pervious backfill material conforming to the following gradation:

U.S. Standard Sieve Size	Percent by Weight Passing
2-inch	100
No. 50	0-100
No. 100	0-8
No. 200	0-4

H. TYPE H – CLASS A RIPRAP MATERIAL:

Type H material shall be SCDOT Class A or riprap shall be graded rock having a range of individual rock weights as follows:

Rock Size	Weight of Stone	Percent Smaller by Weight
0.75 feet	37 pounds	100
0.50 feet	11 pounds	50
0.20 feet	0.7 pounds	15

Based on a specific gravity of 2.65.

I. TYPE I – CLASS B RIPRAP MATERIAL:

Type I material shall be SCDOT Class B or riprap shall be graded rock having a range of individual rock weights as follows:



Rock Size	Weight of Stone	Percent Smaller by Weight
1.30 feet	200 pounds	100
0.95 feet	75 pounds	50
0.40 feet	5 pounds	10

Based on a specific gravity of 2.65.

J. TYPE J – UNCLASSIFIED MATERIAL:

Type J material shall be unclassified material and may be obtained from excavation on site. The material may contain extraneous material such as demolition waste, unsuitable material excavated from beneath structures, and clearing and grubbing debris up to 50 percent by volume excess fill in non-structural areas. Extraneous material shall be thoroughly mixed and the maximum size of organic particles shall be 6 inches.

K. CONCRETE:

Concrete for bedding, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

PART 3 – EXECUTION

3.01 GENERAL

A. EXCAVATION ACTIVITIES:

Perform excavation and compaction using machinery, except in areas where hand work is necessary to protect structures, buried utilities, and private/public properties. No additional compensation will be paid for hand excavation/compaction unless identified on the Drawings and the Specifications.

Perform excavation and compaction of every description and with all encountered materials to the lines, grades, or depth indicated on the Drawings, and as specified herein.

Extend excavation and compaction a sufficient distance from the footings, and foundations to permit placement and removal of concrete formwork, installation of other utilities and to allow access for inspection and testing.

B. EXCAVATION BELOW SUBGRADE:

Do not excavate below depths indicated on the Drawings or below such depths as required by the Engineer.

Excavation below depths indicated on the Drawings that occur through the fault of the Contractor, shall be restored to the indicated or required depths with suitably compacted structural fill material at the expense of the Contractor. The type of the material used for structural fill for excavation below subgrade will be as selected by the Engineer. The expense for restoration of the materials that were removed with prior approval of the Engineer and Owner will be paid by the Contractor.

If the removal of unsuitable materials below the subgrade is required by Engineer, the voids caused by the approved over excavation shall be backfilled and compacted up to the planned subgrade elevation with Structural Backfill Material.

C. CONTROL OF WATER:

The Contractor shall keep excavations reasonably free from water during construction. The static water level shall be drawn down a minimum of 1 foot below the bottom of excavations to maintain the undisturbed state of natural soils and allow the placement of any fill to the specified density. Disposal of water shall not damage property or create a public nuisance. The Contractor shall have on hand pumping equipment and machinery in good working condition for emergencies and shall have workmen available for its operation. Dewatering systems shall operate continuously until backfill has been completed to 1 foot above the normal static groundwater level. Dewatering shall be performed in accordance with Section 02140.

Groundwater shall be controlled to prevent softening of the bottom of excavations, or formation of "quick" conditions. Dewatering systems shall not remove natural soils. The Contractor shall control surface runoff to prevent entry or collection of water in excavations.

Release of groundwater to its static level shall be controlled to prevent disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipelines.

D. SURPLUS MATERIAL:

Unless otherwise specified, surplus excavated material shall be disposed of off site in accordance with applicable ordinances and environmental requirements.

If the quantity of surplus material is specified, the quantity specified is approximate. The Contractor shall satisfy himself that there is sufficient material available for the completion of the embankments before disposing of any material inside or outside the site. Shortage of material, caused by premature disposal of any material by the Contractor, shall be replaced by the Contractor, at no additional cost to the Owner.

Material shall not be stockpiled to a depth greater than 5 feet above finished grade within 25 feet of any excavation or structure except for those areas designated to be preconsolidated. For these areas, the depth of stockpiled material shall be as specified. The Contractor shall maintain stability of the soil adjacent to any excavation. The Contractor shall install silt fences around stock piles to prevent release fine and silt particles.

E. HAULING:

When hauling is done over highways or city streets, the loads shall be trimmed and the vehicle shelf areas shall be cleaned after each loading. The loads shall be watered after trimming to eliminate dust.

F. FINISH GRADING:

Finished surfaces shall be smooth, compacted and free from irregularities. The degree of finish shall be that normally obtainable with a blade-grader.

Finished grade shall be as specified by the contours  $\pm 0.10$  foot except where a local change in elevation is required to match sidewalks, curbs, manholes and catch basins, or to ensure proper drainage. Allowance for topsoil and grass cover, and sub-base and pavement thickness shall be made so that the specified thickness of topsoil can be applied to attain the finished grade.

When the work is at an intermediate stage of completion, the lines and grades shall be as specified  $\pm 0.5$  foot to provide adequate drainage.

If the soil is to be cultivated or straw is to be incorporated into the surface, rocks larger than 2 ½ inches in maximum dimension, roots and other debris on the surface of the slope shall be removed and disposed of prior to cultivation or placement of straw.

G. ENVIRONMENTAL REQUIREMENTS:

Do not perform excavation, backfilling or compaction when weather conditions are such, in the opinion of the Engineer, that work cannot be performed satisfactorily. Do not use frozen and/or saturated materials containing moisture that will not allow satisfactory compaction.

Prior to start of clearing, grubbing, excavation, stockpiling, or compaction activities, install and verify operation of all erosion control devices shown on the Drawings and as required to meet applicable local laws for Erosion and Sediment Control (E&S).

Maintain storm inlets/sewers, E&S, storm drains, surface drainage, perimeter ditches, and silt fence free of debris and excess sediment build-up. No damming or ponding of water in gutters or other waterways will be permitted.

The Contractor shall maintain earthwork surfaces true and smooth and protected from erosion. Where erosion occurs, the Contractor shall provide fill or shall excavate as necessary to return earthwork surfaces to the grade and finish specified.

Prevent spread of dust during performance of work described in this Section. Moisten excavation areas and clean roadways as necessary to maintain dust control as directed by the Engineer, the Owner, and/or to meet the requirement of State and local environmental laws.

#### H. STONE STABILIZATION:

When the bottom of the trench is not sufficiently stable to prevent vertical or lateral displacement of the pipe after installation with bedding, stone stabilization will be required to develop a non-yielding foundation for the bedding and pipe. When such conditions are encountered, the trench will be excavated to a depth determined by the Engineer, and #57 crushed stone will be placed to an elevation 6 inches below the bottom of the pipe. The pipe will then be laid with bedding as directed by the Engineer.

### 3.02 PROTECTION AND STABILITY OF EXCAVATIONS

The Contractor at its own expense shall protect and provide stability for excavation areas in accordance with Federal, State and local laws, ordinances, and other requirements of agencies having jurisdiction.

At all times maintain compliance with applicable OSHA trench and excavation safety regulations. Slope sides of excavations shall comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated as specified in Section 02350. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

At its own expense the Contractor shall protect adjacent structures, buildings and pipelines in the vicinity of the work. The Contractor will maintain sufficient barricades, planks, chains, flagging and rope to barricade open excavation areas after the completion of work each day.

### 3.03 PLACEMENT AND COMPACTION OF BEDDING AND FILL MATERIAL FOR PIPELINES AND OTHER APPLICATIONS

Fill material shall be placed in horizontal layers and compacted with power operated tampers, rollers, idlers, or vibratory equipment. Material type, maximum layer depth, relative compaction, and general application are specified in Table A. Unless otherwise specified, fill classes shall be used where specified in Table A under Application.

**Table A. Fill Placement and Compaction Requirements**

Fill Class	Material Type	Maximum Uncompressed Layer Depths (in.)	Minimum Relative Compaction, (%)	General Application	
				Pipelines	Other
A1	A	8	95	Bedding and initial backfill	Slabs on grade (other than specified for Class E1)
A2	A	48	95	Initial and subsequent when ponded or jetted	
B1	B	8	95	Subsequent backfill	Structure backfill
B2	B	8	90		Site fill, upper 1 ft. of areas requiring less than ¼ inch of settlement
C1	C	8	90-95	Subsequent backfill compaction as specified	
C2	C	8	90		Site fill, embankments and dikes
D1	D		95	Bedding, initial and subsequent backfill	Bedding for tanks, initial and subsequent tank backfill
E1 <sup>a</sup>	E	8			Fill under slabs for structures and tank slabs with pressure relief valves
F1 <sup>b</sup>	F	12	95	Initial and subsequent backfill	Structural backfill
G1	G	8	95	Bedding for plastic pipe, initial and subsequent backfill	
H1	H				Embankment slope face, channel slope face
I1	I				Embankment slope face, channel slope face
J1	J	8	90		Excess fill in non-structural areas

<sup>a</sup>Compaction of layers shall be accomplished in a minimum of 2 passes of equipment with complete coverage across the width of the field.

<sup>b</sup>Material shall not be used for bedding or initial backfill for plastic pipe.

### 3.04 EARTHWORK FOR STRUCTURES

#### A. STRUCTURAL EXCAVATION:

The bottom shall not be more than 0.15 foot above or below the lines and grades specified. If the elevation of structure excavation is not specified, the excavation shall be not more than 0.1 foot above or below the elevation specified for fill material below the structure. Slopes shall vary no more than 0.5 foot from specified grade unless the excavation is in rock where the maximum variation shall be 2 feet.

Should the excavation be carried below the lines and grades specified on the drawings or should the bottom of the excavation be disturbed because of the Contractor's operations and require over-excavation and backfill, the Contractor shall refill such excavated space to the proper elevation in accordance with the procedure specified for backfill. The cost of such work shall be borne by the Contractor.

Unless otherwise specified, excavations shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, and for inspection, except where concrete is specified to be placed directly against excavated surfaces.

#### B. FOUNDATION PREPARATION:

Rock foundations for concrete or masonry footings shall be excavated to sound material. The rock shall be roughly leveled or cut to steps and shall be roughened. Seams in the rock shall be grouted under pressure as directed by the Engineer.

When footings are to be supported on piles, excavations shall be completed to the bottom of the footings before any piles are drilled or driven therein. When swell or subsidence results from driving piles, the Contractor shall excavate, or backfill the footing area to the grade of the bottom of the footing with suitable material as specified. If material under footings is such that it would mix into the concrete during footing placement or would not support the weight of the fluid concrete, the Contractor shall replace the material with suitable material, install soffit forms or otherwise provide a suitable platform on which to cast the footing as directed by the Engineer.

Whenever excavation beneath a structure is substantially completed to grade, the Contractor shall notify the Engineer who will make an inspection of the foundation. No concrete or masonry shall be placed until the foundation has been inspected by the Engineer. The Contractor shall, if directed by the Engineer, dig test pits and make test borings and foundation bearing tests.

### C. STRUCTURAL FILL CLASSIFICATION:

Unless otherwise specified, structural fill shall be Class B1, C1, E1 and F1. The structural fill should be placed in 9-inch loose lifts at  $\pm 2$  percent of the optimum moisture content and compacted to 95 percent of the maximum dry density as determined by ASTM D698. The upper 1 foot of structural fill placed and compacted beneath structures shall be compacted to 98 percent of the maximum dry density in accordance with ASTM D698.

After completion of construction below the elevation of the final grade, and prior to backfilling, forms shall be removed and the excavation shall be cleaned of debris.

Structural fill shall not be placed until the pre-fill subgrade has been inspected by the Engineer. No backfill material shall be deposited against concrete structures until the concrete has developed a strength of not less than 2,500 pounds per square inch in compression, or until the concrete has been in place for 28 days, whichever occurs first.

## 3.05 EARTHWORK FOR PIPELINES AND CONDUITS

### A. GENERAL:

Earthwork for other pipelines and conduits is specified in paragraph 02200-3.03, Table A; in the standard details and in the following paragraphs.

### B. PIPELINE EXCAVATION:

The bottom of the trench shall be carried to the specified lines and grades with proper allowance for pipe thickness and for bedding as specified.

### C. PIPELINE BACKFILL:

1. **BEDDING:** The Contractor shall not proceed with backfill placement in excavated areas until the subgrade has been inspected by the Engineer. All pipe shall have a minimum thickness of bedding material below the barrel of the pipe as specified. Bedding material shall be placed in the bottom of the trench, leveled and compacted. Bell holes shall be excavated at each pipe joint to permit proper inspection and uniform bearing of pipe on bedding material.

After the pipe has been laid to alignment and grade, unless otherwise specified, additional bedding material shall be placed in layers the full width of the trench and compacted up to the specified level. Bedding shall be placed simultaneously on both sides of the pipe, keeping the level of backfill the same on each side. The material shall be carefully placed and compacted around the pipe to ensure that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe. Contractor shall use particular care in placing material on the underside of the pipe to prevent lateral movement during backfilling.

2. INITIAL BACKFILL: After pipe has been properly bedded, Contractor shall place and compact initial backfill as specified in Table A.

3. SUBSEQUENT BACKFILL:

a. General: Backfill material, placement and compaction above the pipe zone shall be as specified. Backfill above the pipe zone shall not commence until pipe zone backfill has been inspected and accepted by the Engineer.

b. Improved Areas: Unless otherwise specified, select granular backfill (Class A1) shall be used under all paved and unpaved roadways and paved and unpaved roadway shoulders, roadway embankments, and in all public right-of-ways and easements. The trench shall be backfilled to an elevation which will permit the placement of the specified surface or paving. Paving shall be as specified in Section 02500. Other surfaces shall be restored, including compaction, to the condition existing prior to construction including restoration of yard areas.

c. Unimproved Areas: Class C1 backfill shall be used for all trenches in pastureland, cultivated land, undeveloped land, and for other unimproved areas where specified. Class C1 backfill shall not be used in any public right-of-way. Trench excavation which meets the requirements of Type C material may be used. The Contractor shall maximize the use of fine-grained materials (e.g., sand, silty sand, sandy silt) as Class C1 backfill.

For Class C1 backfill, the trench above the pipe zone shall be backfilled to within 12 inches of original ground surface. The top 12 inches of soil shall be removed and stored in such a manner that it will not become mixed with unsatisfactory soils. After the trench has been backfilled, the stored topsoil shall be replaced at a uniform depth in its original area compacted to its original condition. The Contractor shall leave the backfilled trench neatly mounded not more than 6 inches above existing grade for the full width of the Class C1 backfill area.

### 3.06 EARTHWORK FOR EMBANKMENTS

#### A. FOUNDATION PREPARATION:

The surface of the embankment foundation shall not contain standing water and shall be free of loose material, foreign objects and rocks greater than 6 inches in maximum dimension. Immediately prior to placement of embankment fill material, the embankment foundation shall be proof-rolled with a loaded dump truck or 20-ton rubber-tired roller. The proof-roll will identify suitable soft subgrade soils and areas with adequate embankment foundation soils. Near surface embankment foundation soils that have suitable in-place moisture content should be scarified to a depth of 6 inches, moisture conditioned as necessary and compacted to 95 percent of the maximum dry density in accordance with ASTM D698. Areas identified during the proof-roll as having soft, yielding, or unsuitable soils shall be removed, and replaced with suitability compacted structural fill material. After the embankment foundation preparation has been completed, the Contractor shall promptly place and compact the first lift of embankment fill to prevent damage to the surface. The



surface of the embankment shall be maintained to permit travel of construction equipment. Ruts in the surface of any layer shall be filled and leveled before compacting subsequent lifts.

**B. EMBANKMENT FILL:**

Rocks, broken concrete or other solid materials, which are larger than 4 inches in greatest dimension, shall not be placed in embankment areas where piles are to be placed or driven.

Fill material having a sand equivalent value less than 10 shall be placed in the lower portions of embankments and shall not be placed within 2.5 feet of finished grade.

When the embankment material consists of large, rocky material or hard lumps, such as hardpan or cemented gravel which cannot be broken readily, such material shall be well distributed throughout the embankment. Sufficient earth or other fine material shall be placed around the larger material as it is deposited so as to fill the interstices and produce a dense, compact embankment.

Embankment fill should be placed in 10-inch loose lifts at  $\pm 3$  percent of the optimum moisture content and compacted to 95 percent of the maximum dry density as determined by ASTM D698.

**C. EMBANKMENT TOLERANCES:**

1. **GENERAL:** Embankment slopes within 4 feet of shoulder grade shall vary less than 0.5 foot from the designated slope. Slopes beyond 4 feet from shoulder grade shall vary less than 1 foot from the designated slope. Measurements for variance shall be made perpendicular to the slope. Slopes which are 6 to 1 or flatter shall vary less than 0.2 foot from the designated slope.

If embankments are constructed of rock greater than 12 inches in diameter, the slopes more than 4 feet below shoulder grade may vary up to 2 feet from the designated slope.

2. **ROADWAY EMBANKMENT TOLERANCES:** The excavated surface shall be less than 0.08 foot above or below the grades specified after deducting for the roadway pavement thickness.

Vertical alignment tolerances permitted on the roadway surface shall not exceed  $\pm 0.30$  foot from the vertical alignment specified, with the provision that within the tolerance range local surface irregularities shall not exceed 0.15 foot as measured by the gap between the roadway surface and a 10 foot straightedge placed on any flat graded surface. On vertical curves, the same standards will apply except that an additional gap allowance will be made for the road surface curvature over the 10 foot length of the straightedge.

Horizontal alignment tolerances permitted shall not exceed  $\pm 1$  foot, providing the departure is relatively uniform over any specific length of the roadway.

Roadway median strips shall be graded to drain and shall not vary more than 0.1 foot from the specified grade.

### 3.07 SUBGRADE FOR PAVEMENT

The soil subgrade beneath the aggregate base course of pavements shall be scarified to a depth of 9 inches and recompact to at least 98 percent of the maximum density as determined by ASTM D698.

### 3.08 NON-STRUCTURAL SITE FILL

Unless otherwise specified, site fill shall be Class C2 fill. If the existing slope in an area to be filled is greater than 5(H):1(V), the Contractor shall bench the area prior to filling.

**\*\*END OF SECTION\*\***

SECTION 02211

ROCK EXCAVATION

PART 1 – GENERAL

1.01 DESCRIPTION

Removal of subsurface rock encountered during excavation, utilizing mechanical or blasting methods.

1.02 RELATED SECTIONS

Section 01560, Environmental Controls

Section 02100, Site Preparation

Section 02200, Earthwork

1.03 REFERENCES

NFPA 495 – EXPLOSIVE MATERIALS CODE, 2001 EDITION

1.04 DEFINITIONS

Rock, in the opinion of the Engineer, cannot be excavated except by drilling, blasting, “jack hammering” or “hoe ramming” and includes sound solid masses, layers and ledges of consolidated and indurated rock or mineral matter of such hardness, durability and/or texture that it is not rippable or cannot be excavated with normal earth excavation equipment such as a Caterpillar 320 series excavator, or equal. Rock exceeds moderately hard rock hardness, as defined in, as defined in as defined in “Subsurface Manual for Design and Construction of Buildings,” 1976, published by the American Society of Civil Engineers. These definitions are summarized in the following:

ROCK HARDNESS CRITERIA

Very Hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimen requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately	Can be scratched with knife or pick. Gouges or grooves to ¼ inch deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.

Medium	Can be grooved or gouged $\frac{1}{16}$ inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of pick point. Small thin pieces can be broken by finger pressure.
Very Soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

#### 1.05 QUALIFICATIONS

Explosives – Retain company, firm, subcontractor or individual specializing in explosives for disintegration of rock, with five year documented experience.

#### 1.06 REGULATORY REQUIREMENTS

Conform to applicable State and local codes for explosive disintegration of rock and to NFPA 495 for handling explosive materials.

Obtain permits from authorities having jurisdiction before explosives are brought to site or drilling is started.

#### 1.07 SCHEDULING

Schedule blasting work to be completed between the hours of 9 a.m. and 5 p.m. Monday through Friday, excluding holidays.

Schedule work to minimize disruption of vehicular traffic in nearby public thoroughfares.

Coordinate schedule with local police and fire departments, including owners of nearby existing facilities.

#### 1.08 SUBMITTALS

Seismic Survey Firm – Retain Company specializing in seismic surveys with five years documented experience. Submit name and qualifications. Submit blasting monitoring reports to the Engineer.

Explosives – Retain company, firm, subcontractor or individual specializing in explosives for disintegration of rock, with five year documented experience. Submit name and qualifications.

Measurement Sketches – Submit plan and profile sketches from surveys showing stationing and rock encountered as agreed to by the Engineer. For payment to be made, certified measurement sketches must be provided by the Contractor. Logs alone from the drilling and blasting firm are NOT adequate to verify payment.

## 1.09 BLASTING SURVEY

Where blasting is approved by Engineer, pre-blasting and post-blasting surveys shall be conducted on and reported for all major structures within the influence range of any blasting operations or within a minimum of 1,000 feet, whichever is greater, from any blast site. The surveys shall consist of a visual inspection and recording by notes and photographs of structures, to include specifically cracks or other structural damage previously sustained. Pre-blast surveys shall be conducted by a qualified technician approved by the Owner. The preconstruction survey will not damage equipment or facilities. A copy of all notes and photographs shall be submitted to the Contractor prior to the beginning of blasting operations and prior to final payment. The records so obtained shall be retained in the Contractor's file for at least 1 year after completion of the Contract. In the event of any damage claim, a report shall be prepared by the Contractor on the particular structure involved to include those notes and photographs and submitted to the Engineer.

Costs for blasting surveys shall be paid directly by the Contractor.

The Contractor shall make all necessary contacts with property owners for the blasting surveys, and shall be responsible for all communications with the owners.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

Explosives – Type recommended by explosives firm.

Delay Device – Type recommended by explosives firm.

Blast Mat Materials – Type recommended by explosives firm.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

Verify site condition and location of nearby buildings, structures and other facilities, recording irregularities, which exist prior to work of this Section.

Verify locations of nearby underground utilities and structures.

### 3.02 PREPARATION

Identify required lines, levels, contours, and datum; establish quantity of rock to be removed to meet project requirements.

Conduct survey and document conditions of buildings and structures near locations of rock removal, and prior to blasting, photograph existing conditions identifying existing irregularities. Provide a minimum of two (2) copies of pre-blast survey reports to ENGINEER prior to any blasting.

### 3.03 ROCK REMOVAL – MECHANICAL METHOD

Excavate and remove rock by mechanical method at locations required by the Contract Documents and when trimming bottom or sides of excavation is necessary to meet project requirements.

Drill holes and utilize expansive tools, wedges, and/or mechanical disintegration compound, as appropriate, to fracture rock.

Cut away rock at bottom of excavation to form level bearing surface for foundations of buildings and structures.

Remove shaled layers to provide sound and unshattered base.

In utility trenches, trim rock to 6 inches below bottom of installed pipe and 12 inches wider than outside diameter of installed pipe.

### 3.04 ROCK REMOVAL – BLASTING METHOD

If blasting method is utilized for rock disintegration, notify the ENGINEER and execute as follows:

1. Advise owners of adjacent buildings, structures and utilities in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations. Allow sufficient time for owners to implement their own protective measures.
2. Obtain a seismic survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties of other work.
3. Prior to blasting, allow time for ENGINEER to take site measurements of rock quantities to be removed.

4. Adequately cover blast area to prevent flyrock. Blast mats or overburden soil are acceptable, but no off-site soil may be imported to be used as overburden.
5. Notify police and fire departments of blasting time schedule.
6. Provide seismographic monitoring during all blasting operations when within SCDOT Highway rights-of-way and within 100 feet of existing buildings.
7. Disintegrate rock and remove from excavation.
8. Cut away at excavation bottom to form level bearing surface for foundation of buildings and structures and bedding of utility mains.
9. Remove fractured layers to provide a sound and unshattered base prior to pipe installation.
10. In utility trenches, trim rock to 6 inches below bottom of installed pipe and 12 inches wider than outside diameter of installed pipe.
11. In addition to observing all laws, regulations, and ordinances relating to transporting storage and handling of explosives, conform to any further requirement with the Engineer may deem appropriate.

### 3.05 DISPOSAL AND REPLACEMENT OF ROCK

Trench excavation, consisting of rock exceeding 50 pounds in weight, and smaller fragments when directed by the Engineer, shall not be used for backfilling. Approved borrow to supply any deficiency of trench backfill shall be provided by the Contractor without additional payment.

The Contractor shall remove and dispose of all pieces of rock which are not suitable for use in other parts of the work. Rock disposed of by hauling away to spoil areas is to be replaced and approved surplus excavation obtained elsewhere on the site, insofar as it is available. Any deficiency in the backfill material shall be made up with acceptable material from outside sources as approved by the Engineer.

Fragments of rock may not be used in backfilling pipe. Backfilling trench is further specified under Section 02200. Nesting of rock fragments will not be permitted and will be removed as directed by the Engineer.

If rock below grade is shattered by blasting caused by holes drilled too deep, or too heavy charges of explosives, or any other circumstance due to blasting; and if, in the opinion of the

Engineer, the shattered rock is unfit for use on the job, the rock shall be removed and the excavation refilled with crushed stone at the expense of the Contractor.

**\*\*END OF SECTION\*\***



## SECTION 02270

### EROSION, SEDIMENTATION AND DUST CONTROL

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

The work shall consist of control measures as required by local regulations, permits obtained by the Owner and by the Engineer, as specified herein and shown on the Drawings, during the life of the contract to control erosion, sedimentation, and dust.

Establish, construct, and maintain erosion and sediment control measures. Siltation control devices shall be installed in the appropriate locations before construction begins. The erosion control structures shall be maintained until temporary ground cover is established to stop all sediment and erosion. All fines imposed for improper erosion and sedimentation and control shall be paid by the Contractor responsible for the work.

Temporary erosion and pollution control shall include construction work off-site where such work is necessary as a result of borrow pit operations, haul roads or equipment storage sites.

In addition to permits obtained by the Owner, the Contractor shall acquire any additional necessary land disturbance permits from the local regulatory agency prior to commencing work. The Contractor shall be responsible for submitting sufficient documents such that approval can be acquired.

Install temporary erosion and sediment controls that will ensure the stormwater, other water, and drainage from job site areas which will be stripped or modified of its naturally existing or artificially established stabilization or protection against erosion shall pass through some type of filter system before being discharged and that these areas shall be kept sufficiently moist to control dust.

The Contractor shall implement the practices set in the Stormwater Pollution Prevention Plan (SWPPP) submitted as a part of the *Notice of Intent (NOI) for Stormwater Discharges from Large and Small Construction Activities, NPDES General Permit SCR100000* and the South Carolina Department of Health and Environmental Control's (SCDHEC) "Storm Water Management BMP Handbook."

##### 1.02 SUBMITTALS

The Contractor shall submit a written plan for controlling erosion, sedimentation and dust. The plan shall conform to the requirements of any permits obtained from local regulatory

agencies. The written plan shall be submitted in accordance with Section 01300 and include at a minimum:

1. Schedule of erosion and sedimentation control activities.
2. Plan for maintenance of sedimentation control structures.
3. List of products and seeding species.
4. Plan for dust control.

### 1.03 SLOPE PROTECTION AND EROSION CONTROL

Whenever steeper slopes or abrupt changes in grade are required, a diversion or berm ditch shall be constructed at the top of the slope to cause the surface water to flow along the diversion to a controlled down slope. The diversion shall be protected against erosion with mulch and hay bales, and paved inverts where needed.

Silt barriers shall be constructed around all inlets and maintained throughout construction. Sediment accumulated behind silt barriers shall be removed when the ponding capacity is reduced by one-half.

### 1.04 SILTATION FENCES

Siltation fences shall be installed in the locations as indicated on the Drawings. Siltation fences shall be installed prior to clearing operations. Siltation fences shall be kept in good repair and maintained throughout construction. Sediment shall be removed when the ponding capacity is reduced by one-half.

Siltation fences shall be constructed around all inlets to the stormwater system. They shall be repaired and maintained throughout construction. Sediment shall be removed before the ponding capacity is reduced by one-half.

### 1.05 DUST CONTROL

The Contractor shall exercise precautionary measures to minimize dust emissions, which will include, but shall not be limited to, periodic sprinkling or wetting of the site. The Contractor has the option of using a dust palliative. The Contractor must comply with all local regulations.

## PART 2 – PRODUCTS

### 2.01 SILT FENCE

Silt fence shall be nylon reinforced polyester netting with fabric weight in excess of 4.0 ounces per yard and having a built-in cord running throughout the top edge of the fabric. Silt fence fabric shall be equal to Mirafi 100X, inert to chemicals commonly found in soil, and resistant to mildew, rot, insects, and rodent attack.

Reinforcing mesh shall be ½ inch galvanized steel

Posts shall be steel 48-inch long (min), 50,000 psi min yield. Standard “T” section with a nominal face width of 1.38” and nominal “T” length of 1.48”. Weigh 1.25 pounds/foot. Have a soil stabilization plate with a minimum cross section area of 17 square inches attached to steel posts. Painted with a water based, baked enamel paint.

### 2.02 FILTER FABRIC

Filter fabric shall conform to the requirements of Section 804.11 of the SCDOT Specification for Highway Construction.

### 2.03 SEDIMENT TUBES

Sediment tubes shall consist of compacted geotextiles, curled excelsior wood, natural coconut fiber or hardwood mulch. Straw, pine needle and leaf mulch-filled sediment tubes are not permitted. The outer netting shall consist of seamless, high-density polyethylene photodegradable materials treated with ultraviolet stabilizers or with seamless high-density polyethylene non-degradable materials.

The sediment tube diameter shall range between 18 and 24 inches.

Where installed within the SCDOT highway right-of-way, the selected sediment tube shall be listed on the SCDOT approved products list.

### 2.04 TURF REINFORCEMENT MATS

Turf reinforcement mats shall be a three-dimensional stable net structure with sufficient thickness, void space and strength to capture and retain soil I to allow for the development of root growth and vegetation within the matrix. All components of the turf reinforcement mat shall be 100-percent synthetic and resistant to biological, chemical and ultraviolet degradation. The materials shall be designed to reduce soil erosion and assist in the growth, establishment, and protection of vegetation for a period exceeding 5 years.

The product shall be selected to meet the slope characteristics and design flow velocity of the application.

## 2.05 NETTING

Netting shall be ½ inch galvanized steel, chicken wire mesh. Netting stakes shall be either steel rods not smaller than ½ inch diameter or shall be either fir, southern pine or hemlock.

## 2.06 FILTER STONE

Filter stone shall be Number 57 stone for all silt fence toed in trenches and Number 4 surge stone for all truck cleaning pads at all job site haul road entrances.

## 2.07 CHECK DAM MATERIAL

Silt check dam material shall be coarse, angular, clean-washed crushed stone, gravel, or rock ranging in size from 12" D50 Riprap (DHEC) meeting the requirements of SCDOT Class A or Class B erosion control stone.

## 2.08 RIPRAP

Riprap shall consist of clean field stone or rough quarry stone, resistant to weathering by wind or water, varying in weight from 25 to 250 pounds. Sixty percent of the riprap shall weigh a minimum of 100 pounds each and no more than 5 percent of the riprap shall weigh less than 50 pounds each. Riprap thickness shall be 1½ times the diameter of the largest stones used. The specific gravity of the individual stones should be at least 2.5.

## PART 3 – EXECUTION

### 3.01 GENERAL

The implementation of all erosion and sedimentation control devices shall be done in accordance with permits obtained, local regulations and the SCDHEC "Storm Water Management BMP Handbook."

The controls shown on the Drawings are to be considered the minimum requirements. The Contractor shall be responsible for providing any additional control measures necessary to avoid soil erosion, sedimentation and storm water pollution.

Temporary construction exits shall be maintained in a condition that will prevent tracking or flow of mud out of the work area or onto public roads.

### 3.02 SILT FENCING

Silt fencing shall be installed as shown on the Drawings, and as required to prevent migration of sediment.

The silt fence shall be installed in order to leave 10 feet between the silt fence and the creek or wetland.

A trench shall be excavated approximately 8 inches wide and 8 inches deep when placing fabric by hand. Twelve inches of geotextile fabric shall be placed into the 6-inch deep trench, extending the remaining 8 inches towards the upslope side of the trench. The trench shall be backfilled with soil or gravel and compacted.

