

**CONTRACT DOCUMENTS  
AND  
TECHNICAL SPECIFICATIONS**

**FOR  
290-GPM OAKS ROAD PUMP STATION  
ALONG OAKS ROAD IN  
CLARENDON COUNTY, SOUTH CAROLINA**

**FOR  
CLARENDON COUNTY  
IN CLARENDON COUNTY, SOUTH CAROLINA**



**ALLIANCE CONSULTING ENGINEERS, INC.  
PROJECT NO. 24110-0014**

**March 2025**

**BID DOCUMENTS**

CONTRACTOR:

ADDRESS:

CONTRACTOR'S LICENSE NUMBER:



Alliance Consulting Engineers, Inc.  
124 Verdae Boulevard, Bonaventure II, Suite 505  
Greenville, SC 29607-3843  
(803) 284-1740 • (803) 284-1740 fax  
[www.AllianceCE.com](http://www.AllianceCE.com)  
Contact: Adam Hogan, P.E.

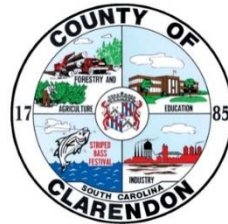


**GENERAL, CIVIL, PROCESS, ELECTRICAL  
AND ALL OTHER DIVISIONS**

**CONTRACT DOCUMENTS  
AND  
TECHNICAL SPECIFICATIONS  
FOR**

**290-GPM OAKS ROAD PUMP STATION  
ALONG OAKS ROAD IN  
CLARENDON COUNTY, SOUTH CAROLINA**

**FOR  
CLARENDON COUNTY  
IN CLARENDON COUNTY, SOUTH CAROLINA**



**Prepared For:**  
Clarendon County  
411 Sunset Drive  
Manning, South Carolina 29102



**Prepared By:**  
Alliance Consulting Engineers, Inc.  
124 Verdae Boulevard, Bonaventure II, Suite 505  
Greenville, South Carolina 29607-3