Twelve inches of fabric shall be buried into the ground when pneumatically installing silt fence with a slicing method.

Posts shall be installed to a minimum depth of 24 inches, with a minimum of 1 to 2 inches above the fabric, and no more than 3 feet of the post above the ground.

The fabric shall be attached to the steel posts using heavy-duty plastic ties that are evenly spaced and placed in a manner to prevent sagging or tearing of the fabric. In call cases, ties should be affixed in no less than four places.

The fabric shall be installed a minimum of 24 inches above the ground. When necessary, the height of the fence above ground may be greater than 24 inches.

In tidal areas, extra silt fence height may be required. The post height will be twice the exposed post height. Post spacing will remain the same and extra height fabric will be 4, 5, or 6 feet tall.

Locate silt fence checks every 100 feet maximum and at low points.

The fence shall be installed perpendicular to the direction of flow and place the fence the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.

The Contractor shall inspect the silt fencing every 7 calendar days and within 24 hours after each rainfall event that produces ½ inch or more of precipitation. Check for sediment buildup and fence integrity. Check where runoff has eroded a channel beneath the fence, or where the fence has sagged or collapsed by fence overtopping.

1. If the fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the section of fence immediately.

2. Remove sediment accumulated along the fence when it reaches one-third the height of the fence, especially if heavy rains are expected.
3. Remove trapped sediment from the site or stabilize it on site.
4. Remove silt fence within 30 days after final stabilization is achieved or after temporary best management practices (BMPs) are no longer needed.
5. Permanently stabilize disturbed areas resulting from fence removal.

Accumulated silt and debris shall be removed by the Contractor from behind the face of the silt fence as needed to provide proper silt fence operation. Clogged or damaged fabric shall be immediately replaced at no additional cost.

### 3.03 SEDIMENT TUBES

Sediment tubes shall be installed along contours, in drainage conveyance swales, and around inlets to help reduce the effects of soil erosion by energy dissipation and retaining sediment.

Sediment tubes shall be located in the area specified on the drawings, and installed in accordance with the details and manufacturer's recommendations. The tube shall be installed so that 20 percent of the tube diameter is buried and there are no gaps between the bottom of the tube and top of the ground. When the length of the area to be crossed requires multiple tubes, they shall be installed to allow a minimum of 6-inch overlap.

Tubes shall be securely anchored in place by wood stakes or steel posts, a minimum of 48 inches in length placed on 2-foot centers. Stakes shall be connected to the mesh on the downstream side and driven to extend 12 inches above the tube.

### 3.04 TURF REINFORCEMENT MATS

The Contractor shall grade and compact the areas to be protected with turf reinforcement mats (TRM) as indicated on the plans. Large rocks, soil clods, vegetation and other sharp objects that could keep the TRM from close contact with the subgrade shall be removed. The top 2 inches of soil, which shall be the seedbed, shall be loosened. Apply seeding in accordance with the seeding schedule. Do not apply mulch in areas that are to be covered with TRMs.

The Contractor shall install the TRM in accordance with the manufacturer's recommendations and the following:

1. The TRM shall extend two to three feet over the crest of the slope and be anchored in a terminal anchor trench a minimum of 12 inches deep by 6 inches wide. Anchor the trench at 1-foot spacings and backfill with compact soils. The TRM shall be unrolled along the

placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when material is placed on or against it. The TRM may be folded and overlapped to permit proper placement in the designated area. Secure TRM to ground surface using U-shaped minimum eight gauge wire staples driven flush into the soil. All anchors should be between 8 and 18 inches long and have sufficient anchoring strength to restrain the TRM in its installed location.

2. The TRM shall be joined by overlapping a minimum of 18 inches (unless otherwise specified), and secured against the underlying foundation material. Securing pins, approved and provided by the TRM manufacturer, shall be placed along the edge of the panel or roll material to adequately hold it in place during installation. The upstream or up-slope TRM shall overlap the abutting down-slope TRM. At vertical laps, securing pins shall be inserted through both layers along a line through approximately the midpoint of the overlap. At horizontal laps and across slope laps, securing pins shall be inserted through the bottom layer only. Securing pins shall be placed along a line approximately 2 inches in from edge of the placed TRM at intervals not to exceed 12 inches unless otherwise specified. Additional pins shall be installed as necessary and where appropriate to prevent any undue slippage or movement of the TRM. The use of securing pins will be held to the minimum necessary. Pins are to be left in place unless otherwise specified.

3. Should the TRM be torn or punctured, or the overlaps or sewn joint disturbed, as evidenced by visible fabric damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area shall be removed and restored to the original approved condition. The repair shall consist of a patch of the same type of TRM being used, overlaying the existing TRM. When the TRM seams are required to be sewed, the overlay patch shall extend a minimum of 1 foot beyond the edge of any damaged area and joined by sewing as required for the original TRM except that the sewing shall be a minimum of 6 inches from the edge of the damaged fabric. TRM panels joined by overlap shall have the patch extend a minimum of two foot from the edge of any damaged area.

### 3.05 STABILIZED CONSTRUCTION ENTRANCES:

#### 1. Construction Specifications

- a. Clear the entrance/exit area of all vegetation, roots, and other objectionable material.
- b. Grade the road foundation so that the entrance/exit will have a cross slope.
- c. Place stone to the dimensions, grade, and elevation shown on plans.
- d. Temporary construction entrance/exit shall be constructed using washed stone 2 to 3 inches in size.

- e. Construction of temporary construction entrance/exit shall utilize filter fabrics.

2. Maintenance Guidelines

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. Contractor shall immediately remove mud and all objectionable materials spilled, washed, or tracked onto any road.

3.06 GRASS LINED CHANNEL:

1. Construction Specifications

- a. Excavate the channel and shape it to an even cross-section as shown. When staking, indicate a 0.2-foot overcut around the channel perimeter for silting and bulking.
- b. Grade soil away from channel so that surface water may enter freely.
- c. Apply lime, fertilizer, and seed to the channel and adjoining areas in accordance with the vegetation plan.
- d. Spread straw mulch at the rate of 100 lb/ 1000 ft<sup>2</sup>.
- e. Start laying the jute fiber netting from the top of the upstream end of the channel and unroll it down grade. Do not stretch netting.
- f. Bury the upslope end and staple the net every 12 inches across the top end, every 3 feet around the edges and across the net so that the straw is held closely against the soil. Do not stretch the netting when stapling.
- g. Netting strips should be joined together along the sides with a 3-inch overlap and stapled together.
- h. To join ends of strips, insert the new roll of net in a trench as with upslope end and overlap it 18 inches with the previously laid upper roll. Turn under 6 inches of the 18-inch overlap and staple every 12 inches across the end.



## 2. Maintenance Guidelines

During the establishment period, check grass-lined channels weekly and after every rainfall. After grass is established, check the channel weekly and after every heavy rainfall event. Immediately make repairs. It is particularly important to check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the grass in a healthy, vigorous condition at all times, since it is the primary erosion protection for the channel.

### 3.07 ROCK CHECK DAMS:

#### 1. Construction Specifications

- a. Check dams shall be placed at the locations shown on the Drawings. The check dams shall be field fit into the existing ditch and placed such that the top is below the ditch to prevent flooding of adjacent areas.
- b. Place stone to the lines and dimensions shown in the plan on a filter fabric foundation.
- c. Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.
- d. Extend stone at least 1.5 feet beyond the ditch banks to keep overflow water from undercutting the dam as it re-enters the channel.
- e. Protect the channel downstream from the lowest check dam, considering that water will flow over and around the dam.
- f. Make sure that the channel reach above the most upstream dam is stable.
- g. Ensure that channel appurtenances, such as culvert entrances below check dams, are not subject to damage or blockage from displaced stones.

#### 2. Maintenance

- a. Inspect check dams and channels for erosion damage weekly and after each runoff event.

- b. Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, install a protective riprap liner in that portion of the channel.
- c. Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.
- d. Upon stabilization of the disturbed areas, the check dams shall be removed and the remaining sediment cleaned out of the ditch. The Contractor shall reshape the ditch to its existing shape or blend into the adjacent ditch section. The Contractor shall properly seed the ditch and protect with matting.

### 3.08 TREE PRESERVATION AND PROTECTION:

#### 1. Construction Specifications

- a. Place barriers to prevent the approach of equipment within the drop line of trees to be retained.
- b. Do not nail boards to trees during building operations.
- c. Do not cut tree roots inside the tree drip line.
- d. Do not place equipment, construction materials, topsoil, or fill dirt within the limit of the drop line of trees to be saved.
- e. If a tree marked for preservation is damaged, remove it and replace it with a tree of the same or similar species, 2-inch caliper or larger, from balled and burlapped nursery stock when activity in the area is complete.
- f. During final site cleanup, remove barriers around trees.

## 2. Maintenance

In the event that damage to protected trees occur, repair any damage to the crown, trunk, or root system immediately.

- a. Repair roots by cutting off the damaged areas and painting them with tree paint. Spread peat moss or moist topsoil over exposed roots.
- b. Repair damage to bark by trimming around the damaged area. Taper the cut to provide drainage, and paint with tree paint.
- c. Cut off all damaged tree limbs above the tree collar at the trunk or main branch. Use three separate cuts to avoid peeling bark from healthy areas of the tree.

### 3.09 OUTLET PROTECTION:

#### 1. Construction Specifications

- a. Ensure that the subgrade for the filter and riprap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.
- b. Excavate below channel outlet and widen channel to the required riprap thickness for each apron. Foundation to be cut to zero grade and smoothed.
- c. The riprap and gravel filter must conform to the specified grading limits shown on the plans.
- d. Filter fabric, when used, must meet design requirements and be properly protected from punching or tearing during installation. Place filter fabric on bottom and sides of prepared foundation. Repair any damage by removing the riprap and placing another piece of filter fabric over the damaged area. All connecting joints should overlap a minimum of 1 foot. If the damage is extensive, replace the entire filter fabric.
- e. Riprap may be placed by equipment, but take care to avoid damaging the filter fabric.
- f. The minimum thickness of the riprap should be 1.5 times the maximum stone diameter.

- g. Riprap may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant, and well graded Class B erosion control stone.
- h. Place riprap on zero grade, top of riprap to be level with existing outlet, no overfall at ends. Set the top of the riprap at the downstream end level with the receiving area or slightly below it.
- i. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
- j. Immediately after construction, stabilize all disturbed areas with vegetation as specified in Section 02933.

2. Maintenance

Inspect riprap outlet structures weekly and after heavy rains to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

3.10 TEMPORARY SEDIMENT TRAP:

1. Construction Specifications

- a. Clear, grub, and strip the area under the embankment of all vegetation and root mat. Remove all surface soil containing high amounts of organic matter and stockpile or dispose of it properly. Haul all objectionable material to the designated disposal area.
- b. Ensure that fill material for the embankment is free of roots, woody vegetation, organic matter, and other objectionable material. Place the fill in lifts not to exceed 9 inches and machine compact it. Overfill the embankment 6 inches to allow for settlement. Fill shall be Class C2. The existing grade shall be scarified to a depth of at least 24 inches and recompacted to at least 95 percent of the Standard Proctor (ASTM D698) maximum dry density. Fill material shall be placed in loose layers not to exceed 9 inches in thickness. At optimum moisture content  $\pm$  2 percent, the fill shall be compacted to 95 percent Standard Proctor (ASTM D698) maximum dry density.
- c. Construct the outlet section in the embankment. Protect the connection between the riprap and the soil from piping by using

filter fabric or a keyway cutoff trench between the riprap structure and the soil.

- i. Place the filter fabric between the riprap and soil. Extend the fabric across the spillway foundation and sides to the top of the dam; or
  - ii. Excavate a keyway trench along the centerline of the spillway foundation extending up the sides to the height of the dam. The trench should be at least 2 feet deep and 2 feet wide with 1:1 slopes.
- d. Clear the pond area below the elevation of the crest of the spillway to facilitate sediment cleanout.
  - e. All cut and fill slopes should be 2:1 or flatter.
  - f. Ensure that the stone (drainage) section of the embankment has a minimum bottom width of 3 feet and maximum side slopes of 1:1 that extend to the bottom of the spillway section.
  - g. Construct the minimum finished stone spillway bottom width, as shown on the plans, with 2:1 side slopes extending to the top of the over filled embankment. Keep the thickness of the sides of the spillway outlet structure at a minimum of 21 inches. **The weir must be level and constructed to grade to assure design capacity.**
  - h. Material used in the stone section should be a well-graded mixture of stone with a  $d_{50}$  size of 9 inches (Class B erosion control stone is recommended) and a maximum stone size of 14 inches. The stone may be machine placed and the smaller stones worked into the voids of the larger stones. The stone should be hard, angular, and highly weather-resistant.
  - i. Ensure that the stone spillway outlet section extends downstream past the toe of the embankment until stable conditions are reached and outlet velocity is acceptable for the receiving stream. Keep the edges of the stone outlet section flush with the surrounding ground and shape the center to confine the outflow stream.
  - j. Direct emergency bypass to natural, stable areas. Locate bypass outlets so that flow will not damage the embankment.
  - k. Stabilize the embankment and all disturbed areas above the sediment pool and downstream from the trap immediately after construction.

1. Show the distance from the top of the spillway to the sediment cleanout level (one-half the design depth) on the plans and mark it in the field.
2. Maintenance
  - a. Inspect temporary sediment traps weekly and after each period of significant rainfall. Remove sediment and restore the trap to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in the designated disposal area or incorporated into site grading.
  - b. Check the structure for damage from erosion or piping. Periodically check the depth of the spillway to ensure it is a minimum of 1.5 feet below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade. **Any riprap displaced from the spillway must be replaced immediately.**
  - c. After all sediment-producing areas have been permanently stabilized, remove the structure and all unstable sediment. Smooth the area to blend with the adjoining areas and stabilize properly.

### 3.11 STREAM PROTECTION:

A temporary ford or structure shall be installed across streams and water courses for short-term use by construction vehicles and heavy equipment to provide a means to cross streams and water courses without moving sediment into streams, damaging stream bed or channel or causing flooding.

Land disturbing activity in connection with construction of pipelines in, on, over or under a natural water course shall minimize the extent and duration of disruption of the stream channel.

### 3.12 PROVISIONS FOR EROSION CONTROL DURING CONSTRUCTION

The Contractor shall inspect all erosion and sedimentation control measures at least once a week and within 24 hours after any storm event of greater than one-half inch of rain per 24-hour period or more frequently if required by state or federal law. The person performing this monitoring shall have certification approved by the Owner. The Contractor shall maintain inspection and maintenance records in compliance with the Owner's erosion and sediment control policies and procedures. Copies of all inspection and maintenance records will be transmitted to the Owner for filing on a weekly basis.

The Contractor shall implement erosion control measures around all areas to be disturbed prior to disturbing ground in the area, to the satisfaction of the Engineer.

The Contractor shall take sufficient precautions during construction to eliminate run-off of polluting substances such as silt, clay, wastes, fuels, oils, and bitumen into water supplies and surface waters. Special precautions shall be taken in the use of construction equipment to conduct operations in a manner that reduces erosion.

The temporary drainage ditches, silt fences, and other erosion and sediment control features shall be maintained at all locations.

Disposal of drainage from the site shall be at a location approved by the Engineer. Drainage shall not be disposed of until silt and other sedimentary materials have been removed. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

As a minimum, the following shall apply:

1. Approved silt fencing shall be provided at points where drainage from the work site leaves the site, to reduce the sediment content of the water. Sufficient silt fence shall be provided such that all flow will filter through the straw or silt fence. Other methods, which reduce the sediment content to an equal or greater degree, may be used as approved by the Engineer.
2. Drainage leaving the site shall flow to water courses in a manner that controls erosion.

**\*\*END OF SECTION\*\***

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SECTION 02350

SHEETING, SHORING AND BRACING

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies requirements for sheeting, shoring, and bracing of trenches greater than 5 feet in depth, for pipe bedding and for temporary coffer dams. Where sheet piling, shoring, sheeting, bracing or other supports are necessary, they shall be designed, furnished, placed, maintained, and except as shown on the drawings or specified otherwise, removed by the Contractor.

B. DESIGN REQUIREMENTS:

The design, planning, installation and removal, if required, of all sheeting, shoring, sheet piling, lagging, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section, to maintain the undisturbed state of the soils below and adjacent to the excavation, to support the pipe bedding and backfill and to facilitate pipe installation by open cut in stream channels.

The Contractor shall design sheeting, shoring, and bracing in accordance with OSHA Safety and Health Standards as well as state and local requirements. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.

When the construction sequence of structures requires the transfer of bracing to the completed portions of any new structure or to any existing structure, the Contractor shall provide the Engineer with a complete design analysis of the expected impact of that bracing on the structure. This action shall in no way absolve the Contractor of responsibility of damage resulting from said bracing.

1.02 REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of the Invitation to Bid. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the

following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
OSHA 2207 (Rev. 1987)	OSHA Safety and Health Standards
ANSI/AWS D1.1	Structural Welding Code

### 1.03 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300.

1. Shop Drawings: No excavations shall be started until the Engineer has reviewed and accepted the Contractor's shoring design. The design shall be submitted 4 week prior to the start of excavations. Design shall include:
  - a. Design assumptions, analyses, calculations, and information on Contractor's proposed method of installation (and removal, if required) of all shoring. The design and calculations shall be performed by, sealed and signed by a professional engineer licensed in the State of South Carolina and experienced in the design of earth retaining structures.
  - b. The maximum design load to be carried by the various members of the support system.
  - c. Detailed excavation support drawings, showing all pertinent dimensions, spacings, and relationships among the components of the shoring, as well as construction sequence and scheduling.
  - d. The method of bracing.
  - e. The full excavation depth and depth(s) below the main excavation to which the support system will be installed.
  - f. Detailed sequence of construction and bracing removal.
  - g. Detailed description of shoring waterproofing system where required.
  - h. Detailed drawings and descriptions of the method to be used by the Contractor to monitor shoring and adjacent ground/structure movements.

2. Prepare a Movement Monitoring Plan:

Plan shall include the location identification and placement of survey monuments at regular intervals along the alignment above existing subsurface utilities and on surface structures that may be affected by the excavation. Surface structures include, but are not limited to, pavement, curb and gutter, utilities such as manholes and valve boxes, transformers, signs, and utility poles.

3. Prepare trench excavation support plan addressing following topics:

- a. Details of shoring and bracing or other provisions for worker protection from hazards of caving ground.
- b. Design assumptions and calculations.
- c. Methods and sequencing of installing excavation support.
- d. Proposed locations of stockpiled excavated material.
- e. Minimum lateral distance from the crest of slopes for vehicles and stockpiled excavated materials.
- f. Anticipated difficulties and proposed resolutions.
- g. Anticipated loads and design for trench covers or temporary bridges.

4. Quality Control Submittals:

- a. Movement measurement data and reduced results indicating any movement trends.
- b. Submit proof of experience and qualifications required in this section.

#### 1.04 QUALITY ASSURANCE

A. Provide surveys to monitor movements of critical facilities.

B. Work of this section shall be performed by an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field) for at least 5 years, which is regularly engaged in, and which maintains a regular force of workmen skilled in design, installation and maintenance of shoring.

C. All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the type of materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local approved testing agency not more than six (6) months prior to commencing work; unless having been continuously employed in similar welding jobs since last certification. Machines and electrodes similar to those used in the work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

## 1.05 SYSTEM DESCRIPTION

A. The shoring system as described in the Specifications shall be comprised of some or all of the following major items:

1. Steel Soldier Piles: Vertical steel member consisting of steel wide flange, “WF”, or steel “H” pile, installed in pre-drilled holes, plumbed vertically, and grouted in place with lean concrete, or piles driven in place.
2. Steel Wales: Horizontal steel member consisting of steel wide flange, “WF”, or steel “H” pile, installed across the inside face of the braced excavation.
3. Timber, Concrete or Steel Lagging: Supports installed to span between individual soldier piles or steel rings.
4. Steel Cross Bracing or Struts: (Horizontal steel member consisting of steel wide flange, “WF”, or steel “H” or pipe pile, installed across open excavation from wale to wale to brace shoring wall and reduce horizontal wale spans, where necessary.)
5. Steel liner plates.
6. Steel Sheet Piles - Sheet Piles: (Vertical steel sheets driven or vibrated into the ground.)
7. Tie rods; butt plates, bolts and other ancillary items as necessary.
8. Slide rail solid wall tight shoring.
9. “Trench box” style shoring systems that provide active support to native ground.
10. Internal trench struts that provide pressure through the use of hydraulic jacks to provide internal bracing pressure.

B. DESIGN REQUIREMENTS:

1. The Contractor shall design and construct the shoring system in accordance with all applicable codes, and in accordance with the specific requirements described herein.
2. The Contractor shall design and construct shoring based on OSHA requirements. Contractor shall take into account all surcharge loadings. Surcharge loadings can be due to such things as material or soil stockpiles, sloping ground adjacent to shoring, and adjacent building foundations. Contractor shall assure that his assumed conditions and loadings are not exceeded in the field during construction.
3. The Contractor shall design shoring to withstand any construction loading and applicable traffic loads.
4. Should soldier piles be used, Contractor shall embed the soldier piles into the ground below the excavation bottom a distance determined by the Contractor's design, but in no case shall embedment be less than 5 feet. All soldier piles shall be placed in pre-drilled holes and grouted in place.
5. Contractor shall install a sufficient number of wales and struts to satisfy the requirement that the shoring system be stiff and keep deflections to a practical minimum; Contractor shall balance this requirement with the need to keep enough clear opening to allow safe and sufficient access for excavation of soil within shoring system and construction of the applicable pipe/structures.
6. The Contractor may use sloped trench walls for the portion of the trench above the pipe zone on portions of the work where vertical trench shoring is not identified on the Plans.
7. The design of shoring shall conform to accepted engineering practice in this field. The Owner's acceptance of the Contractor's plans and methods of construction does not relieve the Contractor of their responsibility for the adequacy of this support.

C. PERFORMANCE CRITERIA:

1. The Contractor shall be solely responsible for, and bear the sole burden of cost for, any and all damages resulting from improper shoring or failure to shore.
2. The safety of workmen, the protection of adjacent structures, property and utilities, and the installation of adequate supports for all excavations shall be the sole responsibility of the Contractor.

3. The design, planning, installation, (and removal, if required) of all shoring shall be accomplished in such a manner as to maintain stability of the required excavation and to prevent movement of soil and rock that may cause damage to adjacent shoring systems, structures and utilities, damage or delay the work, or endanger life and health.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.01 GENERAL

Design, provide, and maintain shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed work.

Activities in connection with construction in natural water courses shall minimize the extent and duration of disruption of the stream channel.

### 3.02 MOVEMENT MONITORING

#### A. PREPARE A MOVEMENT MONITORING PLAN:

Plan shall include the location identification and placement of survey monuments at regular intervals along the alignment (not in excess of 500 feet) above existing subsurface utilities and on surface structures identified by the Engineer that may be affected by the excavation. Surface structures include, but are not limited to, pavement, curb and gutter, utilities such as manholes and valve boxes, transformers, signs, and utility poles.

B. Surveys of the monuments established for the movement monitoring plan shall be made by the Contractor a minimum of two times before the start of the excavation, once a day during excavation, weekly once the excavation is complete, weekly during construction of the structure, daily during backfilling operations, and once after backfill is complete. The surveys shall measure horizontal and vertical movement resulting from deformation of the shoring system.

C. Monitor and record daily readings on the shoring to detect any vertical or horizontal movement. Measurements shall be referenced from an initial position of the shoring, as jointly established and agreed upon by the Contractor and the Owner.

D. Where surface structures or utilities exist adjacent to the excavation, monitor adjacent ground and structures on all sides of excavations to verify that no settlement is occurring or has occurred as a result of the Contractor's construction activities.

E. Should deflections become excessive and jeopardize worker safety and/or the structural integrity of the system or adjacent systems, the Contractor shall stop the excavation work until corrective measures have been taken.

### 3.03 EXCAVATION

A. The methods of constructing the temporary shoring are at the option of the Contractor and subject to review and approval by the Owner. Excavations shall be made to the lines, grade, and dimensions shown on the drawings. If the excavation is found to be deviating from the true lines and grade, the Contractor shall immediately make the necessary changes in operation to bring the operation back to the correct position. Any excess deviation beyond that specified herein shall be remedied by the Contractor at no additional cost to the Owner.

B. Excavation shall be done in such manner as to provide adequate support at all times to adjacent conduits, structures, or roads and so as to offer no hazard to building movement or occupancy, train, truck or automobile operations. Bracing and shoring shall be substantial and safe, and all work shall be done in full conformity and subject to the inspection of all affected parties. If and when required and to the degree necessary, the Contractor shall provide additional support as may be necessary at no additional cost.

C. Excavate only as much as can safely stand unsupported prior to installing shoring, but in no case shall more than 5 feet of vertical trench wall be left unsupported at any time per OSHA regulations. Install bracing or lagging immediately after excavation.

D. Protect, and where needed repair, utilities damaged by operations of this section. Protect adjacent structures and property from damage and disfiguration.

E. Provide necessary groundwater control and drainage in accordance with Section 02140.

F. Every precaution shall be taken by the Contractor to prevent the entry of water, mud and foreign matter into the excavation at all times. It is the intention of these Specifications that all construction work described herein shall be carried out under dry conditions.

G. Any and all excess excavation or over-excavation performed by the Contractor shall be in compliance with 02200.

H. All trenches left open at the end of a work day or work period shall remain shored and have suitably designed traffic rated coverings placed to allow traffic to cross where roadways are impacted. Trench in the Temporary Construction Easements may be fenced to secure the site.

### 3.04 REMOVAL OF EXCAVATION SUPPORT

A. Remove excavation support in manner that will maintain support, as excavation is backfilled and will not leave voids in backfill. As a minimum, remove excavation support between the existing adjacent surface grade and 2 feet below the adjacent surface grade.

B. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed Work, or adjacent property.

C. Fill any void left by shoring system or voids created by the removal of the shoring system to provide soil support between initial and intermediate backfill zone and the native soil.

### 3.05 REPAIR

All costs to repair and/or replace damaged facilities caused by surface deformations exceeding ¼ inch of the actual facility related to excavation support systems placement, installation maintenance, or removal (e.g., street pavement or structures) shall be borne by the Contractor. All surface deformations resulting in a cracked surface or other visual deformation shall be removed and replaced in accordance with the specifications of the local jurisdiction and all costs shall be borne by the Contractor as part of the Project.

**\*\*END OF SECTION\*\***



## SECTION 02450

### BORING AND JACKING

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

This section specifies boring and jacking casings.

The work in this section includes pipe boring and jacking for the installation of a casing, within which a carrier pipe will be installed for the conveyance of water or wastewater.

The Contractor shall provide all equipment, labor, materials and services required to complete the work specified in this Section.

##### 1.02 QUALITY ASSURANCE

This section contains references to the following Codes and Standards. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the Codes and Standards, the requirements of this section shall prevail.

**AASHTO** – American Association of State Highway and Transportation Officials

**AREMA** – American Railway Engineering and Maintenance-of-Way Association

**ASTM** – American Society for Testing and Materials

**AWPA** – American Wood Preservers Association

**AWS** – American Welding Society

**NUCA** – National Utilities Contractors Association

**NSCE-8** – Specification for Pipeline Occupancy of NS Corporation Property

**SCDOT** – South Carolina Department of Transportation

##### 1.03 DESIGN REQUIREMENTS

Design casing pipe for leakproof construction. The casing length shall be as shown on the Drawings. The Contractor may extend the casing length if approved by the Engineer at no additional cost to the Owner.

###### A. HIGHWAY CROSSINGS:

Design casing for earth and other pressure loads present, plus AASHTO H20 live loading.

## B. RAILROAD CROSSINGS:

Design casing for earth and other pressure loads present, plus railroad E80 live loading with 50 percent added for impact.

Design bracing, backstops, and use jacks of sufficient rating for continuous jacking without stoppage, except for adding pipe sections and as conditions permit, to minimize tendency of ground material to "freeze" around casing pipe.

Perform work in accordance with State of South Carolina Department of Transportation Standards, NUCA Trenchless Excavation Construction Equipment & Methods Manual, NUCA Pipe Jacking & Microtunneling Design Guide, AREMA, and Norfolk Southern guidelines, as applicable.

Verify invert elevations of existing work prior to excavation and installation of casing.

### 1.04 QUALIFICATIONS

The installer shall be a company specializing in performing work of this section with a minimum of 5 years of documented experience of projects of similar magnitude and conditions.

The Contractor's field supervisor and equipment operator shall have a minimum of 1 year experience in the operation of the equipment being used. The field supervisor shall be on-site at all times during the preparation and execution of the boring and jacking operation.

### 1.05 SUBMITTALS

The Contractor shall prepare a written procedure for the bore and jacking method that will include the following items:

1. Shop Drawings: Prepare scaled shop Drawings to supplement Contract Drawings, signed and sealed by Professional Engineer.
2. Include details of casing, jacking head, sheeting, and other work for trenches and pits, and support, field sketches, and other details, to complete the work.
3. Show relation of proposed installation to facilities and natural features over installation, angle of installation, right-of-way lines and general layout of built facilities.
4. Show cross section or sections from field survey, showing installation in relation to actual profile of ground.
5. Design Data: Submit casing design calculations and manufacturer's data on casing pipe, end seal details, grout materials and casing spacers.
6. Submit history of previous work completed of equivalent nature and scope. Include qualification and experience of key personnel.

7. Installation Plan: Submit description of proposed construction plan, dewatering plan, and plan to establish and maintain vertical and horizontal alignment.

8. Submit emergency response procedures to handle situations when conduit is compromised and jeopardizes integrity of installation or safety.

A. MANUFACTURER'S CERTIFICATE:

Certify the products meet or exceed the specified requirements.

B. PROJECT RECORD DOCUMENTS:

Record actual locations of casing, carrier pipe, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

C. COORDINATIONS:

1. Convene a pre-installation meeting with the Owner, Engineer, Contractor, SCDOT district engineer and railroad district engineer a minimum of two weeks prior to commencing work of this section.

D. DELIVERY, STORAGE, AND HANDLING

1. Provide temporary end caps and closures on piping and fittings, and maintain in place until installation.

2. Protect piping systems from entry of foreign materials and water by using temporary covers, completing sections of work, and isolating parts of completed system.

3. Accept system components on site in manufacturer's original containers or configuration. The Contractor shall periodically inspect for damage.

4. Use wooden shipping braces between layers of stacked pipe. Stack piping lengths no more than 3 layers high.

5. Store field joint materials indoors in dry area in original shipping containers. Maintain storage temperature of 60 to 85 degrees F.

6. Support casing and carrier pipes with nylon slings during handling.

E. ENVIRONMENTAL REQUIREMENTS

1. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

2. Perform and maintain erosion, sedimentation and dust control in accordance with Section 02270.

## PART 2 – PRODUCTS

### 2.01 CASING AND JACKING PIPE MATERIALS

Furnish materials in accordance with the SCDOT and railroad company standards.

Steel casing pipe shall meet the requirements of ASTM A53/A53M, Grade B, 35,000 psi minimum yield strength with full circumference welded joints in accordance with AWS D1.1 to withstand excavation forces.

The steel casing pipe shall have a minimum wall thickness as shown in the following tables and on the Drawings. These thicknesses are the minimum, and may need to be increased depending on actual site conditions that may impact forces exerted on the pipe. The Contractor may opt to use a steel casing pipe with a larger wall thickness if approved by the Engineer and at no additional cost to the Owner.

Carrier Pipe Diameter (in)	Casing Pipe Diameter (in)	Casing Pipe Wall Thickness (in)
6	12	0.2500
8	16	0.3125
10	16	0.3125
12	20	0.3750
16	26	0.4375
18	30	0.5000
20	30	0.5000
24	36	0.5625
30	42	0.6570
36	48	0.6880
42	54	0.7810

### 2.02 CARRIER PIPE MATERIALS

Wastewater collection system piping shall be as specified in Section 02530.

### 2.03 GROUT AND COVER MATERIALS

Soil backfill for trench approaches and pits to finish grade shall be as specified in Section 02200.

Fill and seal grout at pipe ends using the following method:

1. End seals constructed of 1/8" thick neoprene rubber with 1/2" thick T304 stainless steel bandings and 100% non-magnetic worm gear mechanisms. Casing end seals shall be Advance Products & Systems, Inc. Model AW.

## 2.01 ACCESSORIES

### A. CASING SPACERS:

Casing spacers shall be a two-piece shell fabricated from T-304 stainless steel of a minimum 14 gauge thickness. Each shell section shall be lined with a 0.090-inch thick, ribbed PVC extrusion with a retaining section overlapping the edges of the shell. Bearing surfaces (runners) shall be attached to support sections at positions to properly support the carrier pipe with the casing. The runners shall be mechanically bolted to the riser. Risers shall be made of T-304 stainless steel of a maximum 10 gauge. All risers shall be welded to the shell. Casing spacers shall be manufactured by Cascade Waterworks Manufacturing Company.

### B. SETTLEMENT MARKERS:

In paved areas, surface settlement markers shall be p.k. nails. Outside paved areas, wooden hubs shall be used as surface settlement markers.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

The Contractor shall verify existing conditions before starting work. Verify connection to existing piping system, size, location, and invert elevations are in accordance with the Drawings.

The Contractor shall be responsible for interpreting subsurface investigation reports, determining the site soil conditions and investigating the site prior to Bid. The Contractor shall be responsible for obtaining permits and permissions for conducting site investigations. The Contractor shall not be entitled to additional compensation if rock and/or water is encountered.

### 3.02 PREPARATION

The Contractor shall identify required lines, levels, contours, and datum locations. Establish elevations of casing with not less than 4-feet of cover.

The Contractor shall locate, identify, and protect utilities indicated to remain from damage. Utility companies shall be notified to locate existing utilities.

Plant life, lawns, and other features remaining as portion of final landscaping shall be protected during the execution of work.

The Contractor shall protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

The Contractor shall notify the Engineer in the event of utility conflicts and when minimum separation from existing utilities is not possible.

### 3.03 DEWATERING

The Contractor shall intercept and divert surface drainage precipitation and groundwater away from excavation through use of dikes, curb walls, ditches, pipes, sumps or other means.

Develop a substantially dry sub-grade for prosecution of subsequent operations.

Comply with South Carolina Department of Health and Environmental Control requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

Dewatering operations shall be maintained continuously during the operation.

### 3.04 PROTECTION OF EXISTING FACILITIES

The Contractor shall comply with all permits obtained to conduct the work. This shall include prior coordination with highway or railroad personnel.

Access shall be maintained to existing buildings, roadways, railways and other facilities requiring access. Modify installation as necessary to maintain access.

Excavated materials and equipment shall not be stored in side rights-of-way without prior permission from the necessary agency.

Casing installation shall not interfere or create hazardous conditions within roadways or railways. Ground stabilization shall be performed to minimize loss of ground at the pits or around the face of the casing. The Contractor shall be responsible for any settlement resulting from the casing installation activities, at no additional cost to the Owner.

Blasting shall only be conducted upon full authorization from the Owner, Engineer and highway agency. No blasting will be conducted with railroad rights-of-way.

Excavation, trenching and shoring operations shall be conducted in accordance with current Occupational Safety and Health Act (OSHA) regulations, and ANSI A10.16.

Unless otherwise directed by the Engineer, settlement markers shall be placed at 25 foot intervals along the centerline of the casing when outside of paved areas and at 15 foot intervals when inside paved areas. Each centerline marker shall have markers offset 15 feet on each side. When set, the settlement markers shall be tied to construction benchmarks and shall not be disturbed during construction activities.

Measurements to the settlement markers, to the nearest one-thousandth foot, shall be made at regular intervals during construction. If the measurement indicates settlement or heaving in excess of 1-inch, the Contractor shall cease work, and consult the Engineer, highway district engineer, and/or railroad authority to determine the best method for corrective action. Corrective action shall be conducted immediately, prior to resuming casing installation, and at no additional cost to the Owner.

### 3.05 PITS OR APPROACH TRENCHES

Excavate approach trenches or pits in accordance with installation plan, shop drawings and as site conditions require.

The pits shall be generally rectangular in shape, with adequate space for the equipment and operating personnel. Sides shall be shored with sheeting or trench boxes as needed.

Ensure casing entrance face is as near perpendicular to alignment as conditions permit.

Establish a vertical entrance face at least 1 foot above top of casing.

Dewatering measures and excavation supports shall be installed as required. Keep floor of pit dry during the execution of work.

The floor of the pit shall be firm and stabilized, establishing a solid foundation for which to work. If necessary, over-excavate the floor and place a base of gravel or concrete as stabilization material.

### 3.06 CASING PIPE INSTALLATION

The boring and jacking activities shall be conducted in a pit at one end of the line segment, preferably at the downstream end, boring upstream.

Jacking rails shall be set at the proper alignment and grade within the pit, and secured to avoid movement during the operation. The rails shall hold the casing pipe at true line and grade during installation.

The jacking rails shall be secured at the rear of the pit, with the backing supported to withstand the loads and forces during the operation.

Push casing pipe into ground with boring auger rotating within pipe to remove spoil. Do not advance cutting head ahead of casing pipe except for distance necessary to permit cutting teeth to cut clearance for the pipe. No unsupported excavation shall be permitted ahead of the casing pipe.

Arrange the machine bore and cutting head to be removable from within pipe. Arrange face of cutting head to provide barrier to free flow of soft material.

The bored hole shall have a diameter nearly equal to the outside diameter of the casing pipe.

The Contractor shall regularly check the alignment, horizontal and vertical, of the casing pipe during installation. Adjustments shall be made as needed to maintain the specified alignment.

Segment lengths for the casing pipe shall be as long as practical, based on field conditions. Joints between pipe segments shall be fully welded in accordance with AWS standard practices and procedures.

When within the railroad right-of-way, the boring operation shall be progressed continuously on a 24-hour basis without stoppage (except for adding segments of pipe) until the leading edge has reached the receiving pit.

When unstable soil is encountered during boring retract cutting head into casing to permit balance between pushing pressure and ratio of pipe advancement to quantity of soil.

When voids develop greater than outside diameter of pipe by approximately one inch, grout to fill voids.

When boring is obstructed, the casing pipe shall be abandoned in place, and filled with grout. The Contractor shall relocate the bore as directed by the Engineer, with the approval of the agency maintaining the right-of-way.

Casing pipe damaged by the Contractor during the operation shall be removed and replaced at no additional cost to the Owner.

### 3.07 ROCK EXCAVATION

In the event that rock is encountered during the installation of the casing pipe which cannot be overcome or removed through the casing, a second casing pipe shall be bored at a location designated by the Engineer.

The obstructed casing shall be left in place, filled with grout and capped before moving to the second boring site. Payment for the first casing shall be made based on the unit price for the quantity installed prior to reaching the obstruction. No additional payment shall be made for filling the abandoned casing with grout.

Payment for the installation of the second casing shall be made at the unit price bid for casing installation. Payment for realigning the pipeline to the location of the second casing will be made at the unit prices given for water main and fittings.

If the second casing installation cannot be completed due to rock, a third attempt shall be made to complete the casing installation. Consideration will be given for additional compensation in the event a third installation attempt is necessary.



### 3.08 CARRIER PIPE INSTALLATION

After the casing pipe has been installed, the alignment and elevations shall be verified and submitted to the Engineer for approval, prior to the installation of the carrier pipe.

The carrier pipe shall be installed centered within the casing pipe, and shall be supported by casing spacers, centered on 10-foot intervals and as shown on the Drawings.

The Contractor shall exercise care to prevent damage to pipe joints when carrier pipe is placed in casing.

Support the pipeline within casing so no external loads are transmitted to carrier pipe. Attach supports to barrel of carrier pipe; do not rest carrier pipe on bells. A minimum clearance of 1 inch shall be maintained between the pipe bell and casing pipe.

The ends of the casing shall be sealed by either grouting or installing casing end seals.

**\*\*END OF SECTION\*\***

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## SECTION 02500

### PAVEMENT REMOVAL AND REPLACEMENT

#### PART 1 – GENERAL

##### 1.01 SCOPE

This section specifies the removal and replacing of paving consisting of aggregate base, asphaltic concrete, and associated materials.

The Contractor shall furnish all labor, materials and equipment necessary to perform the work as specified and in the locations and grades shown on the Drawings.

Grades shall be established and maintained by the Contractor. In establishing grades, due allowances shall be made for existing improvements, proper drainage, and adjoining properties.

Paving work shall not commence until underground work has been completed, curbs installed and frames of subsurface structures installed at the indicated elevations.

##### 1.02 QUALITY ASSURANCE

###### A. REFERENCES:

This section contains references to the following Codes and Standards. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

**ASTM D1557** Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10lb (4.5kg) Rammer and 18in (457mm) Drop  
**SCDOT** South Carolina Department of Transportation Standard Specifications

###### B. TESTING:

All field testing will be conducted by an independent testing laboratory, under the direction of the Engineer and paid for by the Contractor. The Contractor will cooperate with the laboratory to facilitate the execution of its required services. All materials shall be tested and certified by the producer. Tests repeated because the sub-grade or base not meeting compaction shall be paid by the Contractor.

### 1.03 WEATHER LIMITATIONS

Apply prime and tack coats only when ambient temperature is above 50 degrees F, and when temperature has not been below 35 degrees F for 12 hours immediately prior to application. Do not apply during rainy weather or when base is wet or contains an excess of moisture.

Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F, and base is dry. Base course may be placed when air temperature is above 30 degrees F, and is rising.

Weather limitations specified within the South Carolina Department of Transportation Standard Specifications shall govern when in conflict with the limitations listed above.

### 1.04 SUBMITTALS

Submittals shall be made in accordance with Section 01300, not less than 10 days prior to application of pavement, and include the following data:

1. Certificates signed by the producer stating that the materials supplied comply with these Specifications.
2. The design mix and test data for each course.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

#### A. AGGREGATE BASE:

Shall conform to the requirements of Section 305 of the South Carolina Department of Transportation Standard Specifications.

#### B. HOT MIX ASPHALT AGGREGATE BASE COURSE:

Shall conform to the requirements of Section 310 of the South Carolina Department of Transportation Standard Specifications.

#### C. HOT MIX ASPHALT BINDER COURSE:

Shall conform to the requirements of Section 402, Type 1, of the South Carolina Department of Transportation Standard Specifications.

D. HOT MIX ASPHALT SURFACE COURSE:

Shall conform to the requirements of Section 403, Type 1, of the South Carolina Department of Transportation Standard Specifications.

E. RIGID PAVEMENT:

Portland Cement Concrete Pavement and Concrete Pavement Patching shall conform to Sections 501 and 502, respectively, of the South Carolina Department of Transportation Standard Specifications.

F. OTHER SURFACES:

When roadways or private driveways of non-specified materials (brick, stone, etc.) are damaged during construction, they shall be repaired, to the extent at which they were damaged, with similar or original materials.

G. PERMANENT PAVEMENT MARKINGS:

Shall conform to the requirements of Section 604 of the South Carolina Department of Transportation Standard Specifications.

## PART 3 – EXECUTION

### 3.01 GENERAL

Construction shall conform to the details, dimensions and grades specified. Maximum variations in finished grade of paving shall be plus or minus 0.05 feet.

### 3.02 PAVEMENT REMOVAL

The pavement to be removed shall be marked with paint, with parallel lines at the trench edge locations.

Asphalt pavement shall be broken along the marked lines with equipment typically used for pavement shearing. Concrete pavement shall be scored with a rotary saw prior to breaking.

After the pavement to be removed has been completely severed from the pavement to remain, it shall be removed by machines in a manner to avoid damage to the adjacent pavement to remain.

Sidewalks shall be removed in complete joint sections.

Curbs shall not be removed if possible. If removal of curbs is unavoidable, they shall be removed to the nearest joint.

### 3.03 AGGREGATE BASE PLACEMENT

Sub-grade: Areas to be paved shall be graded and compacted in accordance with Section 02200.

Prior to placing pavement, the Contractor shall saw cut the existing pavement 12 inches back from the initially removed pavement. The additional pavement shall be removed neatly to provide a smooth edge in which to match the new paving.

Aggregate Base: Placing of aggregate base shall comply with Section 302 of the South Carolina Department of Transportation Standard Specifications. Relative compaction shall be a minimum of 95 percent as determined using methods set forth in ASTM D1557. The aggregate base shall be 8 inches thick, unless otherwise noted in the Drawings or by SCDOT.

### 3.04 ASPHALT CONCRETE PAVEMENT

Asphalt Concrete: Placement of asphalt concrete pavement shall comply with Section 403, Type 1, of the South Carolina Department of Transportation Standard Specifications. Asphalt binder course shall conform to Section 402, Type 1, of the South Carolina Department of Transportation Standard Specifications. The thickness of the pavement shall be a minimum of 2 inches, unless otherwise specified in the Drawings or by SCDOT.

Berms shall be shaped and compacted with an extrusion machine.

A smooth joint shall be formed between the new pavement and the existing pavement.

### 3.05 TRAFFIC LINE PAINTING:

Traffic lines and other permanent traffic control markings shall conform to the requirements of Section 604 of the South Carolina Department of Transportation Standard Specifications, and be similar to the same type and size of the existing markings, unless otherwise specified.

Surfaces are to be free of contaminants that may interfere with adhesion.

Traffic lines shall be of uniform width with the edges straight and even. Traffic shall be restricted from the area until the paint has dried.

### 3.06 SPECIAL SURFACES

Driveways and roadways constructed of special surfaces, such as brick or stone, shall be replaced using similar materials.

Special surfaces shall be restored to a condition equal or better than the existing, undamaged condition.

### 3.07 RIGID PAVEMENT

Rigid surfaces shall comply with Division 500 of the South Carolina Department of Transportation Standard Specifications.

All existing concrete surfaces or base courses shall be replaced with concrete, with a finish equal to that of the existing surface. Concrete base courses shall have a rough finish.

The thickness of the concrete pavement shall match that of the existing pavement, unless otherwise specified in the Drawings or directed by SCDOT.

### 3.08 SIDEWALKS AND CURBS

Rigid surfaces shall comply with Division 500 of the South Carolina Department of Transportation Standard Specifications.

Sidewalks and curbs shall be replaced to the nearest, undamaged joint.

The alignment and grade of sidewalks and curbs shall match the existing condition, unless otherwise specified or directed by SCDOT.

Forms shall be metal or wood and shall be straight, free from distortions, and shall show no vertical variation greater than  $\frac{1}{8}$  inch in 10 feet and show no lateral variation greater than  $\frac{1}{4}$  inch in 10 feet from the true plane on the vertical face of the form.

Joints shall be constructed as indicated on the Drawings, and as specified by SCDOT. Place construction joints every 10 feet along the length of the curbs and gutters.

Expansion joint materials shall be installed at the point of curve at all streets, and behind the curb and abutment to sidewalks and adjacent structures.

Concrete finish shall match that of the existing finish, unless otherwise specified or directed.

### 3.09 PAVEMENT RESURFACING

Areas to be resurfaced are shown or noted on the Drawings.

Where the existing pavement has been damaged or potholed, the loose material shall be removed and filled with aggregate base course to the level of the existing pavement.

The limits of resurfacing shall be perpendicular to the existing roadway, providing a neat transition between old and new pavement.

The binder and surface course shall conform to Division 400 of the South Carolina Department of Transportation Standard Specifications.

### 3.10 PROTECTION AND MAINTENANCE

New surfaces shall be protected from traffic until properly cured. Concrete shall be protected for a minimum of 7 days. Damage occurred while the pavement is being protected shall be repaired by the Contractor at no additional cost to the Owner.

The Contractor shall maintain the surfaces until the area has been accepted by the Owner. Maintenance includes the work necessary for the preservation of a reasonably smooth surface, and repair of damaged or unsatisfactory surfaces.

All surfaces of the work shall be cleaned and free from debris and construction materials.

### 3.11 ACCEPTANCE

The South Carolina Department of Transportation, or the regulatory agency responsible for the operation and maintenance of the pavement, shall provide acceptance of the new surfaces.

The Engineer shall provide acceptance for private roadways or driveways.

The Contractor shall be responsible for repairs to damaged or settled surfaces during the term of the Contract and warranty period.

**\*\*END OF SECTION\*\***



## SECTION 02530

### GRAVITY SEWERS, FORCE MAINS AND ACCESSORIES

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

This Section describes the materials to be incorporated into sanitary sewers and accessories, and the requirements for the installation and use of these items. The Contractor shall furnish all labor, materials and equipment required to complete the work specified herein.

##### A. GENERAL:

Supply all products and perform all work in accordance with applicable American Water Works Association (AWWA), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), or other recognized standards. The latest revisions of all standards are applicable.

B. Setting of line and grade stakes for all sewer lines, as required prior to construction. Provide the Engineer with cut sheets for gravity sewer lines showing stations, centerline elevations, invert elevations, centerline cut, offset elevations, and offset cut. Layout work to utilize points previously established by the Engineer as shown on the Drawings. Consult with the Engineer on any problems encountered.

C. The Owner reserves the right to designate the order in which the various segments of the work will be constructed. In general, this means that the work will begin at the downstream end of any continuous gravity sewer line, working in the upstream direction with the bell end laid upgrade. No construction will be permitted to begin at any intermediate point in a line.

##### 1.02 SUBMITTALS

Submittal product data shall be submitted in accordance with Section 01300.

At a minimum, submit product data for the following:

1. Piping
2. Precast Concrete Manholes & Castings
3. Piping Accessories
4. Pipe Lining and Coating Systems
5. Cut Sheets for all Gravity Sewer Lines

### 1.03 QUALITY ASSURANCE

The product manufacturer shall certify that the products meet or exceed the specified requirements.

Perform work in accordance with all governing State, County, Municipality or Public Works standards.

Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

Reference	Title
AASHTO	American Assn. of State Highway Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
AREA	American Rail Engineers Association
ASCE	American Society of Civil Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
FS	Federal Specifications
MSDS	Material Safety Data Sheets
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NSF	National Sanitation Federation International
OSHA	Occupational Safety and Health Administration
SCDHEC	South Carolina Department of Health & Environmental Control
SCDOT	South Carolina Department of Transportation
UL	Underwriters Laboratories Inc.
WEF	Water Environment Federation

### 1.04 QUALIFICATIONS

#### A. "AMERICAN IRON AND STEEL" PROVISIONS

Projects funded through the Clean Water SRF are required to follow the "American Iron and Steel" provisions of Sec. 436 of the Consolidated Appropriations Act, 2014 and certify that all iron and steel products used in the project are produced in the United States, unless a waiver is granted by the U. S. Environmental Protection Agency.

“Iron and steel” products means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete and construction materials. Additional information may be found in Guidance posted to the EPA Website, [http://water.epa.gov/grants\\_funding/aisrequirement.cfm](http://water.epa.gov/grants_funding/aisrequirement.cfm).

B. MANUFACTURER:

Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

C. INSTALLER:

Company specializing in performing work of this section with a minimum of two years documented experience.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. PRODUCTS:

1. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

2. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

B. PRODUCT DELIVERY REQUIREMENTS:

1. Transport and handle products in accordance with manufacturer's instructions.

2. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

C. PRODUCT STORAGE AND HANDLING REQUIREMENTS:

1. Store and protect products in accordance with manufacturers' instructions.

2. Store with seals and labels intact and legible.

3. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

4. For exterior storage of fabricated products, place on sloped supports above ground.

5. Provide off-site storage and protection when site does not permit on-site storage or protection.

6. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

7. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

8. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

9. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

## PART 2 – PRODUCTS

### 2.01 SANITARY SEWER PIPE AND FITTINGS

#### A. DUCTILE IRON PIPE (DIP):

1. Ductile Iron Pipe shall conform to AWWA C150/ANSI A21.50, AWWA C151/ANSI 21.51 and ASTM A746.

2. Flanged pipe shall be minimum Class 53. Flanges shall be furnished by the pipe manufacturer. Sizes will be as shown on the Drawings.

3. Ductile Iron Pipe shall be furnished in nominal lengths of 18 to 20 feet. When on piers, ductile iron pipe shall be furnished in exact lengths of 20-feet.

4. Pipe sizes will be as shown on the Drawings and shall have a minimum pressure rating as indicated in the following table:

Pipe Sizes (inches)	Pressure Class (psi)
4 - 12	350
14 - 24	250
30 - 54	150

5. DIP shall have an outside bituminous coating with a minimum thickness of 1 mil, in accordance with AWWA C151/ANSI A21.51.

6. Pipe and fittings shall be cement mortar lined in accordance with AWWA C104.

7. Each joint of ductile iron pipe shall be hydrostatically tested before the outside coating and inside lining are applied at the point of manufacturer to 500 psi. Testing may be performed prior to machining bell and spigot. Failure of ductile iron pipe shall be defined as any rupture or leakage of the pipe wall.

8. Push-on and mechanical joint pipe shall be as manufactured by the American Cast Iron Pipe Company, United States Pipe and Foundry Company, or Griffin Pipe Products Company.

9. DIP push-on joints shall conform to AWWA C151/ANSI A21.51. The dimensions of the bell, socket, and plain end shall be in accordance with the manufacturer's standard design dimensions and tolerances. The gasket shall be of such size and shape to provide an adequate compressive force against the plain end and socket after assembly to affect a positive seal. Gaskets shall be vulcanized natural or vulcanized synthetic rubber, and comply with AWWA C111/ANSI A21.11. Restrained joint gaskets shall be "Flex-Ring" or "TR-Flex".

10. DIP mechanical joints shall be used only at the specific locations indicated on the Drawings or as approved by the Engineer. The joint shall be designed to permit normal expansion, contraction, and deflection of the pipe or fitting while maintaining a leak proof joint connection. The mechanical joint shall conform to the requirements of AWWA C111/ANSI A21.11, and ASTM A536 Standard Specification of Ductile Iron Castings.

11. Fittings shall be ductile iron at least class 54 thickness and shall conform to AWWA C110/ANSI A21.10 or AWWA C153/ANSI 21.53 for compact fittings. All ductile iron fittings shall have a minimum working pressure rating of 250 psi. Acceptable types of fittings include Push-On Joint and Mechanical Joint.

12. **MECHANICAL JOINT FITTINGS:** Restraint shall be Megalug series 1100 mechanical joint restraint by EBAA Iron Sales, Inc., Ford wedge action restrainer gland UFR Series 1400, or approved equal.

13. Provide the necessary bolts for mechanical, restrained and flanged connections. Bolts for flanged connections shall be steel with American Regular unfinished square or hexagon heads. Nuts shall be steel with American Standard Regular hexagonal dimensions, all as specified in ANSI B 17.2. All bolts and nuts shall be threaded in accordance with ANSI B 1.1, Coarse Thread Series, Class 2A and 2B fit.

14. **FLEXIBLE JOINT (BALL JOINT) PIPE:** Flexible, restrained joint pipe class shall be as shown on the Drawings. Joints shall be ball and socket type, providing leak tight connections for up to 15 degrees of joint deflection. Pipe shall be equal to American "FLEX-LOK" or U.S. Pipe "USIFLEX". Appropriate transition pieces shall be utilized on each end of run of flexible joint pipe.

15. Epoxy Lining

a. If required on the Drawings, the lining material shall be Protecto 401 Ceramic Epoxy, a two component, modified epoxy formulated for corrosion control, as manufactured by Vulcan Chemical Technologies, Inc.

b. The lining material shall be applied in accordance with the lining manufacturer's recommendations to yield a thickness of 40 mils throughout the barrel of the pipe and 8-10 mils in the joint areas.

16. POLYETHYLENE ENCASEMENT: Ductile iron pipe shall be encased with polyethylene film where shown on the Drawings. Polyethylene film shall have a minimum thickness of 8 mils.

17. Thrust collars shall be welded-on ductile iron body type designed to withstand thrust due to 250 psi internal pressure.

18. DETECTION TAPE: Provide detection tape over DIP sewers

19. ACCEPTANCE: Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. REINFORCED CONCRETE PIPE (RCP): (NOT USED)

C. POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

1. Pipe and Fittings, up to 15-Inches in Diameter: Pipe and fittings shall meet one of the following requirements:

a. Pipe and fittings shall be manufactured in accordance with ASTM D 3034. The minimum wall thickness shall be that which will provide an SDR of 35. The pipe shall also have a minimum pipe stiffness of 46 psi at 5 percent deflection as determined by ASTM D 2412.

b. Pipe and fittings shall be manufactured in accordance with ASTM F 789. The minimum wall thickness shall conform to T-1 as defined in ASTM F 789. The pipe shall also have a minimum pipe stiffness of 46 psi at 5 percent deflection as determined by ASTM D 2412.

2. Pipe and Fittings, Larger than 15-Inches in Diameter: Pipe and fittings shall be manufactured in accordance with ASTM F 679. The minimum wall thickness shall conform to T-1 as defined in ASTM F 679. The pipe shall also have a minimum pipe stiffness of 46 psi at 5 percent deflection as determined by ASTM D 2412.

3. PVC gravity sewer pipe shall be supplied in lengths not longer than 20 feet.

4. Fittings for pipe 8-inches and less in diameter shall be one-piece with no solvent welded joints. Fittings for pipe 10-inches and larger in diameter may be fabricated using solvent welding. No field fabrication of fittings will be allowed. All such fabrication shall be performed at the factory and the fittings shall be delivered ready for use.

5. Joints for pipe and fittings shall be of the integral bell and spigot type with a confined elastomeric gasket having the capability of absorbing expansion and contraction without leakage. Joints shall meet the requirements of ASTM D 3212; gaskets shall meet the requirements of ASTM F 477. The joint system shall be subject to the approval of the Engineer and shall be identical for pipe and fittings.

6. Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

7. Detection Tape: Provide detection tape over PVC sewers.

D. POLYVINYL CHLORIDE (PVC) PRESSURE PIPE: (NOT USED)

E. STEEL PIPE: (NOT USED)

F. HIGH DENSITY POLYETHYLENE (HDPE) PIPE:

1. HDPE pipe shall be manufactured in accordance with ASTM F 714.

2. HDPE wall thickness shall be SDR 17 with dimensions based on Ductile Iron Pipe Size (DIPS).

3. Joints shall be of the butt-fusion type.

4. Fittings shall be cast or ductile iron meeting the requirements of AWWA C 110 or AWWA C 153 with rated working pressure of 150 psi. Fittings shall be cement lined in accordance with AWWA C 104. Furnish fittings with a bituminous outside coating.

5. Special adapters or gaskets shall be provided as recommended by the manufacturer to adapt the HDPE pipe to mechanical joints with cast or ductile iron pipe, fittings or valves.

6. HDPE pipe shall be black in color, unless otherwise authorized by the Engineer.

7. Acceptance: Acceptance will be on the basis of the Engineer's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

8. Detection Tape: Provide detection tape and tracer wire over HDPE pipe.

## 2.02 FLEXIBLE COUPLINGS

Flexible couplings shall be a resilient chemical-resistant elastomeric polyvinyl chloride (PVC) coupling with two stainless steel clamps and stainless steel screws and housings.

Flexible coupling shall be manufactured by Fernco, or approved equal.

## 2.03 FLEXIBLE PIPE BOOT FOR MANHOLE PIPE ENTRANCES

Flexible pipe boots shall conform to ASTM C923, consisting of ethylene propylene rubber (EPDM), with stainless steel clamp and stainless steel hardware.

Flexible pipe boots shall be KOR-N-SEAL as manufactured by NPC, Inc., or approved equal.

## 2.04 CONCRETE ENCASEMENT AND CRADLES

Concrete shall be 3,000 psi 28 day concrete, rough troweled finish.

Concrete steel reinforcement shall conform to ASTM A 615, Grade 60.

## 2.05 UNDERGROUND PIPE MARKERS

Detection tape shall be plastic ribbon tape, bright colored, continuously printed, minimum 6 inches wide by 4-mil thick, manufactured for direct burial service.

Trace wire shall be magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sewer" in large letters.

## 2.06 MANHOLES AND STRUCTURES

### A. PRECAST CONCRETE SECTIONS:

1. Precast concrete base sections, riser sections, transition top sections and flat slab tops shall meet the requirements of ASTM C 478. The minimum compressive strength of the concrete in precast sections shall be 4,000 psi.

2. The minimum wall thickness shall be one-twelfth of the inside diameter of the base, riser or the largest cone diameter. Additionally, the wall thickness shall be sufficient for the proper installation of the pipe boots. Wall thickness shall be as shown on the Drawings.

3. Bottom slab thickness shall equal the riser wall thickness or flat slab top thickness, whichever is greater.

4. Transition slabs which convert bases larger than four feet in diameter to four foot diameter risers shall be designed by the manhole manufacturer to carry the live and dead loads exerted on the slab.



5. Seal joints between precast sections by means of rubber O-ring gaskets or flexible butyl rubber sealant. Butyl rubber sealants shall meet the requirements of AASHTO M-198. Sealant shall be pre-formed type with a minimum nominal diameter of 1-inch. Butyl rubber sealant shall be equal to Kent Seal No. 2 or Concrete Sealants CS202.

6. Manholes shall have the size, configuration, depth and dimensions as shown on the Drawings.

B. BRICK AND MORTAR:

Brick shall be whole and hard burned, conforming to ASTM C 32 Grade MS. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet ASTM C 53.

C. FRAME AND COVERS:

1. Manhole frames and covers shall be manufactured from Class 30 gray iron, meeting the requirements of ASTM A48, and applicable local standards.

2. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Manhole covers and frame seats shall be machined to a true surface.

3. Standard manhole frames and covers shall be built to the dimensions and configurations shown on the Drawings.

4. Covers are to be embossed along the perimeter with the words "Sanitary Sewer" and "Entry Permit Required."

5. Watertight bolt-down frames and covers shall have 4 stainless steel bolts at 90 degrees and one polyvinyl gasket between cover and frame seat. Frame is to have four 1-inch diameter holes in flange at 90 degrees. Bolt down frames and covers are to be utilized whenever a manhole top is set lower than 1-foot above the 100-year base flood elevation.

6. Manhole frame and covers shall be East Jordan Iron Works No. V-1384, or approved equal.

7. Watertight manhole frame and covers shall be East Jordan Iron Works No. V-2335, or approved equal.

D. MANHOLE STEPS:

1. Steps shall consist of a 1/2 inch steel reinforcing rod encapsulated in a copolymer polypropylene plastic; reinforcing rods shall conform to ASTM A615, Grade 60, and polypropylene plastic shall conform to ASTM D4101.

2. Minimum design live load of steps shall be a single concentrated load of 300 pounds and shall withstand a pullout resistance of 2000 pounds when tested in accordance with ASTM C 497

3. Steps shall be nine (9) inches in depth and at least twelve (12) inches in width. Steps shall be uniformly spaced not more than sixteen inches (16") on center, including the spacing between the top step and the manhole cover. Each step shall project a minimum of 5 inches from the wall measured from the point of embedment.

4. Steps shall have non-skid top surfaces.

## 2.07 FLOOR DOORS AND ACCESS HATCHES

### A. NON-TRAFFIC AREAS:

1. The aluminum access frames and covers shall be manufactured with 1/4-inch thick, one-piece aluminum extruded frame, with a continuous concrete anchor as part of the one-piece extrusion.

2. The door panels shall be 1/4-inch thick aluminum diamond plates, to withstand a live load of 300 lbs. per square foot, with a safety factor of 1.5.

3. The doors shall be provided with stainless steel hinges with tamper-proof fasteners. All hardware shall be stainless steel. The doors shall be able to open to 90 degrees and lock automatically in that position with a stainless steel positive locking arm and a stainless steel release handle.

4. Doors shall be provided with a stainless steel lifting handle, stainless steel locking bar, or stainless steel snap-lock with removable key handle. Two key handles shall be provided with each door.

5. The doors shall close flush with the top of the frame, resting on a 1/2-inch wide lip around the entire inside of the frame for added support.

### B. TRAFFIC AREAS (LOW DENSITY TRAFFIC H-20 LOADING):

1. The aluminum access frames and covers shall be provided with a 1/4-inch thick structural grade aluminum channel frame with the flanges acting as a continuous concrete anchor.

2. The inside of the frame shall have a continuous door support angle that must have a full bed of Class "A" concrete under both the frame and support angle.

3. Door leaves shall be a minimum of 1/4-inch thick aluminum diamond plate with structural grade aluminum. Door reinforcing shall withstand an H-20 live load designation. The doors shall also have lifting aids of aluminum tubular construction with compression springs to assist in opening and closing of the doors.

4. The doors shall be provided with heavy-duty stainless steel hinges with tamper-proof fasteners. All hardware is to be stainless steel. The doors shall open to 90 degrees and lock automatically in that position with a stainless steel positive locking arm and a stainless steel release handle. Doors shall be provided with a stainless steel lifting handle, stainless steel snap-lock with removable key handle. Two key handles shall be provided with each door. The door leaves shall extend to the outside perimeter of the frame for added support.

Floor doors and access hatches shall be manufactured by Halliday Products, Inc., or approved equal.

#### 2.08 PLUG VALVES (NOT USED)

#### 2.09 CHECK VALVES (NOT USED)

#### 2.10 AIR VALVES (NOT USED)

#### 2.11 BEDDING AND COVER MATERIALS

Bedding and cover materials shall be as specified in Section 02200.

#### 2.12 SERVICE CONNECTIONS

Sewer service connections to sewer mains shall be made using wyes, saddles, or compression style fittings.

Wyes shall be installed in-line as a part of new construction or point repair to existing sewer mains. The wye material shall match that of the main line.

Saddles shall consist of a stainless steel strap, ductile iron casting, and SBR gaskets. The strap shall be Type 304 stainless steel, 3-1/2" wide, and connect to the casting using stainless steel hardware. The saddle shall be sized to match the main line pipe material and diameter. Service saddles shall be the CB Saddle as manufactured by Romac Industries, or equal.

Compression style fittings shall be a three piece service connection consisting of a PVC Hub, Rubber Sleeve, and Stainless Steel Band, and shall be manufactured by Inserta Tee. Fittings shall be designed to connect to the material and size of the sewer main. When installed in a lined pipe, the compression fitting shall be connected directly to the liner, not the host pipe. Compression style fittings shall not be used on pipes smaller than 12-inches in diameter.

### PART 3 – EXECUTION

#### 3.01 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS

##### A. GENERAL:

The Drawings indicate the approximate location of existing utilities or underground obstructions known to exist according to the best information known to the Owner. The Contractor shall contact the Palmetto Utility Location Service (PUPS) at 800-922-0983 as required by the South Carolina "Underground Utility Damage Prevention Act" and all utility agencies or departments that own and/or operate utilities in the vicinity of the construction work site at least 72 hours, 3 business days, prior to construction to verify the location of the existing utilities.

**B. EXISTING UTILITY LOCATION:**

The following steps shall be exercised to avoid interruption of existing utility service.

1. Provide the required notice to the utility owners and allow them to locate their facilities according to South Carolina law. Field utility locations are valid for only ten days after original notice. The Contractor shall ensure at the time of any excavation that a valid utility location exists at the point of excavation.

2. Expose the facility to verify its true location and grade for a distance of at least 200 feet in advance of pipeline construction to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.

3. Avoid utility damage and interruption by protecting it with means or methods recommended by the utility owner.

4. Maintain a log identifying when phone calls were made, who was called, area for which utility relocation was requested and work order number issued, if any. The Contractor shall provide the Engineer an updated copy of the log bi-weekly, or more frequently if required.

**C. CONFLICT WITH EXISTING UTILITIES:**

1. **HORIZONTAL CONFLICT:** Horizontal conflict shall be defined as when the actual horizontal separation between a utility, main, or service and the proposed water main does not permit safe installation of the sewer by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the sewer to avoid horizontal conflicts if the new alignment remains within the available right-of-way or easement and complies with regulatory agency requirements after a written request to and subsequent approval by the Engineer. Where such relocation of the sewer is not approved by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

2. **VERTICAL CONFLICT:** Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed sewer does not permit the crossing without immediate or potential future damage to the utility, main, service, or the sewer. The Contractor may change the proposed grade of the sewer to avoid vertical conflicts if the changed grade provides minimum required capacity, maintains adequate cover and complies with regulatory agencies requirements, after written request to and subsequent

approval by the Engineer. Where such relocation of the sewer is not approved by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

D. ELECTRONIC LOCATOR:

Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

E. WATER AND SEWER SEPARATION:

1. Follow the SCDHEC regulations for separation of water mains and sanitary sewers lines.

2. PARALLEL INSTALLATION:

a. Preferred/Normal Conditions – sewer mains or sewer manholes shall be constructed at least 10 feet horizontally from water lines whenever possible. The distance shall be measured edge-to-edge.

b. Unusual Conditions – when local conditions prevent a horizontal separation of at least 10 feet, the sewer main or sanitary sewer manhole may be laid closer to a water line provided that:

i. The sewer line shall be placed in a separate trench, with elevation of the top of the sewer line at least 18 inches below the bottom of the water line; or

ii. The sewer line shall be placed in the same trench as the water, and located to one side, on a bench of undisturbed earth, and the elevation of the top of the sewer line at least 18 inches below the bottom of the water main

3. SEWER CROSSING BELOW WATER MAINS:

a. Preferred/Normal Condition – sewer lines shall be constructed to cross below water lines whenever possible and shall be laid to provide a vertical separation of at least 18 inches between the bottom elevation of the water line and the top of the sewer.

b. Unusual Conditions – when local conditions prevent an 18 inch vertical separation as described in the paragraph above, the following construction shall be used:

i. Both the sewer crossing above water line and the water line itself shall be constructed of AWWA-approved Ductile Iron Pipe with joints that are equivalent to water main standards for a distance of 10 feet on each side of the point of crossing.

4. SEWER CROSSING ABOVE WATER MAINS:

a. Unusual Conditions – when local conditions prevent an 18 inch vertical separation, as described in paragraph 3, Sewer Crossing Below Water Mains, Preferred/Normal Condition, above, the following construction shall apply:

i. That a section of DIP sewer pipe, with water main type pipe joints, is centered at the point of the water crossing so that the joints are equal distant and as far as possible from the water main such that, for a 90 degree crossing, the water main type joints

are a minimum of 10 feet on each side of the point of crossing.

ii. Provide adequate structural support for the sewers to prevent excessive deflection of the joints, which can result in settling on and/or breaking the water line.

5. SEWER AND OTHER UTILITIES:

a. Horizontal Separation – Preferred/Normal Condition – sewer lines shall be constructed to provide at least 3 feet of horizontal separation from other utilities whenever possible. The distance shall be measured edge-to-edge.

b. Vertical Separation – Preferred/Normal Condition – whenever it is necessary for another utility to cross a sewer main, a 12-inch vertical separation shall be maintained between the lines. When local conditions prevent a 12-inch vertical separation, the following construction shall apply:

i. Provide adequate structural support for the utility to prevent excessive deflection of the joints, which can result in settling on and/or breaking the sewer line.

6. SANITARY SEWER MANHOLES: No water main shall be allowed to pass through or come in contact with any part of a sewer manhole. A minimum of 3 feet of horizontal separation shall be maintained between water mains and sanitary sewer manholes provided that the applicable provisions of paragraph 2, Parallel Installations, Unusual Conditions, above, are also met.

7. STORM DRAINAGE SYSTEM: No gravity sewer or sewer lateral shall pass through a storm drain pipe or manhole system.

Verify trench is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.02 PREPARATION

Correct over excavation with coarse aggregate.

Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.

Protect and support existing sewer lines, utilities and appurtenances.

Maintain profiles of utilities. Coordinate with other utilities to eliminate interference. Notify Engineer where crossing conflicts occur.

3.03 CONSTRUCTION ALONG HIGHWAYS, STREETS AND ROADWAYS

Install pipe lines and appurtenances along highways, streets and roadways in accordance

with the applicable regulations of, and permits issued by, all governing State, County, Municipality or Public Works Departments with reference to construction operations, safety, traffic control, road maintenance and repair.

A. TRAFFIC CONTROL:

The Contractor shall provide, erect and maintain all necessary barricades; suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.

Construction traffic control devices and their installation shall be in accordance with the current Manual On Uniform Traffic Control Devices for Streets and Highways.

Placement and removal of construction traffic control devices shall be coordinated with all governing State, County, Municipality or Public Works Departments a minimum of 48 hours in advance of the activity.

Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose. Traffic control devices used intermittently, such as “Flagmen Ahead”, shall be removed and replaced when needed.

Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Original locations shall be measured from reference points and recorded in a log prior to relocation. Temporary locations shall provide the same visibility to affected traffic as the original location. Relocated traffic control devices shall be reinstalled in their original locations as soon as practical following construction.

Construction traffic control devices shall be maintained in good repair, and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.

Construction warning signs shall be black legend on an orange background. Regulatory signs shall be black legend on a white background. Construction sign panels shall meet the minimum reflective requirements of all governing State, County, Municipality or Public Works Departments. Sign panels shall be of durable materials capable of maintaining their color, reflective character and legibility during the period of construction.

Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current Manual On Uniform Traffic Control Devices for Streets and Highways, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

Maintain streets, highways, roadways and driveways in suitable condition for movement

of traffic until completion and final acceptance of the work.

During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. The edges of running plates shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted, as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.

Furnish a road grader or front-end loader for maintaining highways, streets, and roadways. Make the grader or front-end loader available at all times.

Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the work.

No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.

### 3.04 CONSTRUCTION OPERATIONS

Perform all work along highways, streets and roadways to minimize interference with traffic.

#### A. STRIPPING:

Where the pipe line is laid along road right-of-way, strip and stockpile all sod, topsoil and other material suitable for right-of-way restoration.

#### B. TRENCHING, LAYING AND BACKFILLING:

Do not open the trench any further ahead of pipe laying operations than is necessary. Backfill and remove excess material immediately behind laying operations. Complete excavation and backfill for any portion of the trench in the same day.

#### C. SHAPING:

Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod and any other materials removed from shoulders.

Construction operations shall be limited to 600 feet, including cleanup and utility exploration.

#### D. EXCAVATED MATERIALS:

Do not place excavated material along highways, streets and roadways in a manner which obstructs traffic. Sweep all scattered excavated material off the pavement in a timely manner.



E. DRAINAGE STRUCTURES:

Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.

F. LANDSCAPING FEATURES:

Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.

G. PIPE DISTRIBUTION:

1. Pipe shall be distributed and placed in such a manner that will not interfere with traffic.

2. No pipe shall be strung further along the route than 1,000 feet beyond the area in which the Contractor is actually working without written permission from the Owner. The Owner reserves the right to reduce this distance to a maximum distance of 200 feet in residential and commercial areas based on the effects of the distribution to the adjacent property owners.

3. No distributed pipe shall be placed inside drainage ditches.

4. Distributed pipe shall be placed as far as possible from the roadway pavement, but no closer than five feet from the roadway pavement, as measured edge-to-edge.

### 3.05 LOCATION AND GRADE

The Drawings show the alignment and grade of the sewer and the position of manholes and other appurtenances. The slope shown on the profile and/or called for in the Specifications is the slope of the invert of the pipe.

From the information on the Drawings and the survey points found on the Project site, the Contractor shall perform all surveys necessary for the establishment of the horizontal and vertical alignment of the sewer.

A. REFERENCE POINTS:

1. The Contractor shall take all precautions necessary, which includes, but is not necessarily limited to, installing reference points, in order to protect and preserve the centerline or baseline established by the Engineer.

2. Reference points shall be placed, at or no more than three feet, from the

outside of the construction easement or right-of-way. The location of the reference points shall be recorded in a log with a copy provided to the Engineer for use prior to his verifying reference point locations. Distances between reference points and the manhole centerlines shall be accurately measured to the nearest 0.1 foot.

3. The Contractor shall give the Engineer reasonable notice that reference points are set. The reference point locations must be verified by the Engineer prior to commencing clearing and grubbing operations.

4. After the Engineer locates and marks the manhole centerlines or baselines of the sewer, the Contractor shall perform clearing and grubbing.

#### B. CUT SHEETS:

1. Cut sheets shall be utilized for basis of payment and confirming that the profile is as shown on the Drawings.

2. Prior to beginning installation of any section of the gravity sewer, prepare cut sheets from field run ground elevations and submit them to the Engineer for approval.

3. The survey, from which cut sheets are prepared, may be performed prior to or after clearing and grubbing operations. The surveyor shall obtain an elevation on each bench mark shown on the Drawings and provide this information to the Engineer.

4. No installation of the sewer shall commence prior to approval of the cut sheets.

5. Submittal of cut sheets shall be in accordance with Section 01300 of these Specifications.

6. Cut sheets shall provide the station (to the nearest 1 foot) and the elevation (to the nearest 0.1 foot) at maximum 100 foot intervals, plus at each change in slope of the ground and at each manhole centerline. The cut sheet shall also show the invert elevation of the sewer at the corresponding sewer station. From a straight line interpolation of the data, the Contractor shall calculate and record the station of each point where there is a change in the cut brackets indicated on the Bid form. The Contractor shall calculate and record the length of the sewer between each change in cut bracket. The Contractor shall also indicate the pipe material and class as well as the type of bedding. The slope of the sewer shall also be indicated between manholes. At least one offset hub or temporary bench mark shall be provided at each manhole. Its elevation and the resulting cut from the hub to the manhole invert shall also be shown on the cut sheets.

7. Construction shall begin at the low end of the sewer and proceed upstream without interruption. Multiple construction sites shall not be permitted without written authorization from the Engineer for each site. As a minimum, cut sheets between construction sites shall be submitted and approved before multiple construction sites will be permitted.

8. The Contractor shall be responsible for any damage done to reference points, base lines, center lines and temporary bench marks, and shall be responsible for the cost of

re-establishment of reference points, base lines, center lines and temporary bench marks as a result of the operations.

### 3.06 BEDDING

Excavate pipe trench in accordance with Section 02200.

Excavate to lines and grades shown on the Drawings, or as required to accommodate installation of encasement.

Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.

Provide sheeting and shoring in accordance with Section 02350.

Place bedding material at trench bottom, level materials in a continuous layer not less than 6 inches of compacted depth; compact to 95 percent.

### 3.07 PIPE INSTALLATION

Lay pipe to slope gradients noted on the Drawings. Begin at downstream end and progress upstream.

Assemble and handle pipe and accessories in accordance with the manufacturer's instructions except as modified on the Drawings or by the Engineer.

Keep pipe and fittings clean until work is completed and accepted by Engineer. Cap open ends during periods of work stoppage.

Lay bell and spigot pipe with bells upstream.

Proper tools and facilities shall be provided for the safe performance of construction. All pipe, fittings and valves shall be lowered carefully into the trench by means of slings, ropes or other suitable tools or equipment in such a manner as to prevent damage to sewer materials and protective coatings and linings. Under no circumstances shall sewer materials be dropped or dumped into the trench.

All pipe, fittings, valves and other appurtenances shall be examined carefully for damage and other defects immediately before installation. Defective materials shall be marked and held for inspection by the Engineer, who may prescribe corrective repairs or reject the materials.

All lumps, blisters and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and free from dirt, sand, grit or any foreign materials before the pipe is laid. No pipe which contains dirt shall be laid.

Foreign material shall be prevented from entering the pipe while it is being placed in the trench. No debris, tools, clothing or other materials shall be placed in the pipe at any time.

As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted.

Detection tape shall be buried 4 to 10-inches deep.

Lay pipe straight in alignment and gradient or follow true curves, where shown on the Drawings, as nearly as practicable. Do not deflect any joint more than the maximum deflection recommended by the manufacturer.

Maintain a transit, level and accessories on the job to lay out angles and ensure that deflection allowances are not exceeded.

The Contractor shall check the invert elevation at each manhole and the pipe invert elevation at least three times daily, start, mid-day and end of day. Elevations shall be checked more frequently if more than 100 feet of pipe is installed in a day or if the pipe is being constructed at minimum slope.

The Contractor shall check the horizontal alignment of the sewer at the same schedule as for invert elevations.

Excavate, lay the pipe, and backfill as closely together as possible. Do not leave un-jointed pipe in the trench overnight. Backfill and compact the trench as soon as possible after laying and jointing is completed.

Push-on, mechanical, flange and restrained type joints shall be assembled in accordance with the manufacturer's recommendations.

Each restrained joint shall be inspected by the Contractor to ensure that it has been "homed" 100 percent.

The Contractor shall internally inspect each pipe joint to insure proper assembly for pipe 24-inches in diameter and larger after the pipe has been brought to final alignment.

Cut ductile iron pipe using an abrasive wheel saw. Cut PVC pipe using a suitable saw. Remove all burrs and smooth the end before jointing. The Contractor shall cut the pipe and bevel the end, as necessary, to provide the correct length of pipe necessary for installing the fittings, valves, accessories and closure pieces in the correct location. Only push-on or mechanical joint pipe shall be cut.

Install wyes or tees in locations designated by the Engineer for connection of service

lines. Plug the branch of the wye or tee. Record the location of fittings installed on a copy of the Drawings to be submitted as Record Drawings.

### 3.08 CONNECTION TO EXISTING MANHOLE

Core drill the existing manhole to a clean opening. The use of pneumatic hammers, chipping guns or sledge hammers is not permitted.

Install a watertight neoprene gasket and seal with non-shrink concrete grout.

Concrete encase the new sewer pipe to minimum of 24 inches towards the nearest pipe joint. Use an epoxy binder between new and existing concrete.

Prevent construction debris from entering the existing sewer line when making connection.

### 3.09 NEW MANHOLE INSTALLATION

#### A. GENERAL:

1. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.

2. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify manholes and structures are internally clean and free from damage. Remove and replace damaged units.

3. Excavate for manholes and structures in accordance with Section 02200 at location and to depth shown. Provide clearance around sidewalls of manhole or structure for construction operations.

4. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes or structures in dry trench. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation.

5. Construct manholes as shown on the Drawings.

6. Install manholes and structures supported at proper grade and alignment on crushed stone bedding.

7. Manholes shall be constructed such that their walls are plumb.

8. Grout base of shaft sections to achieve slope to exit piping. Contour to form continuous drainage channel, rounded and troweled smooth, as indicated on Drawings. Maintain consistent grade through the invert.

#### B. PRECAST CONCRETE MANHOLE STRUCTURE INSTALLATION:

1. Handle sections carefully to prevent cracking or chipping. Lift precast manholes and structures at lifting points designated by manufacturer. Provide uniform bedding of the bottom section to prevent uneven loading. Install gaskets and joint sealants in accordance with manufacturer's recommendations to produce a watertight structure.

2. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and manhole or structure remains clean.

3. Set precast manholes and structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 02200.

4. Assemble multi-section manholes and structures by lowering each section into excavation. Install rubber gasket joints between precast sections in accordance with manufacturer's recommendations. Lower, set level, and firmly position base section before placing additional sections.

5. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.

6. Joint sealing materials may be installed on site or at manufacturer's plant.

7. Verify manholes and structures installed satisfy required alignment and grade.

8. The invert elevations shown on the Drawings shall be for the invert at the centerline of the precast concrete manhole. Prior to setting the laser or other vertical alignment control system for the sewer upstream of the manhole, the Contractor shall verify the elevation of the sewer installed at the manhole. Should the elevation differ from that shown on the Drawings, the Contractor shall take the following corrective action:

a. If the sewer is laid at negative grade, the Contractor shall remove and reinstall the sewer at the correct grade at no additional cost to the Owner.

b. If the sewer is laid at a grade less than that shown on the Drawings, thus reducing the sewer's capacity, the Owner may require the sewer to be removed and relaid at the correct grade at no additional cost to the Owner. As a minimum, the grade to the next upstream manhole shall be adjusted such that the next upstream manhole shall be set at the correct elevation.

c. If the sewer is laid at a grade greater than that shown on the Drawings, and if the Contractor can show that there are no conflicts with upstream existing utilities or obstructions, the Contractor shall adjust the grade of the next upstream manhole such that the next upstream manhole shall be set at the correct elevation. If such an adjustment, in the Engineer's opinion, is substantial, the grade adjustment shall be spread over multiple sections of the sewer. If such an adjustment, in the Owner's opinion, significantly reduces the sewer's capacity, the Owner may require the Contractor to remove and relay that portion of the sewer

laid at the improper grade.

9. All pipes shall be connected to precast concrete manholes by a rubber boot provided in a cored or precast hole of the proper diameter.

10. Cut pipe to finish flush with interior of manhole or structure.

11. Grout base of shaft sections to achieve slope to exit piping. Contour invert to form continuous drainage channel, rounder and troweled smooth. Maintain consistent grade through the invert.

12. Seal all manhole joints and lift holes, both inside and out, with grout. Between precast sections, this is in addition to joint sealant.

### C. DOGHOUSE MANHOLE STRUCTURE INSTALLATION

1. Stake out location and burial depth of existing sewer line in area of proposed manhole or structure.

2. Carefully excavate around existing sewer line to adequate depth for foundation slab installation. Protect existing pipe from damage. Cut out soft spots and replace with granular fill compacted to 95% dry density.

3. Prepare crushed stone bedding or other support system shown on Drawings, to receive foundation slab as specified for precast manholes and structures.

4. Install pre-cast concrete manhole or structure around existing pipe in accordance with the appropriate paragraphs specified herein.

5. Grout pipe entrances as required to provide a leak-tight seam.

6. Block upstream flow at existing manhole or structure with expandable plug.

7. Use hydraulic saw to cut existing pipe at manhole or structure entrance and exit and along pipe length at a point halfway up the outside diameter on each side of the pipe. Bottom half of pipe shall remain as manhole flow channel. Saw cut to have a smooth finish with top half of pipe flush with interior of manhole or structure.

8. Grout base of manhole or structure to achieve slope to exit piping. Contour invert to form continuous drainage channel, rounder and troweled smooth. Maintain consistent grade through the invert.

### D. MANHOLE DROP CONNECTIONS:

1. Manholes requiring drop connections are shown on the Drawings. Construct drop connections of the same materials as the upstream sewer and in accordance with Drawings.

2. Concrete encase pipe drop connection to minimum of 2 feet outside of manhole.
3. Form channel from pipe drop to sweep into main channel at maximum angle of 30 degrees.

#### E. INSTALLATION OF CASTINGS:

1. Set frames using mortar and masonry. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Bed the bottom and sides of every brick in mortar. Where more than one course of concrete brick is required, stagger vertical joints. Apply a smooth coat of mortar, 3/4-inch thick, on the inside and outside.
2. Set frame and cover 18 inches above finished grade for manholes and other structures with covers located within unpaved areas to allow area to be graded away from cover, unless otherwise shown on the Drawings or directed by the Engineer.

### 3.10 WYE BRANCH AND TEE INSTALLATION

Install wye branches or pipe tees at the locations indicated on Drawings concurrent with pipe laying operations. Use standard fittings of the same material and joint type as the sewer main.

Maintain a minimum of 5 feet separation distance between the wye connection and the manhole.

Use a saddle wye or tee with stainless steel clamps for taps into existing piping. Mount saddles with solvent cement or gasket and secure with metal bands. Layout holes with template and cut holes with a mechanical cutter.

### 3.11 SANITARY SEWER LATERAL INSTALLATION

Construct laterals from the wye branch to terminal point at the edge of the right-of-way or permanent easement.

Where the depth of main pipeline warrants, construct riser type laterals from the wye branch.

Maintain 3 feet minimum depth of cover over lateral pipe.

Maintain a minimum of 5 feet separation distance between laterals.

Install watertight plug, braced to withstand pipeline test pressure thrust, at termination of lateral. Install a temporary marker stake extending from the end of the lateral to 12 inches above finished grade. Paint the top 6 inches of stake with fluorescent green paint.



### 3.12 BACKFILLING

Backfill around sides and to top of pipe in accordance with Section 02200.

Maintain optimum moisture content of bedding material to attain required compaction density.

### 3.13 INSPECTION AND TESTING

The Contractor shall provide all equipment, material, water, labor, etc. needed to perform any and all tests in accordance with the procedures listed herein.

The Contractor shall ensure that the new sewer pipe and manholes is clean and free of debris, dirt, sand gravel, etc. prior to commencing testing.

Testing shall be conducted promptly after pipe laying and backfilling activities.

#### A. LOW PRESSURE AIR TESTING (GRAVITY SEWERS):

1. Low pressure air testing shall be the primary method of gravity sewer testing, for pipes less than or equal to 36-inches in diameter, when the ground water elevation is less than two feet above the top of the pipe. Testing shall be conducted after the installation of sewer service connections and laterals.

2. Testing equipment, preparation, procedures and safety precautions associated with low pressure air testing shall be in accordance with ASTM F 1417.

3. The Contractor shall make all necessary safety precautions prior to, during and after testing. Dangerous conditions may arise out of improperly prepared tests, faulty equipment, ignorance or carelessness. Pressure regulators shall be utilized to avoid over pressurizing the main. At no time will anyone be allowed to enter or stand over the opening of manholes during testing.

4. The "*Time –Pressure Drop Method*" shall be the method used during the test. The minimum time required for a 1.0 psig pressure drop for the size and length of pipe shall be as shown in the following table extracted from ASTM F 1417:

**TABLE 1 Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated for Q = 0.0015**

NOTE 1—See Practice UNI-B-6-90.

NOTE 2—Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 in. in diameter.

Pipe Diameter, in.	Minimum Time, min:s	Length for Minimum Time, ft	Time for Longer Length, s	Specification Time for Length (L) Shown, min:s								
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	230:46

**B. INFILTRATION TESTING (GRAVITY SEWERS & MANHOLES):**

1. Infiltration testing shall be the method of testing gravity sewers where the ground water elevation is more than two feet above the top of the pipe.

2. Infiltration testing equipment, preparation, procedures and safety precautions shall be in accordance with ASTM C 969.

**C. MANHOLE VACUUM TESTING**

1. All new sewer manholes shall be vacuum tested in accordance with ASTM C 1244.

2. Manholes shall be vacuum tested immediately after complete assembly, to include frames and pipe connections, and before backfilling around the manhole.

3. Installation and operation of the vacuum testing device shall be conducted in accordance with the testing equipment manufacturer’s recommendations.

4. The testing requirement shall be the time elapsed for the measured vacuum in the manhole to drop from 10 inches Hg to 9 inches Hg. The minimum time requirements are shown in the following table extracted from ASTM C 1244:

5. If the manhole fails the test, the Contractor shall locate and repair the defect and retest the manhole at no cost to the Owner.

**TABLE 1 Minimum Test Times for Various Manhole Diameters (30 – 120 in.) in Seconds**

Depth (ft)	Diameter, in.								
	30	33	36	42	48	54	60	66	72
Time, in seconds									
<4	6	7	7	9	10	12	13	15	16
6	9	10	11	13	15	18	20	22	25
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	29	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

**TABLE 1 Minimum Test Times for Various Manhole Diameters (30 – 120 in.) in Seconds (continued)**

Depth (ft)	Diameter, in.							
	78	84	90	96	102	108	114	120
Time, in seconds								
<4	18	19	21	23	24	25	27	29
6	26	29	31	34	36	38	41	43
8	35	38	41	45	48	51	54	57
10	44	48	52	56	60	63	67	71
12	53	57	62	67	71	76	81	85
14	62	67	72	78	83	89	94	100
16	70	76	83	89	95	101	108	114
18	79	86	93	100	107	114	121	128
20	88	95	103	111	119	126	135	142
22	97	105	114	122	131	139	148	156
24	106	114	124	133	143	152	161	170
26	114	124	134	144	155	164	175	185
28	123	133	145	155	167	177	188	199
30	132	143	155	166	178	189	202	213

### 3.14 PROTECTION AND RESTORATION OF WORK

All disturbed areas shall be returned to a condition equal to or better than their originally undisturbed condition.

The Contractor shall be responsible for coordinating with affected land owners and shall perform all work in a professional manner that minimizes disruptions and damage.

Landscaped and cultivated areas shall be restored as quickly as possible upon the completion of work in the immediate area. The Owner and Engineer may require a temporary stoppage in sewer construction activities, if in their opinion, restoration is not occurring in a timely manner.

Manmade improvements shall be protected to the fullest extent possible. If it is necessary to remove such improvements during the execution of work, they shall be replaced by the Contractor as soon as possible.

Construction debris and waste materials shall be removed from the site in accordance with local, state and federal regulations. Waste removal shall occur continuously during construction activities.

The Contractor shall incorporate measures to ensure the prevention of erosion and maintain sedimentation control throughout the execution of work. The topography of the site shall be restored to its original state upon completion of adjacent work.

Wetland areas shall be protected to the fullest extent possible. There shall be no spreading, dumping or discharge of any pollutant, to include diesel fuel, gasoline, chemicals, pesticides, to any drainage structure, swamp, stream or wetland.

**\*\*END OF SECTION\*\***

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SECTION 02531

VORTEX FLOW INSERT

PART 1 – GENERAL

1.01 DESCRIPTION

Furnish and install Vortex Flow Insert and all associated mounting and connection materials in a drop structure as indicated and specified herein.

A. GENERAL:

Supply all products and perform all work in accordance with applicable American Water Works Association (AWWA), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), or other recognized standards. The latest revisions of all standards are applicable.

1.02 SUBMITTALS

Submittal product data shall be submitted in accordance with Section 01300.

1.03 QUALITY ASSURANCE

The product manufacturer shall certify that the products meet or exceed the specified requirements.

Perform work in accordance with all governing State, County, Municipality or Public Works standards.

Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

Reference	Title
AASHTO	American Assn. of State Highway Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
AREA	American Rail Engineers Association
ASCE	American Society of Civil Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials

Reference	Title
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
FS	Federal Specifications
MSDS	Material Safety Data Sheets
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NSF	National Sanitation Federation International
OSHA	Occupational Safety and Health Administration
SCDHEC	South Carolina Department of Health & Environmental Control
SCDOT	South Carolina Department of Transportation
UL	Underwriters Laboratories Inc.
WEF	Water Environment Federation

#### 1.04 QUALIFICATIONS

##### A. MANUFACTURER:

Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

##### B. INSTALLER:

Company specializing in performing work of this section with a minimum of two years documented experience.

#### 1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

##### A. PRODUCTS:

1. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

2. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

##### B. PRODUCT DELIVERY REQUIREMENTS:

1. Transport and handle products in accordance with manufacturer's instructions.

2. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

C. PRODUCT STORAGE AND HANDLING REQUIREMENTS:

1. Store and protect products in accordance with manufacturers' instructions.
2. Store with seals and labels intact and legible.
3. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
4. For exterior storage of fabricated products, place on sloped supports above ground.
5. Provide off-site storage and protection when site does not permit on-site storage or protection.
6. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
7. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
8. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
9. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

## PART 2 – PRODUCTS

### 2.01 DESIGN REQUIRMENTS

A. The Vortex Flow Insert consists of a Vortex Top Form, a Vortex Shaft and an Energy Dissipation Pool as specified by IPEX Inc.

B. Vortex Flow Insert shall be designed to operate effectively with flows between 15% and 115% of their rated capacity, unless otherwise specified. Design flow to be supplied by Engineer.

C. Contractor is responsible for securing, supporting and connecting the Vortex Flow Insert to existing influent pipe and manhole structure as specified and designed by the Engineer.

D. Vortex Flow Insert must display a label engraved “U.S. Patent No. 6,419,843”.

## 2.02 MANUFACTURING

- A. All Vortex Flow Inserts will be manufactured by IPEX USA L.L.C (1-800-463-9572) or an IPEX authorized Sub-Contractor.
- B. All units to be manufactured to standard specifications produced and supplied under license by IPEX Inc.
- C. All pipe sections used in the fabrication of the Vortex Flow Insert must be manufactured to AWWA C900 and/or AWWA C905 standards.
- D. All pipe sections used in the fabrication of the Vortex Flow Insert must be CSA Certified to CSA B137.3
- E. All PVC sheet used in the fabrication of the Vortex Flow Insert is to be of 1/4" minimum thickness.
- F. All Roving used in the fabrication of the Vortex Flow Insert is to be 24oz/sqyd minimum.
- G. All Mat used in the fabrication of the Vortex Flow Insert is to be 1-1/2oz/sqft minimum.
- H. All Derakane used in the fabrication of the Vortex Flow Insert will be of minimum grade 470-300.
- I. All resin used in the fabrication of the Vortex Flow Insert will be determined by supplier to meet the specific requirements of the fluid and the temperature.

## 2.03 QUALITY ASSURANCE

- A. Acceptance at site:
  - 1. The quality of all materials shall be subject to inspection and approval by the Engineer. The Vortex Flow Insert shall be subject to rejection upon delivery on account of failure to meet specification requirements. If any material is damaged between the times of delivery and the completion of installation, it shall be repaired or replaced, if permitted by the Owner, at the expense of the Contractor.
  - 2. Materials will be inspected for compliance with specified standards and the specifications herein. In addition, all materials shall be inspected for general appearance, dimensions, and cracks.
  - 3. Minor imperfections may be repaired, if permitted by the Owner, at the expense of the Contractor. All repairs shall be inspected before final approval by the Engineer.



## 2.04 MOUNTING HARDWARE & SUPPORT STRUCTURE

A. Contractor shall provide all labor, materials, equipment, services and incidentals as shown or specified and required to furnish and install and place in satisfactory service the Vortex Flow Insert as designed and specified by the Engineer.

B. All bolts, fasteners, straps, supports and mounting hardware shall be SS, with the grade to be determined by the engineer.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

A. Install Vortex Flow Insert in accordance with Engineers plans.

B. Align Vortex Flow Insert as designed and specified by the Engineer.

C. Anchor Vortex Flow Insert as designed and specified by the Engineer.

D. Provide spacers and supports for Vortex Flow Insert as designed and specified by the Engineer.

E. Provide a watertight connection between Vortex Flow Insert and influent pipe through the use of non-shrink sealant/grout or a similar method as approved by Engineer.

F. Protect Vortex Flow Insert from water and debris entering structure during construction.

G. Support all work until permanent support has been installed. Contractor is responsible for furnishing and installing temporary and permanent support systems.

**\*\*END OF SECTION\*\***

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## SECTION 02603

### REHABILITATION OF SANITARY SEWER MANHOLES

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

###### A. SCOPE:

This section specifies rehabilitation of existing sanitary sewer manholes to eliminate infiltration and provide protection against corrosion to the manhole interior. Rehabilitation methods include injection grouting and sealing of manhole interiors.

###### B. REQUIREMENTS:

Contractor shall have at least two (2) years experience in the rehabilitation of sanitary sewer manholes.

Contractor must have at least two (2) years experience with the application of the approved methods as described in these specifications. The Contractor must also provide proof that in the past two (2) years the Contractor's Company and Contractor's Superintendent has successfully lined 400 manholes utilizing each of the described methods and materials for lining manholes. These 400 manholes must equate to at least 2,500 vertical feet. The Contractor and the applicator must be factory trained and provide copy of certificate acknowledging status as being trained in the handling, mixing and application of the product.

Contractor shall provide a list of five (5) municipalities or government agencies that have contracted their services for the lining and rehabilitation of sanitary sewer manholes utilizing the specified methods in the past two years. The names on this list shall serve as references for the Contractor, and shall be provided to the Engineer. Contractors who do not meet the experience and other qualifications specified herein shall not be considered for award of the contract. Each bidder is required to submit with his bid the contractor qualification form attached to these specifications.

Contractor must provide proof of any required federal, state or local permits or licenses necessary for the project. Any and all costs associated with obtaining the above qualifications or requirements shall be borne by the Contractor.

Contractor shall hold the Owner and Engineer wholly harmless in any legal action resulting from patent infringements.

Contractor shall eliminate infiltration of extraneous water into the manhole interior by injecting grout through predrilled holes into the surrounding soil. Grouting shall be performed at all

points within the manhole actively leaking or identified by the Engineer as potential points of leakage. Contractor shall seal the interior surface of each manhole as specified.

Contractor shall furnish all labor, materials and equipment required to clean, grout and/or seal designated manholes. All rehabilitation work, including surface preparation shall be performed from within the manhole. Unless otherwise directed by the Engineer, the Contractor shall supply a continuous supply of fresh air to the manhole while conducting his work. Contractor shall not remove any manhole lid without first monitoring the extent of hazardous gas within the manhole or otherwise providing a safe atmosphere to the manhole interior. Contractor shall comply with all current OSHA regulations pertaining to confined space entry.

## 1.02 QUALITY ASSURANCE

### A. STANDARDIZATION:

Materials and supplies provided shall be the standard products of manufacturers. The standard products of manufacturers other than those specified will be accepted when it is demonstrated to the Engineer that they are equal in composition, durability, and usefulness for the purpose intended. Requests for substitution shall be in accordance with the General Specifications and Special Provisions and shall include directions for application and descriptive literature on safe storage, handling and disposal of the product.

### B. GUARANTEE:

All manhole grouting and sealing work performed by the Contractor shall be guaranteed against faulty workmanship and/or materials for a period of 2 years after the completion of work.

The Engineer will inspect grouted and sealed manholes during wet weather periods to evaluate the Contractor's work product.

## 1.03 SUBMITTALS

Contractor shall submit in accordance with Section 01300 the following items:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Results of grout tests specified in paragraph 02603-2.01.

PART 2 – PRODUCTS

2.01 INJECTION GROUT

The cured grout mixture shall have a minimum solids content of 11 percent. The Contractor shall prepare and ship three samples of cured grout to an independent laboratory approved by the Owner. Testing shall include solids content by weight of the oven-dried samples and the percent by weight of water reabsorbed by the oven-dried samples after continuous immersion for a 1-week period. The tested grout sample shall exhibit a solids content previously stated and the ability to reabsorb at least 98 percent of the water originally present in the cured sample. Test results shall be submitted in accordance with paragraph 02603-1.03 two weeks prior to the first field application. The grout mixture shall also have a controllable gellation time ranging from 10 seconds to 3 minutes. Unless otherwise directed by the Engineer, grout additives shall be proportioned to achieve a minimum gellation time of 1 minute. The Engineer shall determine the gellation time in the field by mixing equal parts of polymer to catalyst and measuring the time required to produce a stiff, non-flowing grout.

Contractor shall use "AC-400" acrylate grout, manufactured by Geochemical Corporation; "Scotch-Seal 5600" polyurethane grout, manufactured by 3M Company; or equal. Contractor shall incorporate into the grout mixture all chemical additives as recommended by the manufacturer, such as to provide strength, control cure time, or control viscosity. Acrylamide grouts are prohibited.

Grout used for preventing infiltration and for filling voids prior to the installation of the liner material shall be recommended and furnished by the lining material manufacturer for the specific application. Grout shall be compatible with the liner material.

2.02 FLEXIBLE URETHANE SEALANT

For manholes lined with the cementitious liner, the Contractor shall install the flexible urethane sealant on the joints between the frame and chimney on the inside of the manhole. This sealant shall be nine (9) inches in width and shall cover at least three inches of the metal frame. This sealant shall be installed after the cementitious liner has cured.

The flexible urethane sealant shall be "Flex Seal Utility Sealant" as manufactured by Sealing Systems, Inc., Loretto, MN or equal.

Minimum requirements for the flexible aromatic urethane resin liner primer shall be as follows:

- Hardness	ASTM D2240	85
- Elongation	ASTM D442	400%
- Tensile Strength	ASTM D412	3,200 psi

- Adhesive Strength     ASTM D0903           410 lb. l/in.
- Tear Resistance       ASTM D1004           200 lb. l/in.

Minimum requirements for the flexible aromatic urethane resin liner final coat shall be as follows:

- Hardness               ASTM D2240           75
- Elongation             ASTM D442           800%
- Tensile Strength       ASTM D412           1,150 psi
- Adhesive Strength     ASTM D0903           175 lb. l/in.
- Tear Resistance       ASTM D1004           155 lb. l/in.

The area to be sealed by the flexible urethane sealant shall be prepared in accordance with the manufacturer’s recommendations.

The product shall be mixed per manufacturer’s recommendations and shall be applied by spray, brush or trowel to produce a flexible urethane seal between 80 – 120 mils in thickness.

### 2.03 PATCHING MATERIAL

A quick setting fiber reinforced calcium aluminate corrosion resistant cementitious material shall be used for filling interior voids and patching. The product shall be mixed and applied per manufacturer’s recommendations and shall have the following minimum requirements:

Compressive Strength	ASTM C109	200 psi @ 15 minutes 800 psi @ 1 hr. 1400 psi @ 6 hrs. 2000 psi @ 24 hrs.
Bond Cement	ASTM C321	145 psi @ 28 days sulfate resistant
Applied Density		105 lbs. ± 5 lbs. pcf
Shrinkage	ASTM C596	0% @ 90% relative humidity

Strong-Seal® “QSR,” Quadex® “Hyperform,” or approved equal shall be used as patching material for this project.

All surfaces to be patched shall be cleaned, including the removal of all loose brick, mortar and debris.

The product shall be mixed per manufacturer’s recommendations, but no more should be mixed than can be applied within 10 minutes. Apply product by hand or trowel and hold in place until material will remain in place. Allow the patching material to set 1 hour before applying liner

## 2.04 SPRAY APPLIED CEMENTITIOUS LINER

The lining material used for manhole sealing shall be a rapid set spray applied cementitious product for use where mild sewer hydrogen sulfide problems exist. The liner shall be formulated with calcium aluminate cement and consist of a blend of acid resistant binders, pozzolanic materials, silicious aggregates, fiberglass rods and other additives. The liner shall be impervious to the flow of water, resistant to sulfide attack, and shall restore structural integrity to existing substrates.

The lining material shall be Strong-Seal® MS-2C, Quadex® Aluminaliner, Lafarge® Sewpercoat P.G., Madewell Mainstay ML-CA or ML-PF, A.W. Cook Cement Cemtec Silatec CAM, Protective Liner Systems Cemtec Silatec, or approved equal, and shall meet the following physical properties:

Compressive Strength	ASTM C109	>6000 psi @ 28 days
Tensile Strength	ASTM C496	>580 psi @ 90 days
Flexural Strength	ASTM C78	>780 psi @ 90 days
Shrinkage @ 90% R.H.	ASTM C596	0.05% @ 28 days
Bond	ASTM C952	>130 psi @ 28 days
Density, when applied		120 pcf ± 5 lbs
Freeze / Thaw	ASTM C666	100 cycles, No Visible Damage

The lining material shall be made with Calcium Aluminate Cement and shall be used according to manufacturer's recommendations in applications where there is evidence of mild sulfide conditions (pH 3.0 or higher).

The lining product shall be factory blended requiring only the addition of water at the job-site and shall be mixed per manufacturer's recommendations.

The lining material shall be reinforced with alkaline resistant fiberglass rods not less than ½ inch in length nor greater than 5/8 inches.

The material shall meet or exceed industry standards and shall not have any basic ingredient that exceeds EPA maximum allowable limits for any heavy metal.

Water used to mix product shall be clean and potable. Questionable water shall be tested by a laboratory in accordance with ASTM C94 procedure. Potable water does not need to be tested. Refer to Section 01500, Contractors Utilities.

Applicator must use approved equipment designed and manufactured specifically for the application of cementitious liners in sanitary sewer system manholes and manufacturer of equipment must provide proof of being in the business of designing and manufacturing of mixing, pumping, and spraying equipment for at least 5 years.

Specifically designed machines consisting of an optimized progressive cavity pump

capable of producing a minimum of 250 psi pumping pressure, patented contrablend mixer with twin ribbon paddles with end discharge, and an air system for low velocity spray application of product, shall be used for applying the liner product. Equipment is complete with water storage and metering system. Mixer and pump are hydraulically powered. SprayMate® models 35C and 35D or the Strong-Seal® MiniMate™ are approved machines for applying the Strong-Seal® Systems products. The Spraymaster™ is the approved machine for applying the Quadex® products.

For each bag of product, use the amount of water or water settings required per manufacturer's recommendations following mixing procedures noted on product bag and using the approved equipment for mixing and application.

Prepared mix shall be discharged into a hopper and mixing shall continue to occur in such manner as to allow spraying continuously without interruption until each application is complete.

The surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated just prior to application of material. Materials shall be spray applied up to 1-inch thick in one or more passes from the bottom of the wall to the bottom of the frame however; minimum total thickness shall not be less than ½ inch. The surface shall then be troweled to a relatively smooth finish being careful not to over trowel. A brush finish shall be applied to the trowel finished surfaces. Manufacturer's recommendations shall be followed whenever more than 24 hours have elapsed between applications.

The invert covers shall be removed and the bench sprayed with materials mixed per specifications and spray applied in such a manner that a gradual slope is produced from the walls to the invert with the thickness at the invert to be no less than ½ inch. The wall/bench intersection shall be rounded to a uniform radius the full circumference of the intersection.

It shall be the Contractor's responsibility to provide a manufacturer's representative for the first installation. The manufacturer's representative shall supervise and ensure that the product is prepared and applied properly.

Caution should be taken to minimize exposure of applied product to sunlight and air movement. If time between applications of additional coats is to be longer than 15 minutes, the structure shall be covered. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before covering or closing access. In extremely hot and arid climates, manhole should be shaded while reconstruction is in process and a concrete curing agent should be used if humidity level is less than 70% within the manhole. Contact manufacturer for curing compound recommendations.

## 2.05 FIBERGLASS AND EPOXY LINER

The fiberglass and epoxy liner used for manhole rehabilitation described in these specifications is the PerpetuWall® liner system or approved equal.



The Contractor shall hand apply a composite structure composed of fiberglass fabric that is encapsulated by a modified epoxy resin system. The finished liner shall have a minimum thickness of 125 mils (1/8 inch).

The reinforcing fiberglass fabric shall be an 18 oz. Fiberglass bonded fabric of Type E glass having a tensile strength of 500,000 psi, a modulus of elasticity of 10.5 million psi and a maximum elongation of 4.8%. The fabric shall be a stitch-bonded construction with a chemical binder to enhance wet out, handling and adhesion.

The modified epoxy resin shall be bisphenol A epoxy resin cross-linked with a modified polyamide curing agent. Contractor shall install a monolithic structure of fiberglass and epoxy composite coating to the inside wall of the manhole that seals and protects from infiltration and corrosion from the ring to, and including, the invert.

The product shall be mixed per manufacturer's recommendations.

Minimum requirements for the epoxy shall be as follows:

– Hardness	ASTM D2240	85
– Ultimate Elongation	ASTM D63860	4.5%
– Tensile Strength	ASTM D63860	12,400 psi.
– Compressive Strength	ASTM D69554	16,800 psi
– Flexural Strength	ASTM D79058T	13,900 psi
– Heat Distortion Temp.	ASTM D64856	220 °F

## 2.06 PRODUCT DATA

The Contractor shall provide the following information in accordance with Section 01300:

1. Manufacturer's literature describing each component of the grout mixture with recommended surface preparation methods, application procedure, mix ratio, and material safety data sheets.

2. Description for grout application equipment recommended by the grout supplier which shall include compressor, pumps, meters, hoses, injector devices, mixing and proportioning equipment, and recommended pumping pressures.

3. Literature describing the lining system to be used, along with the Contractor's equipment and a listing of clients where he has applied the specified system.

4. Written certification specified in above paragraphs.

## PART 3 – EXECUTION

### 3.01 MANHOLE FRAME AND COVER REPLACEMENT

ReWa  
Richland Creek Trunk Sewer

02603-7

Bid Documents  
BC PN: 144953

The Contractor shall remove and replace all damaged manhole frame and covers which allow water to leak into the manhole through cracks in the ring and cover and/or the joint between the ring and the wall of the manhole, thus creating an infiltration problem.

The Contractor shall replace any portion of the brick and mortar ring in the existing manhole walls, which become damaged as a result of removing the damaged ring, at no additional cost.

### 3.02 CLEANING

The entire manhole interior including frame, walls, and bench shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. The interior surface of the manhole shall be prepared by applying a solution muratic acid over the entire wall surface. The solution shall then be washed off from wall and bench surfaces by high pressure wash (minimum 3,500 psi) and allowed to dry. The removal of any loose or protruding materials per the manufacturer's recommendations shall be completed before application of sealant. Contractor shall remove all grease, dirt, rocks, rust, spauled masonry (including mortar, concrete, and brick), and other deleterious materials and debris from the interior of the manhole. The finished interior surface shall consist of sound concrete or brick, with exposed aggregate throughout. Contractor shall remove deteriorated manhole steps as directed by the Engineer prior to cleaning. Unless otherwise directed by the Engineer, manhole steps shall be cut using a hand saw flush with the manhole wall. Voids or holes remaining from removal of the steps shall be filled and toveled flush with the wall using a fast setting, non-shrink grout as specified in paragraph 02603-3.03. Debris from cleaning operations shall be collected within the manhole and disposed of daily at an approved off-site location. Hauling containers shall be watertight. The mixing, applications, and removal of the muratic acid shall be done in strict accordance with the manufacturer's specifications and recommendations.

Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound, clean and neutralized surface. All debris and sludge retrieved shall be properly disposed of by the Contractor in conformance with all Federal, State and Local Regulations concerning solid and hazardous waste. If a detergent or degreaser solution is used, the surface shall be thoroughly rinsed and neutralized prior to the installation of the liner system.

Prior to lining the manhole, repair all voids in walls and inverts with patching material as recommended by the manufacturer of the manhole liner material. Manhole surfaces shall be saturated surface dry (SSD) with no standing water.

### 3.03 SEWER BYPASSING

The Contractor shall bypass flow around his work in accordance with Section 02145.

### 3.04 FLEXIBLE URETHANE SEALANT

Where directed by the Engineer, the Contractor shall install a corrosion resistant aromatic flexible urethane resin coating to the inside wall of manhole joints to stop infiltration and provide corrosion protection.

### 3.05 MANHOLE PREPARATION

Place covers over inverts to prevent extraneous material from entering the sewer lines. No debris shall be allowed to enter the sanitary sewer system.

### 3.06 GROUTING

At each point of infiltration within the manhole structure, a hole shall carefully be drilled through the structure to the surrounding soil. Contractor shall install grout injection devices securely into each drilled hole. Injection devices and their installation shall be as recommended by the grout supplier. Contractor shall pump grout mixture into injection devices until pumping back pressure indicates material refusal. For all grout mixtures which are clear in color, the Contractor shall add a dye to the mixture so that the grout shall be distinguished from infiltration water when injected. Contractor shall drill additional holes and inject grout as required until all infiltration is stopped.

Where large voids exist outside the manhole wall, which would required excessive amounts of grout, the Engineer may direct the Contractor to first grout with cement prior to injection grouting. The Engineer shall determine the appropriate cement mix design in accordance with site conditions. The Contractor shall furnish all labor and materials necessary to pump cement. Care shall be taken during injection of grout or cement to insure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion, injection devices shall be removed, and the holes filled, and toweled flush with the wall surface using a fast setting, non-shrink grout mixture as recommended by the grout supplier.

### 3.07 PATCHING

The manhole interior walls and benches shall be repaired or rebuilt with a fast-setting, high early-strength cementitious product. Water infiltration shall be completely stopped, using a very fast setting powder designed specifically for direct application to the leaking area.

### 3.08 REPAIRING PIPE SEALS

Repair of existing manhole in-flowing and out-flowing pipe seals shall consist of preparation (cleaning) of pipe seals for sealing and sealing the pipe to manhole connection.

Cleaning shall consist of completely removing loose bricks, mortar, roots, mud and debris to the full thickness of the manhole wall, or to a depth necessary to expose a sound sub-base.

Sealing the pipe-to-manhole connection shall consist of plugging any active infiltration

leakage and sealing between the pipe, manhole wall and/or bench with the patching material for the full thickness of the opening.

### 3.09 REPAIR OF BENCHES

Repair of existing manhole bench shall consist of preparation (cleaning) of bench, patching voids, reforming bench, and sealing the joint between the bench and manhole wall.

Cleaning shall consist of completely removing loose brick and mortar, unsound concrete, grease, roots, mud and debris from the interior surface of the manhole to a depth necessary to expose a sound sub-base and allow for proper forming, shaping and finishing of the bench. All roots at the manhole wall/bench joint shall be cut flush with the manhole wall.

After cleaning, the manhole bench shall be prepared for patching and forming. Loose or missing brick shall be removed and replaced and actively leaking areas plugged.

Repairing the bench shall consist of forming, shaping and finishing the bench with grout to construct a manhole floor as shown on the details. Grout shall conform to the requirements of Patching Materials.

The patching material shall be applied to the bench in an expeditious manner. The patching mix shall be troweled uniformly onto the damaged bench at a minimum thickness of ½ inch.

Benches shall be shaped and finished smooth and free of ridges so the manholes will be self-cleaning and free of areas where solids may be deposited as sewage flows through the manhole from all in-flowing pipes to the out-flowing pipe.

The bench shall have a slope of 3-inches per foot in the areas outside of the flow channels. During finishing of the bench, mortar shall be troweled to extend out sufficiently onto the base of the manhole wall to completely seal the manhole wall/bench joint.

Material used for bench repair shall not be allowed to enter any pipe.

### 3.10 MANHOLE STEPS

Manhole steps shall be removed prior to the application of the specified liner. Unless otherwise stated by the Engineer, the Contractor shall not replace the manhole steps.

### 3.11 SPRAY APPLIED CEMENTITIOUS LINER

Contractor must use approved equipment designed and manufactured by the material manufacturer specifically for the application of cementitious liners in sanitary system manholes.

For each bag of product, use the amount of water or water settings required per manufacturer's recommendations following mixing procedures noted on product bag and using the approved equipment for mixing and application. Prepared mix shall be discharged into a hopper and mixing shall continue to occur in such a manner as to allow spraying continuously without interruption until each application is complete.

No application shall be made if ambient temperature is below 40 degrees F. No application shall be made to frozen surfaces or if freezing is expected to occur within the substrate within 24 hours after application. Precautions should be taken to keep the mix temperatures at time of application below 90 degrees F. Water temperatures shall not exceed 80 degrees F. Chill with ice if necessary.

The surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated just prior to application of material. Materials shall be spray applied up to 1-inch thick in one or more passes from the bottom of the wall to the bottom of the frame, however, minimum total thickness shall not be less than ½ inch. The surface shall then be troweled to a relatively smooth finish being careful not to over trowel. A brush finish shall be applied to the trowel finished surfaces. Manufacturer's recommendations shall be followed whenever more than 24 hours have elapsed between applications.

The invert covers shall be removed and the bench sprayed with materials mixed per specifications and spray applied in such a manner that a gradual slope is produced from the walls to the invert with the thickness at the invert to be no less than ½ inch. The wall/bench intersection shall be rounded to a uniform radius the full circumference of the intersection.

Caution should be taken to minimize exposure of applied product to sunlight and air movement. If time between applications of additional coats is to be longer than 15 minutes, the structure shall be covered. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before covering or closing access. In extremely hot and arid climates, manhole should be shaded while reconstruction is in process and a concrete curing agent should be used if humidity level is less than 70% within the manhole. Contact manufacturer for curing compound recommendations.

Unless otherwise recommended by the lining manufacturer, the final application of the liner product shall have the following minimum cure times before being subjected to flows:

Storm run-off, surcharge and flows above bench – 4 hours

Force main impact – 6 hours

Gravity flows (below bench) – 2 hours

Traffic will not be allowed for a minimum of 24 hours after liner application

Four – two inch cubes shall be cast each day or from every pallet of product used, and shall be properly packaged, labeled and returned to manufacturer for testing in accordance with the owners or manufacturer's directions for compression strength per ASTM C109 procedure

### 3.12 FIBERGLASS AND EPOXY LINER

The Contractor shall begin by applying the modified epoxy resin to the interior walls at an approximate thickness of 100 mils. The applicator determines the workable area to be covered in the first pass.

The fiberglass fabric shall be cut to the required dimensions and pressed, using a putty knife, into the epoxy resin to achieve full wetting of the fabric. The edges of the fabric shall be overlapped or butt-joined, at the discretion of the applicator, during subsequent applications. Epoxy shall be applied between the overlapped edges to assure a monolithic construction. Butted joints shall be coated with epoxy and covered with a 4-inch wide fiberglass seaming-strip to assure a monolithic construction.

The fabric shall be top coated with modified epoxy resin to assure complete saturation and encapsulation of the fabric, with a finished lining thickness of approximately 125 mils. The entire wall structure, from rim to bench, shall be lined in this fashion.

### 3.13 MANHOLE EXTERIOR REPAIR

Where directed by the Engineer, the Contractor shall repair voids and cracks on the exterior of the manhole that is above ground elevation.

Typically Type I mortar/grout shall be used for exterior patching and repair.

### 3.14 PAYMENT

Payment for rehabilitating sanitary sewer manholes shall be as specified in Section 01025.

There shall be no separate payment for cleaning. Payment shall be based on the unit cost as listed in the Bid Proposal and shall include labor, materials, testing, equipment and apparatus not specifically mentioned herewith or noted, but which are incidental and necessary to complete the work specified.

**\*\*END OF SECTION\*\***

## SECTION 02651

### SEWER TELEVISION INSPECTION

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

Furnish all necessary labor, materials, equipment, services and incidentals required to visually inspect by means of closed-circuit television designated sewer line sections, including, but not limited to, recording and playback equipment, materials and supplies.

The inspection shall be performed on one sewer line section (i.e. manhole to manhole) at a time. The section being inspected shall be suitably isolated from the remainder of the sewer system.

The Engineer shall be provided the opportunity to witness all inspections.

Video recordings shall be made of the television inspections and copies of both the recordings and printed inspection logs shall be supplied to the Owner.

Contractor may have to perform point repairs, remove obstructions or remove protruding service connections to complete pre-rehabilitation TV inspection.

Contractor shall provide PACP certified personnel. Defects shall be coded in accordance with PACP guidelines.

##### 1.02 RELATED WORK

Sewer line cleaning is included in Section 02760.

Sewer bypassing is specified in Section 02145.

Cured-in-Place pipe lining is specified in Section 02765.

#### PART 2 – PRODUCTS

##### 2.01 EQUIPMENT

The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions.

The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution color video picture. Picture quality and definition shall be to the satisfaction of the Engineer and if unsatisfactory, inspection shall be performed again with the appropriate changes made as designated by the Engineer at no additional cost to the Owner. The television inspection equipment shall have an accurate footage counter that shall display on the monitor, the exact distance of the camera from the centerline of the starting manhole.

## PART 3 – EXECUTION

### 3.01 PROCEDURE

The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition but in no case will the television camera be pulled at a speed greater than 30 fpm. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire sewer line section, the equipment shall be removed and repositioned in a manner so that the inspection can be performed from the opposite manhole. All set-up costs for the inspection shall be included in the unit prices bid. If, again, the camera fails to pass through the entire section, the Contractor shall remove or cut protruding service connections at no additional cost to the Owner, or re-clean or further remove roots or blockage at no additional cost to the Owner. If clearing the blockage through cutting protruding service connections or through additional cleaning, the Contractor shall perform point repairs as directed by the Owner, the payment for which is outlined in Section 01025.

Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes of the sewer line being inspected to ensure that good communications exist between members of the crew.

The accuracy of the measurements cannot be stressed too strongly. Measurement for location of defects shall be above ground by means of a meter device. Marking on cable, or the like, which would require interpolation for depth of manhole, shall not be allowed. Measurement meters shall be accurate to two-tenths of a foot over the length of the sewer line section being inspected. Accuracy of the measurement meters shall be checked daily by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Owner's representative.

The camera height shall be adjusted such that the camera lens is always centered (1/3 I.D. or higher) in the pipe being televised. Flow shall be controlled such that depth of flow shall not exceed 20% of pipe's diameter.

Lighting system shall be adequate for quality pictures.



### 3.02 RECORDING OF FIELD OBSERVATIONS

#### A. TELEVISION INSPECTION LOGS

Printed location records shall be kept which shall clearly show the location, in relation to adjacent manholes, of each source of infiltration discovered. In addition, other data of significance including the locations of building and house service connections, along with an estimation of infiltration from such services, joints, unusual conditions, roots, storm sewer connections, cracked or collapsed sections, presence of scale and corrosion, sewer line sections that the camera failed to pass through and reasons for the failure and other discernible features shall be recorded and a copy of such records shall be supplied to both the Owner and the Engineer.

#### B. VIDEO RECORDINGS

The purpose of tape recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed by the Owner. Video recording playback shall be at the same speed that it was recorded. Video recordings shall be made in color and on a DVD in a digital format selected by the Owner. The Contractor shall be required to have all media and necessary playback equipment readily accessible for review by the Owner/Engineer during the project. At the completion of the project, the Contractor shall furnish all of the video media to the Owner. DVD Labels shall include the project number, date televised, sewer segment reach designation, street location, and manhole numbers on the disc.

**\*\*END OF SECTION\*\***

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## SECTION 02760

### SEWER CLEANING

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

###### A. SCOPE:

This section specifies the requirements for cleaning of sewers prior to television inspection and rehabilitation.

###### B. REQUIREMENTS:

The Contractor shall clean the sewers specified for television inspection and rehabilitation of debris, roots, and grease accumulations. All materials dislodged during cleaning shall be removed from the sewer and disposed of by the Contractor. Sewer cleaning methods shall include water jetting, sodding, pigging, or bucketing.

Television inspection is not required during cleaning operations. However, the Contractor may, at his own expense, inspect the sewer to view current line conditions.

##### 1.02 MAJOR BLOCKAGE

A major blockage shall be defined as an obstruction within the sewer which cannot be removed by cleaning with commercially available hydraulic or mechanical cleaning equipment. Removal of a major blockage shall be by point repair in accordance with Section 02769.

#### PART 2 – MATERIALS

##### 2.01 EQUIPMENT

###### A. GENERAL:

All equipment specified in this section shall be in good working condition and manufactured or fabricated to withstand the severity of the work covered under this section.

###### B. HYDRAULIC AND MECHANICAL CLEANING:

All hydraulic cleaning equipment shall be truck mounted. Water jet cleaning equipment shall include a water tank, auxiliary engine, pumps, and hydraulically driven hose reel. The Contractor shall provide a minimum of 600 feet of high pressure hose and a selection of high

velocity nozzles, each having a capacity of 60 gallons per minute at working pressures of 1000 to 1500 pounds per square inch. Pressure to the nozzle shall be regulated by a relief valve adjustable from 1 to 1500 psi. Nozzles shall be capable of producing a jet stream angle of 15 to 45 degrees from the horizontal. The Contractor shall also provide a high velocity gun with sufficient discharge and pressure to thoroughly clean manhole interiors.

Sewer pigs which are propelled by water shall be readily collapsible at any time during the cleaning operations to protect against flooding of the sewer lines. The Contractor shall provide pigs in sizes consistent with the pipe diameters encountered. Each pig shall have a flexible scraper at its periphery to ensure the total removal of grease. Sewer pigs which are not readily collapsible are prohibited.

Mechanically powered equipment such as bucket machines shall be provided in pairs and shall be belt-driven or employ an overload device. Power rodding machines shall be a "continuous rod" type capable of rodding distances of up to 1000 feet in one setup. Rodding machines shall have the ability to spin the rod either clockwise or counterclockwise and be able to be pushed straight out or pulled back without rotating the machine. It shall be capable of pulling pipe-size swabs or brushes back through the sewer for cleaning and flushing purposes. The rodding machine shall have a positive drive and shall be capable of producing a 2000-pound pull. The rod shall be specifically designed for use with the rodding machine.

#### C. ROOT REMOVAL:

The Contractor shall employ sewer cleaning equipment to cut all roots encountered back to the pipe surface.

#### D. DEBRIS REMOVAL:

The Contractor shall provide suitable equipment to remove all debris dislodged during cleaning operations from the nearest downstream manhole. Equipment or methods which require a member, or members of the Contractor's crew, to physically excavate debris from within the manhole is prohibited. All debris shall be promptly removed from the sewer from the nearest manhole and shall be disposed of off site in a lawful manner at an Owner-approved location. Hauling containers shall be watertight.

### PART 3 – EXECUTION

#### 3.01 GENERAL

The Contractor shall at all times conduct his work so as to prevent any blockage and minimize surcharging in the sewer manholes and connecting sewer pipelines. Damage to existing facilities as a result of the Contractor's work shall be promptly repaired in kind at the Contractor's expense.

### 3.02 SEWER BYPASSING AND DEWATERING

Contractor shall be responsible for bypassing sewer flow around his work and dewatering of sewer lines in accordance with the requirements of Section 02145.

### 3.03 CLEANING

Cleaning shall remove all sludge, rocks, debris, roots, grease accumulations and obstructions from the sewer. Sewer cleaning methods may include water jetting, rodding, pigging, or bucketing. Unless otherwise directed by the Engineer, the Contractor shall select the most effective of these cleaning methods according to the prevailing site condition. Where bucketing is warranted, bucket machines shall be used to remove the major portion of debris. Bucket operations shall proceed in the upstream direction in one sewer reach at a time. The operation shall continue until the buckets can pass the entire reach with minimum collection of debris. Upon completion, the line shall be cleaned using a sewer pig and then hydraulically cleaned.

During cleaning operations, the Contractor shall provide a means of catching and removing the dislodged debris conveyed downstream with the sewer flow. The method chosen shall not allow the transport of debris to downstream sewer reaches.

All debris removed from the sewer shall be stored until the day's end whereupon the Contractor shall be responsible for its proper disposal off site.

### 3.04 RECLEANING

Where the sewer is not adequately cleaned as determined by the Engineer through pre-rehabilitation television inspection review, Contractor shall remove all equipment or materials from the sewer and reclean the sewer at no additional expense to the Owner.

### 3.05 TAG LINES

The Contractor may install a tag line after cleaning for later TV inspection equipment connections. However, the tag line shall not be left in the sewer longer than overnight. This allowance may be rescinded by the Engineer at any location if unacceptable procedures are used by the Contractor to secure the tag line. Damage caused by sewage backup due to the tag line shall be the responsibility of the Contractor.

### 3.06 PAYMENT

Payment for all cleaning operations and associated work will be as outlined in Section 01025.

The following items of work will not be measured for payment, but the cost thereof will be considered as incidental to the contract:

1. Removal and disposal of debris
2. Sewer bypassing
3. Recleaning

**\*\*END OF SECTION\*\***

## SECTION 02765

### CURED-IN-PLACE PIPE LINING

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required and install and test cured-in-place (CIPP) pipe lining and appurtenances complete as shown on the Drawings and as specified herein.

Cured-in-place pipe lining is specified as an acceptable product for lining all sewers specified on the Drawings.

##### 1.02 RELATED WORK

Sewer line cleaning is included in Section 02760.

Television inspection of pipelines is included in Section 02651.

Bypass pumping and wastewater flow control is included in Section 02145.

Service lateral replacement and re-connection is included in Section 02530.

##### 1.03 SUBMITTALS

The Contractor shall furnish, prior to use of the materials, satisfactory written certification of his/her compliance with the manufacturer's standards for all materials, conformance with the methods of the manufacturer, and accordance with all standards specified and referenced herein.

##### 1.04 REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified

by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM D608	Test Methods for Tensile Properties of Plastics
ASTM D790	Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
ASTM D2412	Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
ASTM D2990	Standard Test Methods for Tensile, Compressive and Flexural Creep and Creep Rupture of Plastics
ASTM F1216	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F2019	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured in Place Pipeline (CIPP).

## 1.05 QUALIFICATIONS

The Contractor performing the CIPP lining work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be certified and/or licensed as an installer by the CIPP manufacturer.

The Contractor shall have successfully installed a minimum of 300,000 feet of the proposed liner for a minimum of 5 years, using the methods and materials proposed for this work, as documented by verifiable references.

The proposed Superintendent shall have successfully installed a minimum of 100,000 feet of the proposed liner using the methods and materials proposed for this work as supported by Owner references.

There shall be no exceptions to this requirement.

The Contractor shall submit the following information to the Owner for review and approval before any CIPP lining work is performed.



- The number of years of experience in installing CIPP lining.
- The name of the CIPP lining manufacturer and supplier for this work and previous work listed below.
- The Contractor shall submit a certified statement from the manufacturer that he/she is a certified and/or licensed installer of the CIPP lining.
- A minimum of three municipal clients that the Contractor has performed this type of work for, including names, phone numbers, linear footage, and a description of the actual work performed. Provide a sufficient number of references to total 300,000 feet or more of lining work to date.

The Contractor shall also be capable of providing crews as needed to complete the work without undue delay.

The Owner shall approve or disapprove the Contractor and/or manufacturer based on the submitted information and a follow up interview.

#### 1.06 GUARANTEE

All CIPP lining placed shall be guaranteed by the Contractor and manufacturer for a period of one year from the date of final acceptance. During this period, defects discovered in the CIPP lining, as determined by the Engineer, shall be removed and replaced in a satisfactory manner by the Contractor at no cost to the Owner. The Owner may conduct an independent television inspection, at his own expense, of the lining work prior to the completion of the one year guarantee period.

#### 1.07 QUALITY ASSURANCE

The CIPP lining shall be provided by a single manufacturer. The supplier shall be responsible for the provision of all test requirements specified herein as applicable. In addition, all liner to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory acceptable to the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection will be the responsibility of the Contractor.

Inspection of the liner may also be made by any representative of the Owner after delivery. The liner shall be subject to rejection at any time on account of failure to meet any of the requirements specified, even though sample liner may have been accepted as satisfactory at the place of manufacture. Liner rejected after delivery shall be marked for identification and shall be removed from the job site at once.

## 1.07 DELIVERY, STORAGE AND HANDLING

Care shall be taken in shipping, handling and storage to avoid damaging the liner. Extra care shall be taken during cold weather construction. Any liner damaged in shipment shall be replaced as directed by the Engineer.

Any liner showing a split or tear, or which has received a blow that may have caused damage, even though damage may not be visible, shall be marked as rejected and removed at once from the job site.

The liner shall be maintained at a proper temperature in refrigerated facilities to prevent premature curing at all times prior to installation. The liner shall be protected from UV light prior to installation. Any liner showing evidence of premature curing will be rejected for use and will be removed from the site immediately.

## PART 2 – PRODUCTS

### 2.01 CIPP LINING

CIPP lining shall be Insituform by Insituform Technologies, Inc., Inliner by Reynolds Inliner Inc., National Liner by American Water Services, Premier Pipe by AMLiner East (American Pipe and Plastics), MSP-Liner by Mid-South Partners, Invert-A-Pipe by Improved Technologies Group, Diamond Lining Systems by Daystar Composites, LLC, Aqua-Cure for SAK Construction by Applied Felts or an approved equal.

The liner shall be composed of tubing material consisting of one or more layers of a flexible non-woven polyester with or without additives such as woven fiberglass or other fibers. The felt tubing shall be impregnated with a thermosetting polyester resin and catalyst, vinyl ester and catalyst or epoxy resin and hardener. The liner material and resin shall be completely compatible. The outside layer of the tube shall be coated with an impermeable material compatible with the resin and fabric.

The liner shall be capable of fitting into irregularly shaped pipe sections and through bends and dips within the pipeline.

The liner shall be able to cure in the presence of water at a temperature of 180 degrees F or less, or in the presence of steam.

When cured the liner shall form a continuous, tight fitting, hard, watertight and impermeable liner.

The liner shall be chemically resistant to trace amounts of gasoline and other oil products commonly found in municipal sewerage and soils adjacent to the sewer pipe to be lined.

The liner shall be fabricated to a size that will tightly fit the sewer being rehabilitated after being installed and cured. Allowance for longitudinal and circumferential expansion shall be taken into account when sizing and installing the liner. All dimensions shall be field verified by the Contractor prior to installation of the liner. Field measurements shall be used to ensure maximum closure between the new liner and the existing sewer pipe.

The application of the resin to the felt tubing (wet-out) shall be conducted under factory conditions and the materials shall be fully protected against UV light, excessive heat and contamination at all times.

The length of the liner shall be the length deemed necessary by the Contractor to effectively carry out the insertion of the liner and sealing of the liner at the outlet and inlet manholes. The required length of liner shall be verified in the field by the Contractor prior to fabrication.

The Cured-in-Place liner shall have the minimum wall thicknesses shown in the table below, when fully cured:

Pipe Size	Up to 8' Depth	Over 8' Depth
8-inch diameter	5.5 mm	6.2 mm
10-inch diameter	6.6 mm	7.7 mm

The cured liner shall have the following minimum structural properties:

Property	Test Method	Minimum Standard
Flexural Strength	ASTM D790	4,500 psi
Flexural Modulus	ASTM D790	250,000 psi

Where the Contractor proposes to use a liner material with structural properties exceeding the minimum standards above, the minimum wall thicknesses may be modified accordingly. The wall thicknesses shall be designed to meet the following minimum criteria:

- Use fully deteriorated conditions based on ASTM F-1216, Appendix X.3, Equation 6
- Greatest depth of bury for each segment
- Full submergence, that is water table at the ground surface
- Ovalization of the host pipe at 2 percent
- Long term flexural modulus,  $E_L = 125,000$  psi (Based on 50 percent loss of initial flexural modulus,  $E_0 = 250,000$  psi over design life)
- Flexural strength = 4,500 psi
- A modulus of soil reaction of 800 psi
- Unit weight of soil of 120 pcf

- Soil  $K_u'$  of 0.13
- HS-20 concentrated live load pattern
- A factor of safety of 2.0

Where a material is proposed with strength characteristics different than specified above, all material specifications, design criteria and all calculations for final thicknesses shall be submitted as part of the bid documents.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

Clean each length of pipe to be lined and dispose of any resulting material as specified in Section 02760.

The Contractor shall conduct a color digital television inspection of each length of pipe after it is cleaned and prior to ordering liner fabrication. The purpose of this inspection is to confirm that existing conditions are suitable for the installation of the proposed lining process, to document the location of all service lateral connections and to confirm point repair locations, in accordance with Section 02651. Digital recordings on either CD's or DVD's shall be prepared and retained by the Contractor and submitted with the post-lining inspection recordings prior to request for payment. Where this television inspection reveals conditions that are not suitable for lining, the digital recordings shall be immediately provided to the Engineer for review.

At the Contractor's discretion and cost, the Contractor may also conduct a television inspection of each length of pipe immediately prior to inserting the liner to confirm that conditions are acceptable for lining. This inspection is for the Contractor's use and submittal of a record of this inspection is not required, unless conditions have changed since the previous inspection.

All service connections protruding into the sewer to be lined shall be either internally cut or ground down with a robotic cutter or externally replaced so as to be flush with the pipe to be lined prior to liner installation. The robotic cutter shall be monitored by closed circuit television equipment to verify proper cutting and shall be capable of cutting VCP and PVC pipe. Equipment specifically designed for cutting roots from sewers (such as a chain cutter) shall not be allowed for this purpose. Protruding service connections of CIP or DIP shall be realigned through an external point repair prior to liner installation. The cost of this work shall be included in the unit cost for the liner installation.

The Contractor shall provide bypass pumping of sewage flows, as required to prevent sewage overflows, basement backups or damage to upstream facilities due to the pipe rehabilitation work.

The Contractor shall notify all property owners who discharge sewage directly into the sewer to be lined that their sewage service will be discontinued while the liner is being installed, cured, and active service connections re-opened. Notifications shall consist of a general mailing to all property

owners at least two weeks in advance of mobilization to an area, and a second notice immediately prior to mobilization which can be either a hand delivered notice or door hanger. The notifications shall describe the work to be undertaken and approximate dates of the work. The text of the notifications may be provided by the Owner or, if provided by the Contractor, shall be approved by the Owner in advance.

The Contractor shall develop and submit to the Engineer a protocol for addressing odor complaints during the CIPP installation process (primarily styrene odor complaints). The protocol shall include steps to be taken by on-site and management personnel immediately when the complaint is received, including discussing the odor with the property owners to address their concerns and alleviating the odor from the home or business using fans or other means as necessary. The Contractor shall also maintain a calibrated portable styrene test unit to immediately document the atmospheric concentrations of the styrene on the site and in the house/business when a complaint is received. The styrene concentrations must be tested prior to exhausting the odors from the household/business. The Contractor shall also utilize blowers (vacuum blowers) during the CIPP installation to exhaust odors from the sewers and into the atmosphere during the installation as deemed necessary. This will help to minimize the potential for odors to travel up service laterals and into homes/businesses. The blowers shall be strategically placed to exhaust the concentrated odors in an isolated location. The costs for addressing such odors issues/complaints shall be included in the unit prices bid for CIPP.

Furnish and install the liner in the full length of sewer as shown on the Drawings, and as field verified by the Contractor. The installation of the liner shall be in complete accordance with the applicable provisions herein and the manufacturers' installation requirements. The methods used to install and cure the liner are at the option of the Contractor but a method statement must be submitted to the Engineer for approval prior to mobilizing to the work site.

Install temperature sensors, at the minimum, in the invert at the downstream termination point of the installation. The Engineer may require additional temperature sensors at intermediate manholes.

Representative specimens of the installed liners are to be removed for testing by an independent laboratory. The number of specimens shall removed shall be at least:

- Liners less than 24 inches in diameter; one specimen for every 1,000 feet of liner installed
- Liners from 24 inches to less than 48 inches; one specimen for every 750 feet installed
- Liners 48 inches in diameter and greater; one specimen for every 500 feet installed

Remove specimens of at least 18 inches in length for testing of thickness and for flexural properties specified in Paragraph 2.01 per the following standards and procedures

Property	Test Method
Thickness	ASTM D5813
Initial Flexural Strength	ASTM D790, Procedure A

All samples shall be prepared in accordance with ASTM D5813.

The number of tests required may be reduced as approved by the Engineer after sufficient tests have been performed to verify the CIPP design, production and installation procedures. Likewise, the frequency of tests may be increased by the Engineer and performed by the Contractor at no additional cost to the Owner when the required tests show that the installed lining does not meet the specifications. The specimens shall be cut from a section of installed and cured liner at the downstream termination point of the installation. If the Contractor opts to line multiple sewer segments at once, samples may be taken from the invert section of an intermediate manhole. Contractor may propose to use plate samples placed in the downtube only if downstream or intermediate sample points are not possible, and if approved in advance by the Engineer. All testing shall be paid for by the Contractor and shall be performed by an independent testing laboratory. Results of the tests for each liner shall be submitted within 30 days after the liner is installed.

Where the Contractor opts to line multiple sewer segments at one time, the top one-half of the liner in the intermediate manhole shall be neatly removed, and the void behind the liner shall be filled with non-shrink grout. The channel in the manhole shall be a smooth continuation of the pipe (s) and shall be merged with other lines or channels, if any. Channel cross section shall be U-shaped and sides of channels shall be built up with mortar/concrete to provide benches at a maximum of 1 in 12 pitch towards the channel.

Ultimately, all service connections to the lined pipe will be replaced with either a saddle or compression style fitting. Unless the Contractor is prepared to replace the service connection immediately after the liner cools, he shall reopen the existing connection in order to restore service until the connection can be replaced. Replace or reopen all of the existing active service connections in each length of sewer following reformation and cooling of the liner. The exact number and location of active service connections shall be determined from the CCTV digital recordings. It shall be the Contractor's responsibility to accurately field locate all existing active service connections. The service connections shall be reopened from inside the sewer by means of a television camera controlled cutting device appropriate for the liner material and the rehabilitated sewer pipe. All openings shall be clean and neatly cut and shall be flush with the lateral pipe. The bottom of the openings shall be flush with the bottom of the lateral pipe to remove any lip that could catch debris. Openings shall be sufficient to provide service. All of the liner penetrations or openings shall be watertight. Sewer connection replacement shall be in accordance with Section 02530.

Where sewage has backed up into a property due to the Contractor's failure to reopen a lateral properly or expeditiously, the Contractor shall immediately notify the Owner and Engineer, inspect the property with the Owner or Engineer's representative and agree on remedial measures. The Contractor shall be responsible for all cleaning, repair and / or replacement of damaged property, temporary relocation of all occupants of the affected properties, if required, all to the satisfaction of the property owner. These actions shall be undertaken immediately upon learning of the backup. Cleaning shall be performed by firms specializing in this type of work. All costs associated with the cleaning, repair, replacement of damages, occupant accommodations, insurance and reinstatement of the sewer lateral shall be borne by the Contractor.

For every segment of liner installed, the Contractor shall generate a report that documents installation, including date, time, weather conditions, curing temperature, curing time, etc. The reports shall be submitted to the Engineer prior to requesting payment.

### 3.02 FIELD TESTING AND PRELIMINARY ACCEPTANCE

Following installation of the liner and reopening/replacing of the service connections, the Contractor shall conduct a final digitally recorded color television inspection of the completed work. Copies of these post-installation digital recordings, as well as the digital recordings made prior to the liner installation shall be submitted to the Engineer for approval and shall be retained by the Owner. Payment will not be made for any CIPP lining until the Engineer has reviewed and approved these digital recordings. The Contractor shall submit the CD or DVD disks a minimum of 10 days in advance of any payment request to provide the Engineer ample time to review the recordings.

There shall be no dry spots, lifts, wrinkles, ridges, splits, cracks, delaminations or other type defects in the CIPP lining. Defective lining will be removed and the pipe re-lined at no additional cost to the Owner. If during the removal process, the host pipe is damaged, Contractor will perform a point repair at Contractor's own expense.

Groundwater infiltration through the liner shall be zero.

All service connections shall be open, clear and watertight. The liner opening shall conform neatly with the opening in the host pipe and shall be free of burrs or debris.

Preliminary acceptance of CIPP lining shall be based on the Engineer's evaluation of the installation and curing data, results of air testing where required, and review of the TV digital recordings.

### 3.03 FINAL ACCEPTANCE AND IMPACTS OF NON-COMPLIANCE

Final acceptance of the liner shall be based on the preliminary acceptance of the liner by the Engineer in Section 3.02. and on the results of the certified laboratory tests on the liner specimens in Section 3.01.

#### A. MEETING OR EXCEEDING REQUIREMENTS

Liners meeting or exceeding the specified thicknesses and strengths, as evidenced by the certified laboratory testing results, shall be paid for in full according to the contract unit rate for the finished diameter per linear foot.

## B. NON-COMPLIANCE TO REQUIREMENTS

Where the laboratory analysis results indicate that the liner section does not comply with either the minimum thickness specified or the minimum flexural modulus specified, payment for the section of liner represented by the specimen shall be modified, or the liner rejected, according to the following procedure:

1. The minimum cured thickness required for the indicated liner section shall be recalculated using the actual liner cured flexural strength reported by the certified laboratory for the liner specimen taken from that section of liner. The values used shall be the average of the test values reported for that specimen, where all test values are higher than one standard deviation less than the calculated average. If any test value reported lower than one standard deviation less than the calculated average, the average shall be recalculated, this time using a weighted factor of 2.0 times the lower value(s). The minimum required thickness shall be calculated as described in Section 2.01.

2. Calculate the value factor for the liner segment according to the following equation:

$$\text{Value Factor} = (\text{Actual thickness} / \text{calculated minimum required thickness})^{1.5}$$

In words, the Value Factor is equal to the ratio of the average of the actual reported thickness and the calculated minimum required thickness, all to the 3/2 power.

3. Where the Value Factor is calculated at 0.95 or greater, the payment for the liner shall be at the full unit price bid per linear foot for that diameter liner.

4. Where the Value Factor is calculated at less than 0.95 but greater than 0.85, payment for the liner segment in question shall be based on the product of the Value Factor times the contractual unit price per linear foot for that diameter liner times the total length of the liner segment.

5. Where the Value Factor is calculated at less than 0.85, the liner shall be rejected and the Contractor shall replace the non-conforming liner or shall propose an alternate method for modifying the finished liner to conform to the specified strength and thickness, all at the Contractor's expense.

**\*\*END OF SECTION\*\***



## SECTION 02766

### SLIPLINING OF EXISTING SEWERS

#### PART 1--GENERAL

##### 1.01 DESCRIPTION

###### A. SCOPE:

This section specifies properties of polyethylene pipe and fittings; joining tools and procedures for sliplining of existing sanitary sewers.

###### B. REQUIREMENTS:

Contractor shall provide a leakproof liner in all sewers identified for sliplining. Individual pipe lengths shall be assembled by butt-fusion welding unless otherwise specified. Connecting fittings shall be fused or mechanically joined to the liner as specified. Contractor shall also be responsible for cleaning and television inspection of the sewer, bypassing and dewatering sewer flow around his work, leak testing the liner and liner fittings, grouting the annular space between the liner and existing sewer, temporarily suspending and restoring sanitary and water service to all facilities affected by the Contractor's work, and performing a grout pumping demonstration.

Spot repairs where specified and any spot repairs determined necessary and authorized by the Construction Manager shall be performed in accordance with Section 02769.

##### 1.02 QUALITY ASSURANCE

###### A. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version

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ReWa  
Richland Creek Trunk Sewer

02766-1

Bid Documents  
BC PN: 144953

with a later date, discontinued or replaced.

Reference	Title
ASTM C31	Standard Method of Making and Curing Concrete Test Specimens in the Field
ASTM C39	Standard Test for Compressive Strength of Cylinder Concrete Specimens
ASTM C172	Sampling Fresh Concrete
ASTM D425	Compressive Joints for Vitrified Clay Pipe and Fittings
ASTM D638	Tensile Properties of Plastics
ASTM D1238	Flow Rates of Thermoplastics by Extrusion Plastomer
ASTM D1248	Polyethylene Plastics Molding and Extrusion Materials
ASTM D1505	Standard Test Method for the Density of Plastics by the Density-Gradient Technique
ASTM D1693	Test for Environmental Stress Cracking of Ethylene Plastics
ASTM D2122	Determining Dimensions of Thermoplastic Pipe and Fittings
ASTM D2657	Heat Joining Polyolefin Pipe and Fittings
ASTM D3350	Polyethylene Plastic Pipe and Fittings Materials
ASTM F585	Insertion of Flexible Polyethylene Pipe Into Existing Sewers

**B. CERTIFICATION:**

All pipe welding personnel shall receive training in the proper use of joint fusion equipment and recommended methods for liner connections. All personnel directly involved with installing the liner shall receive training in the proper methods for handling, inserting, trimming and finishing the liner. Training shall be performed by a representative of the pipe manufacturer.

The Contractor may satisfy this requirement by providing one day on-site training for his crew by the pipe supplier in the presence of the Construction Manager. Where the training is not witnessed by the Construction Manager, the Contractor shall provide a certification of training for each crew member in accordance with paragraph 02765-2.07.

**1.03 SUBMITTALS**

The Contractor shall submit the following information in accordance with Section 01300:

1. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included,

with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Construction Manager shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

2. Shop drawings which include a complete materials list showing liner and fittings dimensions and construction details. Shop drawings shall also include for each liner installation all excavation locations, interfering utilities, excavation dimensions, flow bypass and traffic control schematics.
3. At least 2 weeks prior to the start of work, the Contractor shall submit his sliplining schedule identifying daily work hours and working dates for each installation. For each installation, the total time connecting house laterals will be out of service shall be 8 hours. When the Contractor intends to perform night work, the noise level, measured in accordance with local noise ordinances, for all equipment to be used, shall be submitted.
4. Grout design mixes and grout testing reports.

## PART 2--PRODUCTS

### 2.01 POLYETHYLENE PIPE LINER

#### A. GENERAL:

The polyethylene base resin shall meet the requirements of ASTM D1248 for Type III, Grade P34, Category 5. The polyethylene resin shall contain antioxidants and be stabilized with a minimum of 2 percent carbon black, well dispersed, for protection against ultra-violet degradation. Pipe and fittings produced from this resin shall have a cell classification of PE 345434C in accordance with ASTM D3350 and shall meet or exceed all the requirements of this specification. All pipe and fittings shall be made from virgin material. No rework compound, except that obtained from the manufacturer's own production of the same formulation, shall be used. Pipe shall be

homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.

**B. LINER PHYSICAL PROPERTIES:**

The liner, welded joints, and fittings shall all meet or exceed the following physical properties:

Property	Test value (73.4 degrees F)	ASTM Method
Density (pipe)	0.955 gr/cc	D1505
Density (natural base resin)	0.943 gr/cc	D1505
Melt index (pipe-condition E)	0.1 to 0.2 gr/10 minutes	D1238
Melt index (resin-condition E)	0.1 to 0.2 gr/10 minutes	D1238
Tensile strength (yield, 2 ipm)	3200 psi	D638
Tensile strength (ultimate, 2 ipm)	>5000 psi	D638
Elongation (2 ipm)	>500 percent	D638
Modulus of elasticity	113,000 psi	D638
Flexural modulus	136,000 psi	D3350
Environmental stress cracking resistance (Condition C, f20)	1500 hours	D1693

**C. DIMENSIONS:**

The following table lists commercially available liner sizes and SDR values. The specifier should verify that the liner will provide sufficient flow capacity and withstand any anticipated loads. The liner wall thickness is determined by dividing the liner outside diameter by the SDR value. Typically, an SDR value of 26 is sufficient for sewer sliplining where the existing sewer can support the loads.

Existing sewer inside diameter, inches	Available liner outside diameter, inches	Flow factors at various SDR values <sup>a</sup>					
		32.5	26.0	21.0	17.0	15.5	13.5
6	4.500	0.57	0.54	0.51	0.48	0.46	0.44
6	5.563	1.00	0.95	0.90	0.85	0.82	0.77
8	6.625	0.74	0.71	0.67	0.63	0.60	0.57

Existing sewer inside diameter, inches	Available liner outside diameter	Flow factors at various SDR values <sup>a</sup>					
		0.90	0.86	0.81	0.76	0.73	0.69
8	7.125	0.90	0.86	0.81	0.76	0.73	0.69
10	8.625	0.82	0.79	0.75	0.70	0.67	0.63
12	10.750	0.91	0.87	0.82	0.77	0.75	0.70
15	12.750	0.79	0.76	0.72	0.67	0.65	0.61
15	13.386	0.90	0.86	0.82	0.76	0.74	0.70
15	14.000	1.01	0.97	0.92	0.86	0.83	0.78
18	16.000	0.89	0.85	0.81	0.76	0.73	0.69
21	18.000	0.81	0.77	0.73	0.69	0.66	0.62
21	20.000	1.07	1.02	0.97	0.91	0.88	0.83
24	21.500	0.91	0.87	0.82	0.77	0.75	0.70
24	22.000	0.97	0.93	0.88	0.82	0.79	0.75

<sup>a</sup>Line full flow capacity equals factor times existing sewer full flow capacity. Flow factors based on liner "n" value equal to 0.009 and sewer "n" value equal to 0.0135.

In general, SDR values of 32 through 25 will be used for gravity and low-pressure systems such as sewers, sewage force mains, intakes and outfall. Lower SDR values, i.e., greater wall thickness is used for medium and high pressure systems and may be warranted for sewer work where the parent pipe material is missing.

## 2.02 PIPE JOINING

Unless otherwise specified, liner lengths shall be assembled in the field with butt-fused joints in accordance with ASTM D2657. Where this reference is nonspecific, the Contractor shall follow the pipe manufacturer's written instructions. Butt-fused joints shall have internal bead projections 1/8 inch or less. Joint strength shall be equal to or greater than pipe as demonstrated by testing requirements in paragraph 02765-2.07, and joints shall indicate a ductile rather than brittle fracture when tested. Threaded or solvent-cement joints and connections shall not be permitted.

Where excavations for liner insertion are made between manholes, the liner ends shall be joined together by butt fused joints, where recommended by the pipe supplier, or with a full circle seal clamp with stainless steel hardware and with a rubber sleeve. Seal clamps shall be by Rockwell, Dresser, or equal.

Lateral connections to the installed liner shall be made using mechanical or fusion saddles, unless otherwise specified.

The joining rig, or fusion machine, shall have hydraulic pressure control for fusing two pipe ends together and shall be equipped with gages to monitor fusion pressures. The machine shall be equipped with an electric or gasoline engine powered facing unit to square and trim the pipe ends smooth and provide full surface contact with the heating plate. The heating plate on the fusion machine shall be electrically heated and thermostatically controlled, capable of maintaining 500 degrees F (plus or minus 10 degrees F), and shall contain a temperature gage. Fusion temperature shall be as recommended by the pipe manufacturer.

### 2.03 FUSION SADDLES

Fusion saddles shall be made of polyethylene pipe compound that meets the requirements of ASTM D1248, Class C and suitable for fusion welding to polyethylene pipe. Fusion saddles shall be "Branch Saddle" by Driscopipe, "Fusion Saddle" by DuPont, or equal.

### 2.04 MECHANICAL SADDLES

Mechanical saddles shall be made of polyethylene pipe compound that meets the requirements of ASTM D1248, Class C. Mechanical saddles shall have stainless steel straps and fasteners, neoprene gasket and backup plate and shall be "Strap-On-Saddle" by Driscopipe, "Tapping Saddle" by DuPont, or equal.

### 2.05 FLEXIBLE COUPLINGS

Saddle connections to existing service laterals shall be made using flexible couplings. All flexible couplings shall conform to ASTM C425 and shall be Joints Incorporated Calder Couplings, Mission Rubber Company Flex-Seal Couplings, Mission Clay Products Band Seal Couplings, or equal.

### 2.06 GROUT

The Contractor shall submit grout design mixes capable of meeting or exceeding 500 psi compressive strength at 28 days. Testing requirements shall be in accordance with paragraph 02765-3.09. Contractor may incorporate grout additives to improve its flow properties, provided that the minimum compressive strength requirements are met. Grout design mixes with their test results shall be submitted prior to the grouting demonstration specified in paragraph 02765-3.09.

### 2.07 PRODUCT DATA

Contractor shall provide the following information in accordance with Section 01300:

1. Test results indicating that polyethylene pipe and fittings meet or exceed the physical properties specified in paragraph 02765-2.01 B.

2. Training certification.
3. Grout testing reports.
4. TV inspection reports in accordance with Section 02761.

## PART 3--EXECUTION

### 3.01 INSTALLATION

#### A. SEWER BYPASSING AND DEWATERING:

Contractor shall be responsible for bypassing sewer flow around his work and dewatering of sewer lines in accordance with the requirements of Section 02145. During installation and testing of the liner, the Contractor shall provide sewer plugs in upstream sewers to prevent flow from entering his work. Flow from connecting service laterals shall be handled in accordance with paragraph 02765-3.07.

#### B. SEWER PROOFING:

Prior to sliplining, the Contractor shall clean and TV inspect the sewer line in accordance with Sections 02760 and 02761, respectively. If TV inspection shows a major obstruction that would prohibit or otherwise damage the liner during installation, the Contractor may be directed by the Construction Manager to conduct a spot repair in accordance with Section 02769.

Following TV inspection, the Contractor shall verify that the sewer is free of obstructions (proof the line) by pulling a 4-foot piece of liner through the existing sewer line. The proofing liner shall be assembled with at least one field made fusion joint. The proofing liner shall have the same diameter dimensions as the intended slipliner and shall be fitted with a pulling head and cable on both ends. Pull heads shall be made of material which will not damage the sewer and shall have a outside diameter within 0.5 inch of the sewer inside diameter. The winch used to pull the proofing liner shall be equipped with a load gage which measures the developed winching force. The maximum allowable pulling force shall be 700 pounds per inch-diameter of the liner. During proofing, the Contractor shall document all portions of the existing sewer where the pulling force exceeds 50 percent of the maximum allowed. Proofing shall be stopped if the winching force reaches the maximum allowed pull force and the proofing section removed by reversing the pull or by excavation. The Contractor shall be responsible for all costs incurred in retrieving the proofing section. Where the outside surface of the proofing liner is damaged, the Contractor may be directed by the Construction Manager to prepare a new proofing liner. The sewer shall be considered ready for sliplining where, after proofing the sewer, the proofing liner shows no evidence of cuts, kinks, gouges, or other damage.

No sliplining shall be performed until the sewer has been successfully proofed. Where the sewer is unacceptable for sliplining, the Contractor shall review the TV inspection report and determine the location(s) where spot repair(s) or additional cleaning is required. Spot repairs shall be authorized by the Construction Manager and performed in accordance with Section 02769.

C. SEQUENCE OF WORK:

The Contractor shall perform the work in the following sequence:

1. Clean the sewer.
2. TV inspect the sewer.
3. Spot repairs as required.
4. Proof the sewer.
5. Install the liner.
6. Proof the liner.
7. Leak test the liner.
8. Reconnect service connections.
9. Leak test saddles.
10. Cut out liner at service connections.
11. Grout annular space.
12. Internal television inspection.

### 3.02 EXCAVATION

Excavation shall be in accordance with Section 02200 and ASTM F585. Access pit length shall be such that a minimum bending radius of 33 times the liner outside diameter is maintained. Sheeting, shoring and bracing requirements shall be in accordance with Section 02350. Service lateral connections should be exposed prior to or during liner installation.

Access pit excavations shall be performed at all points where the liner pipe will be inserted into the existing sewer. When possible, access pit excavations shall coincide with service lateral connection points or changes in the sewer line or grade.

### 3.03 LINER INSERTION

The liner shall be continuously supported above ground on rollers during joining and insertion. The liner shall be inserted into the existing sewer pipe in accordance with the requirements of ASTM F585. Within the dimensions of the access pit, the existing sewer pipeline above the springline shall be cut and removed as necessary for the insertion of the liner. Contractor shall not disturb the existing pipeline below the springline. The point of insertion shall be at a joint in the existing sewer which shall be protected by some means to prevent damage to the liner during insertion. The Construction Manager may direct the Contractor to retrieve the installed liner for inspection and possible rejection where damage is evident from contact of the liner and the point of insertion.



A power winch cable shall then be connected to the end of the liner via a pulling head approved by the pipe supplier so that the liner can be fed into the existing sewer. The winch shall be equipped with a load gage to read the developing winching force directly. The force shall be recorded regularly during winching and at every start and restart. The maximum pulling tension on the liner shall not exceed 700 pounds per inch-diameter.

Where the winching pulling force reaches the allowed maximum, the Contractor shall stop liner insertion and excavate a new insertion pit. The location of the pit shall coincide with the position of installed end of the liner and shall be of sufficient dimensions for liner insertion and joining, and such that the Contractor will not need to extend the excavation due to liner contraction. The cost for the access pit shall be borne by the Contractor.

The liner shall be handled with care to minimize the possibility of it being cut, kinked, or gouged, or otherwise damaged. The use of cables or hooks will not be permitted. Sections of the liner damaged, cut, or gouged shall be repaired by cutting out the section of damaged pipe and the rejoining the liner.

If the liner is pulled through a manhole, that portion within the manhole shall be removed and the annular space around the liner grouted in accordance with paragraph 02765-3.09.

### 3.04 LINER RELAXATION

The Contractor shall allow time for the liner to relax by natural contraction to its final installed length. The relaxation period shall be determined by the Construction Manager by measuring the distance by which the liner contracts over time. When the rate of change in the liner length is within 5 percent of the rate of change measured in the initial time interval immediately following insertion, the liner will be considered substantially relaxed and ready for subsequent operations.

The Contractor may elect to plug and fill the liner with cold water to speed up the relaxation period and may also perform an exfiltration leak test at this time in accordance with paragraph 02765-3.06.

### 3.05 LINER PROOFING

Proofing shall consist of pulling a 4-foot section of liner with pulling heads on both ends through the entire length of the liner. The pulling heads shall be made of a material that will not damage the liner. The outside diameter of the pulling heads shall not exceed that of the proofing liner. The proofing liner shall be within 1/2 inch of the inside diameter of the installed liner.

The winch used to pull the proofing liner shall be equipped with a load gage which measure the developed winching force. Points where the load gage reads 50 percent or more of the maximum allowable pulling force specified in paragraph 02765-3.01 B shall be excavated, and the

installed liner repaired or replaced at the Contractor's expense. The proofing liner shall be assembled in accordance with paragraph 02765-3.01 B. Where the outside surface of the proofing liner is cut or scraped, the Contractor may be directed by the Construction Manager to prepare and use a new proofing liner.

### 3.06 LINER LEAK TEST

Following proofing of the installed liner, the Contractor shall conduct a leak test using air or water.

An exfiltration test shall be made by plugging the downstream end of the liner and installing a standpipe to the liner's upstream end using appropriately sized 90-degree elbow fittings, plastic standpipe and flexible watertight couplings. The standpipe shall be temporarily secured within the manhole and shall extend up to or above the roadway elevation. The Contractor shall fill the standpipe and liner with water so that a head of at least 4 feet is provided above both the water table and the crown of the liner at the upstream manhole. Contractor shall extend the standpipe height as necessary where the water table elevation is within 4 feet of the roadway elevation. The filled liner shall be allowed to stand for a 2-hour test period. The water level during the test period shall remain unchanged for the liner to be accepted as watertight.

Alternately, the Contractor may use low pressure air to test the installed liner. Contractor shall plug and brace the ends of the liner and provide a means to introduce test air to the sealed liner. The liner shall be pressurized with air to 4.0 psi plus 0.5 psi for each foot the groundwater table is above the minimum invert elevation of the liner. The maximum test pressure shall be 10 psi. The Contractor may delay the start of the test until the test pressure has stabilized. The liner shall be accepted as watertight where the pressure within the sealed liner remains constant for 5 minutes after the air supply has been disconnected. The Contractor shall exercise due caution when air testing. Plugs shall be adequately braced against the forces developed during testing. All test pressure shall be removed from the liner prior to removal of test plugs. All personnel shall be isolated from the area under test while the liner is pressurized. The test pressure gage shall have a maximum reading of 15 psi and shall be calibrated prior to testing.

Where the liner fails the leak test, the Contractor shall continue to test smaller segments of the liner in like manner and fix all leaks. The method of fix shall not diminish the liner dimensions. All costs incurred in providing a successful test shall be borne by the Contractor.

### 3.07 SERVICE CONNECTIONS

The Contractor shall temporarily suspend water and sewer service to all occupants connected during liner insertion and leak tests. Contractor shall notify in writing, at least 48 hours in advance, all occupants affected of the dates and times their service will be out. The Contractor shall insert sewer plugs in each service lateral near the mainline and shut off all water service lines. During the period service is out, the Contractor shall provide interim sewer service as necessary by providing a vacuum truck capable of removing the waste from the service lateral cleanouts. The

Contractor shall be responsible for locating all service laterals, cleanouts and water line valves and returning service to all occupants within 8 hours after the lateral was removed from service.

### 3.08 REINSTATEMENT OF CONNECTING SEWERS

#### A. GENERAL:

Following a successful leak test, the Contractor shall reconnect all live service connections to the new liner. A portion of the existing sewer around each live service connection shall be removed to expose the liner pipe and provide sufficient working space for making the new service connections.

Service laterals shall be connected to the liner pipe by the use of a heat fused saddle as specified in paragraph 02765-2.03 or mechanical saddle as specified in paragraph 02765-2.04. Saddle stub-out dimensions shall be the same size or larger than the existing service lateral.

Saddles shall be connected to existing service laterals by using flexible couplings as specified in paragraph 02765-2.05.

#### B. SADDLE LEAK TEST:

The Contractor shall pressure test each saddle using air following connection to the slipliner and prior to cutting out the slipliner. Contractor shall provide a means for capping the saddle's unconnected end and introducing pressurized air to the saddle. Contractor shall pressurize the saddle to 4 psi. Where the test pressure remains constant for 2 minutes, the saddle and saddle connection will be accepted as watertight by the Construction Manager. Where the saddle fails the leak test, the Contractor shall provide all material, labor and supervision at his expense to produce a successful test. Following a successful test, the Contractor shall cut out the liner to the full inside diameter of the saddle and smooth all edges. Existing service laterals shall not be coupled with liner fittings without prior inspection by the Construction Manager.

### 3.09 GROUTING OF ANNULAR SPACE

The annular space between the outside of the liner and the inside of the existing sewer shall be grouted. For each mix submitted, the Contractor shall demonstrate that he can adequately pump the grout mixture within the annular space for a minimum length of 30 feet. The Contractor shall demonstrate this capability during the first sliplining installation by excavating one point along the existing sewer 30 feet from the upstream manhole. Contractor shall then inject grout from this access point to the referenced manhole. The demonstration will be considered satisfactory where the grout is observed at the referenced manhole.

Samples of grout shall be obtained in accordance with ASTM C172. One set of four standard cylinders shall be cast for each batch in accordance with ASTM C31. Testing of the specimens for compressive strength shall be in accordance with ASTM C39. One test shall be made

3 days from the time of casting, one test at 7 days, and two tests shall be made 28 days from the time of casting. The average of the 28-day strength tests shall be equal to or greater than 500 psi.

Grouting of the annular space shall be done in such a manner as to prevent damage or collapse of the liner. Grout shall be pumped into the annular space at the manholes, service connections, and wherever the liner is exposed. If the distance between grout points exceeds the Contractor's pumping capability, as previously demonstrated, the Contractor shall excavate additional grouting points at no cost to the Owner. The liner at access pits, service connections, and grouting points shall not be grouted above the springline of the existing sewer pipe. At manholes, the Contractor shall trowel the grout to form a smooth transition between the manhole base and the liner. The Contractor shall ensure that the manholes are not damaged during grouting.

The Contractor shall prevent the liner from floating or collapsing during grouting by filling the liner with water or some other positive method, as approved by the Construction Manager.

### 3.10 TV INSPECTION

After the annular space has been grouted, the liner shall be TV inspected in accordance with Section 02761. Where the TV inspection indicates the liner wall is damaged or forced out of round through grouting, the affected portion(s) of the liner shall be replaced at no additional cost to the Owner.

### 3.11 CONCRETE ANCHORS

At all points where the liner has been exposed as in access pits, service connections, and other locations, the Contractor shall remove all debris and create a void along each side of the existing sewer pipe at the springline to undisturbed soil. The total width of the void shall not exceed the sum of either the sewer O.D. plus 2 feet or service lateral O.D. plus 2 feet. Contractor shall encase the exposed liner and fittings in a minimum of 6 inches of 2000 psi concrete followed by backfill requirements in accordance with Section 02200. Contractor shall not encase flexible couplings in concrete.

### 3.12 CLEANUP

After the work has been completed, the Contractor shall clean up the entire project area. All excess material and debris not incorporated into the permanent installation shall be disposed of off site in a lawful manner by the Contractor.

### 3.13 PAYMENT

Liner will be measured for payment by the linear foot actually placed along the centerline of the sewer from the inside faces of the manholes. Payment will be made for the quantities measured at the unit price per linear foot listed in Section 00311. Payment includes excavation and backfill, liner and all incidentals.

The following items of work will not be measured for payment, but the cost thereof will be considered as incidental to the contract:

1. Records and logs.
2. Cleaning and debris removal and disposal.
3. Television inspection prior to and after liner installation.
4. Bypassing and dewatering as required.
5. Temporary suspension and restoration of water and sanitary service and notification to all facilities affected by the work.
6. Providing interim sanitary service.
7. Service lateral connections to liner fittings.
8. Annular space grouting.
9. Liner and saddle testing.
10. Grout testing and pumping demonstration.

**\*\*END OF SECTION\*\***

SECTION 02769

POINT REPAIR OF EXISTING SANITARY SEWER MAINS

PART 1 – GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies point repair of existing sewers prior to rehabilitation.

B. REQUIREMENTS:

The Contractor shall be responsible for repairing the sewer where point repairs are identified on the drawings or otherwise authorized by the Engineer. The work shall include verifying the location of the point repair through television inspection of the sewer, locating all interfering utilities, furnishing all labor and materials necessary for excavation, dewatering, pipe repair or replacement, backfill, surface restoration, temporary flow bypassing, sewer dewatering, and traffic control.

1.02 QUALITY ASSURANCE

A. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM C14	Concrete Sewer, Storm Drain and Culvert Pipe

Reference	Title
ASTM C76	Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
ASTM C425	Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C700	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe

#### B. WORK SCHEDULE:

The Contractor shall coordinate with applicable authorities, agencies, Owner and Construction Manager in preparing his work schedule. The work schedule, identifying the Contractor's sequence of work, dates and locations, shall be submitted to the Construction Manager for acceptance before the work commences.

#### C. INSPECTION:

All point repairs shall be inspected, measured and accepted by the Engineer prior to concrete placement and/or backfilling.

#### 1.03 RELATED WORK

Sewer bypassing is specified in Section 02145

Gravity sewers and accessories are specified in Section 02530

Sewer line television inspection is included in Section 02651

Sewer line cleaning is included in Section 02760

#### 1.04 SUBMITTALS

Contractor shall provide shop drawings of pipe fittings, special joints and assembly thereof, and all joint materials and details in accordance with Section 01300.

## PART 2 – PRODUCTS

### 2.01 SEWER PIPE AND FITTINGS

Pipe and fittings used for point repairs shall be PVC as specified in Section 02530.

### 2.02 BEDDING AND BACKFILL

Bedding and backfill material and placement shall be in accordance with Section 02200.

### 2.03 AGGREGATE BASE AND PAVEMENT

Aggregate base and pavement materials and placement shall be in accordance with Section 02500.

### 2.04 PRODUCT DATA

The Contractor shall provide the work schedule specified in paragraph 02769-1.02 B in accordance with Section 01300.

## PART 3 – EXECUTION

### 3.01 POINT REPAIR LOCATION, EXCAVATION AND PIPE REPLACEMENT

The location of point repairs which are specified or otherwise authorized by the Engineer shall be determined by the Contractor through TV inspection in accordance with Section 02651. All point repairs shall be performed as directed by the Engineer.

Excavations shall be performed in accordance with Section 02200. Each point repair excavation shall be 10 feet long as measured along the sewer axis; 5 feet in the upstream and downstream direction from the centerline of the defect. The Contractor may, for his convenience, overexcavate to remove damaged pipe to the nearest joint but shall do so at no additional cost to the Owner. Trench width dimensions shall be in accordance with Section 02200 with provisions for sheeting, shoring and bracing requirements. Service laterals shall be excavated no less than 4 feet back from the lateral-to-mainline connection.

After the point repair is located and exposed, the Contractor shall, unless otherwise specified, fix defective joints, wyes, tees, taps and sections of damaged pipe by removal and replacement. Replacement pipe, fittings and couplings shall be as specified or otherwise directed by the Engineer. Unless otherwise specified, the Contractor shall remove defective pipe at exposed joints or by cutting the pipe perpendicular to the pipe axis. Contractor shall then prepare a replacement section of like material and dimensions. Connections to existing pipe shall be made with flexible couplings as specified in paragraph 02530-2.02. The replacement pipe ends shall mate square with the existing pipe and provide a maximum 1/2-inch gap on either end when installed.



Coupling sizes shall be as recommended by the manufacturer and shall be long enough to overlap pipe ends by a minimum of 2 inches. Rubber couplings shall be installed on clean pipe and shall be watertight.

The Contractor shall inspect all pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are used. Existing and replacement pipe ends shall be cleaned thoroughly and kept clean during laying and connection. Contractor shall lower pipe into the trench in such a manner as to avoid any physical damage to the pipe and shall remove all damaged pipe from the job site.

After replacement pipe and fittings have been fully coupled to the existing sewer, the Contractor shall wrap and securely fasten a light gage sheet metal or building felt around all replacement pipe connections so that no concrete can enter the line. The Contractor shall then encase his work in concrete. Contractor shall make the entire concrete collar in one pour extending a minimum of 12 inches on each side of the replacement pipe and a minimum of 6 inches around the outside diameter of the pipe. No concrete shall be poured in water. After the collar is poured and has taken an initial set as determined by the Engineer, the concrete shall be fully cured by covering with well-moistened earth.

The Contractor shall notify the Engineer not less than 48 hours in advance of the time he plans to begin point repair work at a particular location.

### 3.02 SEWER BYPASSING AND DEWATERING

Contractor shall be responsible for bypassing sewer flow around his work and dewatering of sewer lines in accordance with the requirements of Section 02145. Contractor shall bypass all flow around his work until such time as the sewer is reconnected.

Service laterals shall be plugged if required to comply with sewer bypassing and dewatering requirements. Contractor shall provide notification to all residents whose service laterals are plugged and shall be responsible for removing sewer plugs when the work is completed.

3.03 POINT REPAIRS FOR REHABILITATION BY GROUTING (Not Used)

3.04 POINT REPAIRS FOR REHABILITATION BY SLIPLINING (Not Used)

### 3.05 POINT REPAIRS FOR REHABILITATION BY INVERSION LINING

Point repair work in conjunction with inversion lining shall be performed prior to rehabilitation and may include restoration of the existing sewer to its original line and grade or pipe replacement as directed by the Engineer. For all defects authorized for point repair which alter the alignment of the existing sewer, the Contractor may upon approval of the Engineer expose the defect and realign the existing pipe. Contractor shall insure that the realignment is permanent and will not adversely affect the performance or impede the installation of the inversion liner. All other defects identified for point repair shall require pipe replacement.

### 3.06 TV INSPECTION

The Contractor shall TV inspect the completed point repairs and submit the TV inspection documentation in accordance with Section 02651.

### 3.07 CLEANUP

During the progress of the work, the Contractor shall maintain all job sites in a clean and orderly condition. The Contractor shall properly attend to the concern of any persons having contact with the work and shall repair or replace any damage caused by his operation as directed by the Engineer.

### 3.08 PAYMENT

Contractor shall be paid for all spot repairs where specified and as authorized by the Engineer at the unit price per spot repair listed in the Bid. Payment shall include excavation and backfill, all labor and materials, and all incidentals necessary to complete one spot repair as specified in this section. The Contractor shall be paid at the unit cost for gravity sewer, as measured along the pipe by the Engineer, with a minimum of 10 feet for each point repair.

The following incidental items of work will not be measured for payment, but the cost thereof will be considered as incidental to the contract:

1. Television inspection and documentation after completion of the spot repair.
2. Flow bypassing.
3. Excavation pumping and dewatering as required.

**\*\*END OF SECTION\*\***

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## SECTION 02777

### PIPE BURSTING SEWER LINING

#### PART – GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required to install and test new high density polyethylene (HDPE) sewer pipe and appurtenances using pipe bursting.
  - 1. Connect new pipe to existing manholes.
  - 2. Modify existing manhole bases as needed.
  - 3. Reconnect existing sewer lateral connections.
  - 4. Perform pre- and post-rehabilitation television inspection
  - 5. Perform all other work as shown on the Drawings.

##### 1.02 DEFINITIONS

- A. Pipe Bursting is a method for replacing existing buried piping by installing a replacement pipe material into an existing host conduit. The actual pipe bursting shall be accomplished by inserting a tool/head with a greater outside diameter than the maximum inside diameter of the existing host conduit, and which, when advanced pneumatically or mechanically, fragments the existing host conduit and pushes the fragments into the surrounding soil.
- B. Host Conduit is defined as the existing sewer pipeline to be replaced by bursting.
- C. Replacement Pipe is defined as the new inserted diameter SDR 17, ASTM F 714-05, IPS system, HDPE pipe to be installed behind the pipe bursting tool/head to replace the host conduit.

##### 1.03 RELATED WORK

- A. Sewer Line Testing is included in Section 02530.
- B. Sewer Cleaning is included in Section 02760.
- C. Closed Circuit Television Inspection is included in Section 02651.
- D. Sewer Bypassing is included in Section 02145.

## 1.05 SUBMITTALS

- A. Submit in accordance with Section 01300 shop drawings and schedules for all installation equipment, pipe, and appurtenances required. Submit design data and specification data sheets listing all parameters used in the pipe design and thickness calculations based on HDPE. Additional calculations shall include the anticipated pulling forces, equipment pull capability, maximum pulling forces that can be applied to the pipe, and stresses and strains at manhole connections. All pipe design calculations shall be sealed and signed by a South Carolina registered professional engineer.
- B. Submit the detailed construction method procedures for installing the pipe including a detail for the proposed pipe-to-manhole connection method.
- C. Prior to starting work, submit the following:
  - 1. A drawing and layout plans showing the size and location for all proposed pits and excavations required to complete the work. All access pits must be within the easement limits defined on the Drawings. It is assumed the excavations will occur primarily at or near existing manhole locations.
  - 2. A written plan for maintaining sewage service flows for review and approval
  - 3. One copy of the Contractor's record of the pre-bursting condition survey including video and written documentation
  - 4. Qualifications for personnel trained in using butt-fusion equipment and their training in the proper methods for handling and installing the HDPE pipe
  - 5. Project specific Contingency Plan that accounts for obstructions, heave and/or settlement, damage to laterals and other utilities, loss of line and grade, and loss of bursting head
  - 6. Submit the following information for review and approval of the pipe bursting contractor, personnel and manufacturer
    - a. Years of experience for the pipe bursting contractor in performing pipe bursting projects
    - b. Equipment manufacturer and supplier name for this work and previous work listed below. The pipe bursting contractor shall be experienced with the manufacturer's equipment and systems, and shall be trained by the pipe bursting manufacturer. Training verification shall be submitted.
    - c. The name for the pipe bursting supervisor who will provide constant full-time direction over all pipe bursting operations
      - 1) Include years of pipe bursting experience, total footage of pipe bursting experience on 8-inch diameter or larger pipe, and full information for reference projects.

- d. A list with all municipal clients for whom the pipe bursting contractor has performed this type of work in the last 2 years. The list shall contain:
  - 1) Names, email addresses, and telephone numbers for reference project oversight persons
  - 2) A full description of actual work performed including the project location, construction year, diameter for the pipe replaced and the pipe installed by pipe bursting, the total linear footage and diameters of pipe installed by pipe bursting, and the pipe's type/use (i.e., gravity sewer, force main, etc.).
  - 3) The pipe bursting system (equipment) manufacturer's name for the work performed
  - 4) The name for the pipe bursting supervisor who provided direction over the work

## 1.06 QUALIFICATIONS

### A. Manufacturer

1. The pipe bursting system manufacturer shall have previously demonstrated its ability to successfully install 1 million feet of pipe minimum via pipe bursting. Pipe bursting system manufacturers shall be TT Technologies, Inc., Aurora, Illinois; TRS Trenchless Replacement Service, LTD, Calgary, Alberta, Canada; Miller Pipeline Corp., Indianapolis, Indiana or approved equal.

### B. Pipe Bursting Contractor

1. The pipe bursting contractor shall provide proof of training by the Pipe Bursting System Manufacturer.
2. The pipe bursting contractor shall have at least 2 years continuous experience in pipe bursting, and shall have completed at least 3 projects in the last 5 years involving pipe bursting installations for a combined 100,000 feet or more total for 8- to 24-inch diameter (outside diameter of replaced pipe) pipes.
3. Pipe bursting operations shall be performed under the constant full-time direction of a single pipe bursting supervisor, who shall have pipe burst or supervised pipe bursting for a minimum of 25,000 linear feet of 8-inch through 24-inch diameter gravity flow pipe.
4. The pipe bursting manufacturer shall to be on site during the commencement and 25 percent duration for the pipe bursting operations and during commencement for reconnecting 10 percent of the laterals.

- C. Be able to provide equipment and crews as needed to complete the work without delay. The pipe bursting contractor crews shall perform all work associated with the pipe bursting operations.

- D. HDPE pipe jointing shall be performed by personnel trained in using butt-fusion equipment and the required joint procedures for butt-fusion joining the product pipe being used. Qualification for the product pipe size(s) and type(s) shall be submitted and shall be current at the time of the project and when performing pipe joining. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the product pipe. Such training shall be conducted by a qualified fusion equipment manufacturer or pipe supplier representative.

#### 1.07 WARRANTY

- A. Warrant to OWNER that the equipment used on this Contract, where covered by patents or license agreements, is furnished in accordance with such agreements, and the prices included herein cover all applicable royalties and fees in accordance with such license agreements. Defend, indemnify, and hold OWNER and the Engineer harmless from and against any and all costs, loss, damage, or expense arising from or in any way connected with any claim of infringement of patent, trademark, or violation of license agreement.

#### 1.08 AVAILABLE SEWER VIDEOS

- A. Many of the existing sewer lines scheduled for rehabilitation have been inspected to the degree possible for pipe conditions by a cleaning and closed circuit television (CCTV) services contractor for the OWNER. FOR INFORMATION ONLY, and if available, a CD with the video inspection reports only (no videos) will be provided to the offers with the bidding documents. The awarded contract holder will be provided a copy of the CCTV video.

#### 1.09 QUALITY ASSURANCE

- A. Quality assurance is the workers' sole responsibility during the project's duration. Be responsible for any costs associated with corrective measures required to replace or repair items not meeting the quality standards.
- B. No pipe bursting restoration shall be accepted that has created a sag in the restored line (not previously inherent to the existing line). Correct any sags in the line created by this operation.

#### 1.10 GUARANTEE

- A. All pipe bursting work shall be fully guaranteed for a 3-year period from the acceptance date. During this period, all serious defects discovered by OWNER shall be removed and replaced in a satisfactory manner at no cost to OWNER.

#### 1.11 WATER

- A. Water for all construction operations shall be available from identified OWNER fire hydrants. In order to use water from a fire hydrant, the Contractor shall apply for a temporary hydrant meter. The OWNER shall waive all fees for the application and water usage fees.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Select appropriate pipes and pipe joints to safely carry the loads, including jacking forces, imposed during construction. Pipe joints shall be flush with the outside pipe face when the pipes are assembled. Pipe material shall be ASTM F714-05, light-colored HDPE pipe, IPS system, SDR 17.
- B. Pipe couplings and/or fittings shall be ASTM D3261 HDPE.
- C. Use round pipe with a smooth, even outer surface, which has joints that allow for easy connections between pipes. Pipe ends shall be designed so the bursting loads are evenly distributed around the entire pipe joint, and so point loads will not occur when the pipe is installed. Pipe used for pipe bursting shall be able to withstand all forces that will be imposed by the installation process and the final in-place loading conditions.
- D. The pipe bursting equipment may include a bentonite or polymer slurry lubrication system in accordance with the pipe bursting equipment manufacturer's recommendations to reduce friction developed on the replacement pipe surface during insertion.
- E. Electrofusion couplings shall be manufactured by Central, Friale by Friatec or approved equal.

### 2.02 EQUIPMENT

- A. The pipe bursting contractor shall confirm proper pipe bursting equipment selection which, based on past experience, has proven to be satisfactory for pipe bursting the existing diameter(s) and material(s) of existing pipe(s) with a new HDPE pipe, while maintaining accurate line and grade control. Equipment shall generally include a full bodied tool with rear expander, and constant tension winch or other method to monitor correct cable tension.
- B. Sound emissions from the pipe bursting replacement process shall be limited to 80 decibels (dB) at 100 feet from the exhaust point of the pipe to be installed during the installation process. The Contractor shall measure noise and shall provide silencers or other devices to reduce equipment and work noise to meet these requirements or those that govern the location of construction, whichever is most stringent.
- C. Pipe jacking equipment shall include the following features:
  - 1. Main jacks mounted in a jacking frame located in the starting pit
  - 2. Jacking frame which successively pushes a string of connected pipes towards a receiving pit
  - 3. Sufficient jacking capacity to push the string of pipe through the ground; incorporate intermediate jacking stations, if required



4. At least 20 percent greater capacity than the calculated maximum jacking load
5. Uniformly distributes jacking forces on the pipe's end by using spreader rings and packing, measured by operating gauges
6. Jack Thrust Reactions: Use reactions for pipe jacking that are adequate to counteract the jacking pressure developed by the main jacking system. Special care shall be taken when setting the pipe guide rails in the jacking pit to ensure correct alignment, grade, and stability.

## PART 3 - EXECUTION

### 3.01 MAINTAINING FLOW

- A. Provide for sewage flow diversion and/or bypass pumping during pipe bursting operations as specified in Section 02145.
- B. Be solely responsible for cleanup, repair, property damage costs, and claims resulting from a diversion and/or bypass pumping system failure.

### 3.02 PREPARATION FOR PIPE BURSTING OPERATIONS

#### A. Notifying Residents

1. Notify the owners and residents of any homes or businesses whose service lateral will be affected by the lining work. In addition, deliver written notification to each such resident or business 3 days prior to such lining work, further advising of the work. Include in the notifications any restrictions on using the sewage system facilities. Describe exact days and hours when the sewer system cannot be used. Notification must be approved by Engineer.

#### B. Service Connections and Other Existing Utilities

1. The Contractor shall conduct a pre-rehabilitation CCTV inspection for all sewers to be rehabilitated by pipe bursting methods in accordance with Section 02732. The inspection shall be to identify pipe defects, to document all service lateral connection locations, and to confirm additional needed point repair locations other than those indicated on the Drawings. The Engineer will review pre-rehabilitation inspection videos to confirm point repair locations to be performed by the Contractor. The Contractor may not proceed with pipe bursting until the Engineer has reviewed and approved the Contractor's pre-rehabilitation CCTV inspection data. A minimum of 10 working days shall be provided to review each pre-rehabilitation CCTV inspection data submittal

2. If the data is available, the OWNER will provide the Contractor information on the location of known active laterals and cleanouts; however, this list may not be interpreted as all-inclusive. The Contractor shall be responsible for verifying active customer service connection prior to rehabilitation. The Contractor shall compare the service connections from the CCTV video with above ground measurements at the approximate location of center of each house or building. Any discrepancies between the CCTV data and above ground measurements of laterals shall be brought to the attention of the Owner/Engineer for a determination of lateral reinstatements. If the Contractor discovers an error or addition to the list provided, the Contractor shall immediately notify the Engineer for additional investigation. Upon completion of the rehabilitation work, a list of all service laterals abandoned or reconnected as part of the work shall be submitted to the Owner in .PDF format. The compiled list shall include the following information:
  - 1) Location of each service lateral based on the CCTV inspection logs. Location shall include both accurate distance measured from the centerline of the starting manhole as well as a notation (by clock-reference) of where on the circumference of the pipe, the service lateral connects.
  - 2) Status (Active or Inactive)
  - 3) The address of each customer and associated active lateral location
3. Prior to pipe bursting, locate, excavate, expose, and completely disconnect all active service connections. Exercise due diligence when excavating to sufficiently allow the existing pipe to uniformly circumferentially expand through the service connection pit.
4. All buried utilities adjacent to the pipe bursting operation within 20 feet shall be reviewed. Where necessary, utilities shall be excavated to relieve transient loading during the pipe bursting operation. If the Contractor considers any utilities to be too close to the pipe to be burst, excavate a pit at the location to check clearance. If adequate clearance does not exist between the existing sewer line and the subject utility, employ substitute means to rehabilitate the existing sewer line. For utilities crossing near the existing sewer line to be burst, soil shall be excavated and removed to relieve loading during the pipe bursting operation.
5. Be responsible for all costs resulting from damage to utilities during pipe bursting operations.

#### C. Point Repairs

1. Determine if point repair(s) are required to complete the pipe bursting operations. The Engineer shall be informed before each and every point repair is undertaken. Perform any excavation and repair to prepare the sewer segment for pipe bursting. This includes repairing significant segments of sunken sewer main which would not be corrected during the pipe bursting process, if specified on the Drawings or directed by the Engineer.

#### D. Existing Manholes

1. Connections at existing manholes shall be enlarged before the bursting operation if the new pipe is planned to traverse through the manhole during bursting. The manholes shall be replaced if traversed through to adjacent segments.

#### E. Concrete Encasements

1. Any concrete encasement shall be excavated and removed prior to the bursting operation to allow pipe bursting head to have a steady and free passage.
2. All in-line valves and fittings shall be removed prior to the pipe bursting operation.

#### F. Access Pit Locations

1. Excavation, trenching, dewatering, sheeting, shoring, and bracing shall comply with all applicable OSHA, local, and state standards and specifications.
2. Locate and protect existing utilities as required during construction and/or as required by utility companies, OWNER, and/or Engineer.
3. Sedimentation tubes and silt fence shall be installed at each excavation to prevent damage to wetlands and buffer zones.
4. The size, location, and number for pits shall be determined to facilitate the pipe bursting insertion, minimize excavation and traffic disruption, and shall be submitted prior to construction. All access pits and excavation shall be within the limits defined on the Drawings. Provide the minimum number of pits necessary to satisfactorily complete the work. Pits shall be a sufficient size to allow equipment access and new pipeline installation. Pits shall be centered over the existing sewer, and are generally anticipated to occur at each existing manhole location, at manhole construction points, at service connections, or at points where spot repairs need to be performed.
5. Submit any pit relocations and reasons for pit relocation for review. Include any appropriate sketches deemed necessary by the Engineer. The Contractor shall be responsible for obtaining all necessary permits as they relate to the relocation should they be approved by the Engineer.
6. Access pits shall be excavated and constructed as required to allow adequate access width for workers, sheeting and shoring installation, and to provide clearance necessary to avoid damage to the pipe during insertion.

7. Keep all open excavations maintained and secured at all times using barricades, lights, signs, construction tape, or fencing, etc. and/or by other means necessary or as directed by the Engineer.

#### G. Cleaning/Television Inspection

1. Perform the cleaning in accordance with Section 02760 prior to televising. The cleaning shall be to the extent necessary to conduct pipe bursting operations and to televise and identify potential obstructions or other concerns. No additional compensation will be made if additional work is required because the conduit was not sufficiently cleaned. The television inspection work, unless otherwise herein specified, shall be done in accordance with Section 02651 and 02760.

#### H. Line Obstructions

1. If pre-installation video (CCTV) inspection reveals an obstruction in the existing sewer (heavy solids, dropped joints, protruding service laterals, protruding utility lines, or collapsed pipe) which cannot be removed by conventional sewer cleaning equipment and will prevent completing the pipe bursting process, the Contractor shall remove the obstruction with the Engineer's approval. Obstruction removal shall be performed by digging an obstruction elimination pit and removing by point repair. Collapsed pipe shall be replaced by pipe replacement or by other measures as approved by the Engineer.

#### I. Sags in Line

1. If pre-installation video (CCTV) inspection reveals a sag in the existing sewer that is greater than 1/4 the existing pipe's diameter or causes the CCTV camera lens to be underwater and is not identified on the Drawings, the Engineer should be notified to determine if the sag is acceptable or if repair is required. When a sag repair is necessary prior to pipe bursting, the Contractor shall take the necessary measures to eliminate these sags by pipe replacement, by digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with the existing pipe invert, or by other measures as approved by the Engineer.

### 3.03 PIPE BURSTING OPERATIONS

#### A. General

1. Though the installation process may be licensed or proprietary in nature, no change to any material, thickness, design, values, or procedural matters stated in the submittals shall be allowed without the Engineer's prior knowledge and approval.
2. Pipe bursting operations, including instances where pipe upsizing is required, shall not cause excessive disruption or heaving to the above ground terrain or improvements.

3. Upon commencing the bursting process, pipe insertion shall be continuous and without interruption from one entry point to another, except as approved by the Engineer.
4. If pipe spans between manholes are fused ahead of bursting operations, transport the pipe to the site by using rollers and/or other means that will not damage the pipe's exterior. Contractor shall not drag the pipe to the insertion pit locations.
5. Protect the pipe and joints driving ends against damage.
6. Install pulleys, rollers, bumpers, alignment control devices, and any other equipment required to protect existing manholes and to protect the pipe from damage during installation. Lubrication may be used as recommended by the manufacturer. Under no circumstances shall the pipe be stressed beyond its elastic limit.

#### B. Pre-Bursting Condition Survey

1. Prior to starting pipe bursting, conduct a pre-bursting condition video survey of all existing structures and existing conditions on or within 100 feet of the site. The survey shall include wetland areas, trees and vegetation, existing buildings and homes, roads, cart paths, and all other significant features. Coordinate activities, issue notices, obtain clearance, and provide whatever assistance is necessary to accomplish the preconstruction video survey.
2. Record observations while surveying each structure's existing conditions.
3. The pre-bursting condition survey record shall include written documentation and photographs for the conditions identified, with appropriate audio description for conditions and defects.
4. All pre-bursting condition survey records must be submitted to Engineer.
5. Upon completing all pipe bursting, examine any properties, structures, and conditions where damage complaints have been received or damage claims have been filed. Notify all interested parties so they may be present during the final examination.

#### C. Installing Pipe Bursting Machine and Replacement Pipe

1. The specific type of replacement pipe material described above for HDPE shall be installed in the locations as shown on the Drawings and delineated in these specifications.
2. All sharp edges shall be removed from the exposed pipe opening.
3. The pipe bursting tool shall be pneumatically advanced without interruption through the host conduit from access pit/manhole to access pit/manhole. The replacement pipe shall be advanced pushed, pulled, or both directly behind the tool to fill the void left by the shattered host conduit.

4. In areas where construction site access is limited, existing sewers are deep, or where restrictions on streets are limited and/or lane blockage is prohibited, the Contractor may consider sectional pipe installation (i.e., cartridge style) methods.
5. The bursting head shall be sized so the maximum diameter of the temporary void created by the bursting operation shall not exceed the replacement pipe's maximum outside diameter by greater than 20 percent. The new sewer shall be installed straight along the existing pipeline centerline following the same line and grade.
6. Due to the presence of existing utilities adjacent to the sewer to be replaced, the pipe bursting method shall limit vibrations transmitted to the surrounding soils. The peak particle velocity for ground vibrations resulting from pipe bursting operations shall be limited to 0.5 inches per second.
7. If bentonite or polymer slurry is used, maintain an envelope around the pipe's exterior during the pipe bursting operation to reduce the exterior friction and the possibility of the pipe seizing in place.
8. If the pipe reaches the rejection point (seizes in place) and it is elected to construct a recovery access pit, obtain Engineer's approval, then coordinate property access, traffic control measures, and utility adjustments as necessary prior to commencing work. Excavations within delineated wetlands shall be avoided when possible.
9. If a pipe section is damaged during the bursting operation or joint failure occurs as evidenced by inspection, visible groundwater infiltration or other observations, submit methods for repairing or replacing the pipe to the Engineer for approval. Repairing pipe sections damaged during bursting operations shall be made at no additional cost to OWNER.
10. Allow the new HDPE pipe to return to its original length and shape in the unstressed state, and then trim the excess pipe in the manholes. The liner pipe manufacturer's recommendations shall be followed regarding relieving and normalizing stress and strain due to temporary stretching and elongation after pulling operations have been completed. Time allowed for stress and strain relief shall not be less than 24 hours.

#### D. Work in Existing Manholes

1. After the pipe has been inserted into the entire sewer section length, anchor the pipe at existing manholes. The pipe shall protrude in manholes for enough distance to allow sealing and trimming.
2. After the pipe has been inserted into the entire sewer section length, install new precast manholes as needed or as directed by Engineer, and as shown on the Drawings.

3. If a new manhole is not shown on the Drawings, restore manhole bottom and invert, and repair damage caused by the insertion process. If the Engineer deems the damage caused by insertion process not repairable, replace the manhole at no cost to OWNER.
4. When the replacement pipe passes through or terminates at an existing manhole, the channel and portion of the base shall be removed as the Contractor deems necessary for the bursting tool to be able to maintain a constant line and grade upstream and downstream of the manhole. The pipe within the existing manhole shall be neatly and completely saw-cut off and not broken or sheared off, to protrude at least 4 inches away from the manhole walls. If the new pipe passes through the manhole, the pipe's top half within the manhole shall be neatly cut off and not broken or sheared off, at least 4 inches away from the manhole walls. The channel in the manhole shall be rebuilt with new concrete and mortar, shall be a smooth continuation of the pipe(s), and shall be merged with other lines or channels, if any. Channel cross section shall be U-shaped with a minimum height to the pipe's crown. The channel sides shall be built up with mortar/concrete to provide benches at a 1 in 12 pitch maximum towards the channel.
5. All cutting and sealing for the new pipe at manhole connections shall provide watertight pipe and manhole trough seals. Connections to manholes will not be made any earlier than 24 hours following the bursting operations. This 24-hour "relaxation period" is intended to allow the pipe temperature to reach equilibrium with the surrounding soil and for the pipe to release stresses imparted during bursting operations. The time period shall be extended based on manufacturer's and/or supplier's recommendations, if required.
6. To seal the pipe at the manhole, provide a flexible gasket connector in the manhole wall at the pipe's end, centered in the existing manhole wall. Grout the flexible connector in the manhole wall filling all voids for the full thickness.
7. The replacement pipe in the manhole shall be locked down and sealed as specified above before proceeding to the next pipe bursting section. All manholes shall be individually inspected by the Engineer for replacement pipe cutoffs, benches, and sealing works prior to any additional manhole rehabilitation activities.

#### E. Service Connections

1. After the replacement pipe has been completely installed and tested, all existing active service laterals shall be reconnected after the liner has been pulled in place, but not permanently before the pipe has been allowed to relax for 24 hours minimum.
2. If the main sewer is being replaced through pipe bursting, the Contractor shall abandon inactive laterals without further action and shall burst through the abandoned laterals. No payment will be made for disconnecting or reconnecting abandoned laterals. No bursting through abandoned laterals shall be performed without prior approval from the Engineer.

3. Prepare and submit to the Engineer a list of abandoned laterals during pipe bursting. List shall be in PDF format in accordance with 3.02B.
4. Connections to the existing service lateral pipe shall be made using reinforced flexible couplings that conform to ASTM C425, such as Fernco Inc. or equal. Joint deflection limits and lateral connections shall meet the maximums indicated in ASTM C12 and C425. The slope for the existing lateral toward the newly installed sewer main shall be maintained at the existing percent.
5. Sewer connections shall be attached to polyethylene replacement pipe by heat fusion saddles or InsertaTees. InsertaTees may be used for pipes larger than 10-inches in diameter having a 0.36-inch or greater wall thickness. InsertaTees shall be "Fatboy" type with hub manufactured of SDR 26 PVC material incorporating a 360 degree integral stop on the hub surface and exceeding ASTM F1336 Section 10.3 Pipe Stop Load Support Test, or approved equal. Fusion saddles shall be as manufactured by Central Plastics, Phillips Driscopipe, or equal. Once the saddle is secured in place, drill hole in pipe equal to the saddle outlet's full inside diameter. Connection to PVC or ductile iron pipe replacement pipe shall be accomplished using a compression fit service connection and per pipe manufacturer's and/or supplier's guidance.
6. Sewer laterals from the connection shall be replaced by excavation to the easement or property line if in rights-of-way with a cleanout installed. For reconstructed laterals, a minimum 2 percent slope is required.

F. Post-Bursting Condition Survey and Television Inspection

1. Following the pipe bursting operations, including work associated with manhole and service connections, conduct final videotaped color television inspection in accordance with Section 02733 for the completed work.
2. The replacement pipe shall be continuous over the sewer's entire length between 2 manholes, and shall be free from visual defects. Defects the Engineer determines may affect the pipe's integrity or strength shall be repaired or replaced.

### 3.04 FIELD TESTING AND ACCEPTANCE

- A. Field acceptance for the new pipeline shall be based on the Engineer's evaluation of the installation, including CCTV videos, inspecting the manhole connection, and all pipe and manhole testing results.
- B. Testing shall be required after the replacement pipe has been installed. The replacement pipe shall be tested before it has been sealed in-place at the manholes and before any service reconnections have been made. This test checks the integrity of the joints that have been made and verifies the replacement pipe has not been damaged by inserting it through the host conduit.



- C. Groundwater infiltration into the new pipe, including at the manhole and service connections, shall be zero.
- D. Refer to Section 02675 for air testing requirements for segments replaced through pipe bursting.
- E. All service connections shall be open, clear, and watertight.

### 3.05 CLEANING AND RESTORATION

#### A. Cleaning the New Sewer Main Line

- 1. After evaluating the CCTV videotapes, if the Engineer determines the new sewer mainline needs to be cleaned, Contractor shall re-clean the line at no additional cost to OWNER. The cleaning shall be done in accordance with Section 02760.

#### B. Disturbed Areas

- 1. Upon completing the pipe bursting operation, restore all areas disturbed by these operations including streets, yards, cross country easements, and wetland areas to a condition as good as or better than what existed prior to initiating construction activities.

### 3.06 CLOSEOUT ACTIVITIES

- A. Provide in accordance with Section 01700

**\*\*END OF SECTION\*\***

## SECTION 02933

### TOP SOILING AND SEEDING

#### PART 1 – GENERAL

##### 1.01 SCOPE

The Contractor shall furnish all labor, equipment and material required to place topsoil, seed, commercial fertilizer, agricultural limestone and mulch material, including seedbed preparation, harrowing, compacting and other placement operations on graded earthen areas as described herein or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement or sidewalks; all cleared or grubbed areas which are to remain as finish grade surfaces; and on all existing turf areas which are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these Specifications.

The Work shall include temporary seeding operations to stabilize earthen surfaces during construction or inclement weather and to minimize stream siltation and erosion. Temporary seeding shall be performed at the times and locations as directed by the Engineer.

##### 1.02 SUBMITTALS

Submittals shall be made in accordance with Section 01300. In addition, the following specific information shall be provided:

###### A. SEED:

Prior to seeding operations, the Contractor shall furnish to the Engineer labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the Contractor of any responsibility or liability for furnishing seed meeting the requirements of this Section.

###### B. TOPSOIL:

Prior to topsoil operations, the Contractor shall obtain representative samples and furnish soil test certificates including textural, pH, and organic ignition analysis from a certified testing laboratory.

## PART 2 – PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

Wood-cellulose fiber mulch shall be manufactured by Weyerhaeuser Company, Conway Corporation, or approved equal.

### 2.02 MATERIALS AND CONSTRUCTION

#### A. TOPSOIL:

Utilizing designated stockpiles or borrow areas on-site, the Contractor shall place a minimum of 4 inches of topsoil over all graded earthen areas and over any other areas to be seeded. Sources of topsoil shall be approved by the Engineer prior to disturbance.

Topsoil shall be a friable loam containing a large amount of humus and shall be original surface solid of good rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than ½ inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, stocks, chips or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life.

Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam or a combination thereof. The pH shall range from 5.5 to 7.0. Topsoil shall contain not less than 5 percent or more than 20 percent by weight organic matter as determined by loss on ignition of oven-dried samples to 65 degrees C.

#### B. SEED:

Seed shall be delivered in new bags or bags that are sound and labeled in accordance with the U.S. Department of Agriculture Federal Seed Act.

All seed shall be from the last crop available at time of purchase and shall not be moldy, wet or otherwise damaged in transit or storage. Species, rate of seeding, fertilization and other requirements are shown in Table 1 of this Section.

Seed shall bear the growers analysis testing to 98 percent for purity and 90 percent for germination. At the discretion of the Engineer, samples of seed may be taken for check against the grower's analysis.

C. FERTILIZER AND LIMING MATERIALS:

Fertilizer and liming materials shall comply with applicable state, local and federal laws concerned with their production and use.

Commercial fertilizer shall be a ready mixed material and shall be equivalent to the grade or grades specified in Table 1. Container bags shall have the name and address of the manufacturer, the brand name, net weight and chemical composition.

Agricultural limestone shall be pulverized limestone having a calcium carbonate content of not less than 85 percent by weight.

D. MULCH MATERIALS:

All mulch materials shall be air-dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth. Mulch shall be composed of wood cellulose fiber, straw or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch blowing equipment. Straw mulch shall be partially decomposed stalks of wheat, rye, oats or other approved grain crops. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum or other approved standing field crops.

E. MULCH BINDER:

Mulch on slopes exceeding 3 to 1 ratio shall be held in place by the use of an approved mulch binder. The mulch binder shall be non-toxic to plant life and shall be acceptable to the Engineer. Emulsified asphalt binder shall be Grade SS-1, ASTM D 977. Cutback asphalt binder shall be Grade RC 70 or RC 250.

F. INNOCULANTS FOR LEGUMES:

All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

G. WATER:

Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

## PART 3 – EXECUTION

### 3.01 SECURING AND PLACING TOPSOIL

Topsoil shall be secured from areas from which topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.

The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage and other characteristics as to offer assurance that, when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.

All areas from which topsoil is to be secured, shall be cleaned of all sticks, boards, stone, lime, cement, ashes, cinders, slag, concrete, bitumen or its residue and any other refuse which will hinder or prevent growth.

In securing topsoil from a designated pit, or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Engineer, the pit shall be abandoned.

Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed, unless otherwise approved by the Engineer. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

### 3.02 SEEDBED PREPARATION

Before liming, fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line from unsightly variation, bumps, ridges and depressions and all detrimental material, roots and stones larger than 3 inches in any dimension shall be removed from the soil.

Not earlier than 24 hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than 2 inches with a weighted disc, tiller, pulvimixer or other equipment until the surface is smooth and in a condition acceptable to the Engineer. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be cultivated for seeding.

Ground preparation operations shall be performed only when the ground is in a tillable and workable condition, as determined by the Engineer.

### 3.03 FERTILIZATION AND LIMING

Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown in Table 1. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of ½ inch.

Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.

Agricultural limestone shall be thoroughly mixed into the soil according to the rates in Table 1. The specified rate of limestone application may be reduced by the Engineer if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.

It is the responsibility of the Contractor to make one application of a maintenance fertilizer according to the recommendations listed in Table 1.

### 3.04 SEEDING

Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds, nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the dates shown in Table 1 unless otherwise approved by the Engineer. Seed mixtures may be sown together provided they are kept in a thoroughly mixed condition during the seeding operation.

Seed shall be uniformly sown by any approved mechanical method suitable for the slope and size of the areas to be seeded, preferably with a broadcast type seeder, windmill hand seeder or approved mechanical power drawn seed drills. Hydro-seeding and hydro-mulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder for seedings at the proper rate before seeding operations are started and to maintain their adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.

Immediately after sowing, the seeds shall be covered and compacted to a depth of ⅛ to ⅜ of an inch by a cultipacker or suitable roller.

Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

### 3.05 MULCHING

All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and the air to

circulate and, at the same time, shade the grounds, reduce erosion and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.

One of the following mulches shall be spread evenly over the seeded areas at the following application rates:

Mulch Type	Coverage
Wood cellulose fiber	1,400 pounds per acre
Straw	4,000 pounds per acre
Stalks	4,000 pounds per acre

These rates may be adjusted at the discretion of the Engineer at no additional cost to the Owner, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

The Contractor shall cover structures, poles, fence and appurtenances if the mulch binder is applied in such a way that it would come in contact with or discolor the structures. Mulch and binder shall be applied by suitable blowing equipment at closely controlled application rates in a manner acceptable to the Engineer.

### 3.06 WATERING

The Contractor shall be responsible for maintaining the proper moisture content of the soil to insure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain adequate water content in the soil.

Watering shall be accomplished by hoses, tank truck or sprinklers in such a way to prevent erosion, excessive runoff and overwatered spots.

### 3.07 MAINTENANCE

Upon completion of seeding operations, the Contractor shall clear the area of all equipment, debris and excess material and the premises shall be left in a neat and orderly condition.

The Contractor shall maintain all seeded areas without additional payment until final acceptance of the work by the Owner, and any regrading, refertilizing, reliming, reseeding, remulching or mowing shall be done at Contractor's own expense. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is accomplished. Damage resulting from erosion, gulleys, washouts or other causes shall be repaired by filling with topsoil, compacting and repeating the seeding work at the Contractor's expense. Maintenance shall include mowing grass, if needed.

Contractor's guarantee of 1 year shall also cover a fully rooted stand of grass.

TABLE 1  
SEEDING REQUIREMENTS  
*Seeding Schedule for Areas in the Upper State of South Carolina*  
PERMANENT VEGETATION SCHEDULE (PER ACRE)

From March 15 To August 14		From August 15 To March 14	
23 Lbs	Common Bermuda (Hulled)	50 Lbs	Kentucky 31 Fescue
10 Lbs	Weeping Lovegrass	30 Lbs	Common Bermuda (Hulled)
50 Lbs	Sericea Lespedeza (Scarified)	10 Lbs	Weeping Lovegrass
50 Lbs	Kentucky 31 Fescue	80 Lbs	Sericea Lespedeza (Scarified)
		20 Lbs	Reseeding Crimson Clover
		20 Lbs	Rye Grain

TEMPORARY VEGETATION SCHEDULE (PER ACRE)

Annual Sudan Grass (Sweet or Tiff)	40 Lbs	April 1 – August 15
Brown Top Millet	50 Lbs	April 1 – August 15
Rye Grain	55 Lbs	August 16 – March 31

- i. If hydroseeded, use 13 pounds per 1,000 square feet of low salt formulation of 19-19-19 instead of 10-10-10 to give long term fertilization benefits.
- ii. Liquid lime is not a substitute for agricultural lime. A few gallons of liquid lime raises soil pH one point, but this effect is very temporary – usually 45 to 50 weeks. Liquid lime may be used with agricultural lime to give quick results together with the long term benefits of agricultural lime.
- iii. Grain straw mulch is the most important ingredient in these seeding recommendations and is 90% of the reason for success. Paper and other synthetic mulches may be substituted for grain straw when a hydroseeder is used, but not on steep areas, areas with concentrated water runoff, or on deep sandy soils. (All slopes steeper than 2:1 must be hydroseeded and mulched with grain straw using an approved anchoring method such as glue tackifier or tractor and straight disk harrow.)
- iv. Around office buildings and within subdivisions use 4 to 6 ounces of centipede seed per 1000 square feet.
- v. Growth of rye grain must be mowed in early spring to encourage growth of permanent grasses (Bermuda and Centipede grass).

\*\*END OF SECTION\*\*



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DIVISION 3

CONCRETE

<u>Section</u>	<u>Title</u>
03340	Flowable Fill
03481	Precast Concrete Vaults

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SECTION 03340

FLOWABLE FILL

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies flowable fill which consists of furnishing all material, mixing and transporting equipment, and performing all labor for the proportioning, mixing, transporting, and placement as indicated.

1.02 QUALITY ASSURANCE

A. QUALITY CONTROL BY CONTRACTOR:

To demonstrate conformance with the specified requirements for flowable fill, the Contractor shall provide the services of an independent testing laboratory which complies with the requirements of ASTM E329. Costs of testing laboratory services shall be borne by the Contractor.

B. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM C31	Standard Method of Making and Curing Concrete Test Specimens in the Field
ASTM C33	Concrete Aggregates
ASTM C39	Standard Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C150	Portland Cement
ASTM C172	Sampling Fresh Concrete

## 1.03 SUBMITTALS

1. Reports of flowable fill mix designs shall be provided in accordance with Section 01300.
2. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. ***Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.***

## PART 2 – PRODUCTS

### 2.01 MATERIALS

#### A. CEMENT:

Portland cement shall be ASTM C150, Type I or Type II.

#### B. AGGREGATES:

1. GENERAL: Aggregates shall conform to ASTM C33. Aggregates shall be tested in accordance with ASTM C136. Aggregates shall be nonreactive and shall be washed before use. Aggregate shall be fine aggregate.

When sources of aggregates are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing concrete work.

2. FINE AGGREGATE: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine. Gradation shall conform to ASTM C33.

C. WATER:

Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalies, and organic materials.

2.02 FLOWABLE FILL CHARACTERISTICS

A. MIX PROPORTIONING:

Flowable fill shall be composed of specified cement, fine aggregates and water proportioned and mixed to produce a fill material flowable not requiring the need to dump, lift, spread or tamp. Strength shall be a minimum of 50 psi and a maximum of 150 psi.

PART 3 – EXECUTION

3.01 GENERAL

Flowable fill shall be truck-mixed. Materials shall be proportioned by weighing. The Contractor shall be responsible for producing concrete of the specified characteristics.

Flowable fill shall be delivered to the site of work, and discharge shall be completed within 1-1/2 hours after introduction of the water to the mixture.

3.02 INSTALLATION

Flowable fill shall be installed as indicated in Contract Drawings.

**\*\*END OF SECTION\*\***

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## SECTION 03481

### PRECAST CONCRETE VAULTS

#### PART 1 GENERAL

##### 1.01. SECTION INCLUDES

- A. Factory design and manufacture of precast concrete vault sections and accessories.
- B. Quality assurance and control.
- C. Field installation of vaults.
- D. Waterproofing [and epoxy coating] of vaults.
- E. Installation of frames, hatches, and fall protection.
- F. Ladders and safety devices.
- G. Vault schedule.

##### 1.02. REFERENCES

- A. American Concrete Institute
  - ACI 301** Specifications for Structural Concrete Buildings
  - ACI 315** Details and Detailing of Concrete Reinforcement
  - ACI 315R** Manual of Engineering and Placing Drawings for Reinforced Concrete Structures
  - ACI 318** Building Code Requirements for Structural Concrete
  - ACI 350** Environmental Engineering Concrete Structures]
- B. American Society for Testing and Materials
  - ASTM C150** Portland Cement
  - ASTM C207** Hydrated Lime for Masonry Purposes
  - ASTM C478** Precast Reinforced Manhole Sections
  - ASTM C913** Precast Concrete, Water, and Wastewater Structures



C. Concrete Reinforcing Steel Institute

CRSI 63 Recommended Practice for Placing Reinforcing Bars

1.03. DESIGN

- A. All vaults shall be designed by a licensed professional engineer registered in the State of South Carolina, and engaged by the manufacturer. All dead loads, live loads, flotation, erection, temperature and anchorage stresses shall be considered.
- B. The calculations and drawings shall be prepared in a neat and legible manner, sealed by the licensed Professional Engineer performing the calculations.
- C. The sealed calculations shall include a summary page to list all design loads, material specifications, and design criterion used in the calculations.
- D. For design, groundwater shall be assumed based on Geotechnical Engineering Report: *Terracon Consultants, #86445008, 2014* and the design shall provide for a 1.5 percent factor of safety against floatation.
- E. Vaults shall be designed for H-20 wheel load on top slab, hatches, and surcharge loading at grade around all sides of the vault.

1.04. SUBMITTALS

- A. Submit evidence that shows current PCI, NPCA, and/or SCDOT certification.
- B. Submit shop drawings of wall sections and bases proposed for this project, include joint design and related details for field assembly as applicable.
- C. Submit certification of conformance with Contract Documents and ASTM C478, C913.
- D. Submit catalog cut and installation details for cast iron manhole covers, aluminum hatches with fall protection grates, and ladders with safety devices
- E. Submit catalog cut for epoxy coating system used at interior surfaces and waterproofing system used on exterior surfaces.
- F. Under a separate submittal, provide two file copies of calculations for each vault indicating all loads and load combinations. Other than the summary page, calculations will not be reviewed; calculations will not be returned to Contractor.

## 1.05. QUALITY ASSURANCE

- A. Manufacturer shall be a PCI, NPCA, and/or SCDOT-certified plant for production of precast vaults as specified herein.
- B. Aggregate used in producing concrete shall be from SCDOT approved sources.

## 1.06. QUALITY CONTROL INSPECTION

- A. The quality of all materials, the process of manufacture and the finished sections shall be subject to inspection by Engineer. Such inspection may be made at the place of manufacture and/or at the Site after delivery.
- B. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close-textured and free of honeycomb, cracks, roughness, exposure of reinforcement, damaged joints, or other irregularities.
- C. All sections which have been damaged after delivery will be rejected, or if already installed, shall be repaired or removed and replaced entirely at Contractor's expense.
- D. Rejected sections shall be tagged as such, segregated from other sections, and removed from the Site.

## PART 2 PRODUCTS

### 2.01. CONCRETE

- A. Minimum 28-Day Compressive Strength - 4500 psi.

### 2.02. REINFORCEMENT

- A. Reference Section 03200.

### 2.03. PRECAST OR CAST-IN-PLACE CONCRETE BASES

- A. Design and manufacture of precast concrete bases shall conform to the requirements of this section and ASTM C478, C913. Cast-in-place concrete bases shall conform to Section 03100 and Section 03300.
- B. Bases shall conform to the dimensions indicated on the Drawings or as required by design. The horizontal joint at the top of the base shall be compatible with that of the precast wall section.

- C. Sumps shall be field constructed where shown on the Drawings. Walking surfaces shall be sloped to the sump, have a non-slip broom finish, and be sealed with a penetrating concrete sealer. Minimum concrete fill thickness at sumps shall be two inches.

#### 2.04. PRECAST CONCRETE WALLS

- A. Design and manufacture of precast concrete walls shall conform to the requirements of this section and ASTM C478, C913.
- B. All tongue-and-groove joints in the precast wall, including the joint at the top of the base, shall be made up using gaskets.
- C. The precast sections shall be provided with a special groove to receive and hold the gasket in position during joint assembly.
- D. After joint assembly, the gap between sections shall be packed on the inside and outside with “Masterflow 713” by Master Builder; “Five Star Grout” by U.S. Grout Corp.; or equal, and shall be troweled smooth so that no projections remain on the inside. There shall be concrete to concrete bearing between the various sections. The gasket shall not support the weight of the section.

#### 2.05. PRECAST CONCRETE SLAB TOPS

- A. Precast reinforced concrete slab tops shall be manufactured in accordance with ASTM C478, C913. Openings and frames shall be provided for hatches where shown on the Drawings. Slab tops shall be set in a full bed of mortar.
- B. Slab tops shall be crowned or sloped to drain, minimum 1/4 inch per foot.
- C. Concrete slab tops shall receive a non-slip broom finish and a penetrating concrete sealer per Section 03300.

#### 2.06. PIPE SEALS

- A. Where polyethylene, plastic or PVC pipe is utilized, connections between vault and pipes shall be made with flexible rubber sleeves with stainless steel straps and bolts. Provide an elastomeric waterstop gasket where sleeve sizes are not commercially available.
- B. The annular space around the pipe wall or sleeve shall be packed with “Masterflow 713” by Master Builders, “Five Star Grout” by U.S. Grout Corp.; or equal. Before the grout has set, Contractor shall recheck invert elevations of the pipe.
- C. For steel or ductile iron pipe, provide a pipe sleeve sized to accept the pipe plus a modular mechanical seal such as Link Seal or equal.

## 2.07. HATCHES

- A. Hatches shall be of the size and type shown on the Drawings and as described herein.
1. Aluminum single leaf, watertight gasketed floor hatch. Floor hatch shall be furnished with flush stainless steel hinges, aluminum stiffeners, and lockable slam latch. Hatches shall have extended aluminum frame to match concrete thickness with continuous anchor and shall be constructed of 1/4-inch minimum aluminum diamond pattern plate design.
  2. Hatches shall be provided with an auto-lock, hold-open device and torsion spring assembly. All hardware, including all parts of the latch and lifting mechanism assemblies, hold-open arms and guides, and all brackets, hinges, pins and fasteners shall be stainless steel or bronze.
  3. The hatches shall be designed for an H-20 wheel load. A 1-inch drain coupling shall be provided in hatch frame. Contractor to extend drain to exterior of structure or to sump pit at vaults intended to remain dry.
  4. At all hatches, provide a hinged aluminum grate fall-through protection system.
  5. Aluminum hatches shall be Bilco "PCM" or as manufactured by Washington Aluminum Company or equal.

## 2.08. LADDER

- A. Where shown on Drawings, provide ladder rungs made of cast iron or polypropylene with steel reinforcement. Rungs shall be either cast in place or drilled and adhesive grouted in the shop. Rungs are equally spaced at a maximum 12-inch spacing from the top of the base slab to the top of the top slab.
- B. Install ladder rungs so that the distance from the rungs to the finished wall is 7 inches.
- C. Provide stainless steel ladder access safety post by Bilco, U.S.F. Fabrications, or equal.

## 2.09. OPENINGS AND INSERTS

- A. All openings required in the concrete shall be reinforced with additional diagonal bars tied to each layer of wall or slab reinforcement.
- B. Any required pipe sleeves, inserts, and wall openings shall be coordinated with mechanical requirements prior to casting the units.

## 2.10. WATERPROOFING

- A. Around the exterior of all wall joints, apply the “Bituthene” primer and membrane waterproofing system by W.R. Grace Company, or equal.
- B. Exterior wall surfaces shall be waterproofed using manufacturer’s standard two-coat system, specifically designed to waterproof the exterior of concrete surfaces in a below-grade submerged condition.
- C. For the top slab and above-grade exposed side walls, the concrete shall be sealed with two coats of a penetrating concrete slab sealer.

## 2.11. EPOXY COATING

- A. The interior surface of the wet well shall receive a factory applied epoxy coating. Apply at wall surfaces (full height) and ceiling.
- B. Surfaces shall be abrasive blasted and allowed to cure a minimum of 28 days prior to application of epoxy coating system. Follow manufacture’s instructions for primer, application temperatures, etc. Use Sika Corporation “Sikagard 62”, Euclid Chemical Company “Duraltex 1707”, or equal.

## PART 3 EXECUTION

### 3.01. EXAMINATION

- A. Verify that subgrade elevations for vault base is correct, excavation is dewatered, and subgrade is pre-compacted.
- B. Verify that rejected units have been removed from Site.

### 3.02. PREPARATION

- A. Provide foundation mat of run-of-crusher stone to support base. Mat shall be 6 inches minimum depth and shall bear on sound undisturbed earth; excavate and remove subgrade material as necessary to reach sound subgrade.
- B. Stone foundation mat shall be a minimum of 1 foot greater than the footprint of the vault base, and shall be compacted to a uniform, level surface.

### 3.03. INSTALLATION

- A. Vault shall be accurately located and uniformly supported on the foundation mat in a level position.

- B. Install wall sections in properly oriented position; follow manufacturer's instructions for joining together each section using the gaskets. Pack joints with grout.
- C. Units shall be laid-up plumb and level.
- D. Contractor is responsible for the integrity of all materials and protection against flotation during the installation and backfilling process.

#### 3.04. COATINGS

- A. All exterior below-grade wall joints shall be sealed using a membrane waterproofing system. Next, all below-grade wall surfaces shall be waterproofed, applied per manufacturer's instructions.
- B. After installation is complete, the cover slab and interior walking surfaces shall be sealed as specified above.
- C. After installation of mechanical equipment, provide touch-up painting of damaged epoxy wall finish.

#### 3.05. BACKFILLING

- A. Backfill using well compacted structural fill material, being careful to not damage exterior waterproof coating while providing full support under connecting pipes using compacted bedding material.
- B. During the one year warranty period, all visible leaks shall be sealed in an approved manner.

**\*\*END OF SECTION\*\***

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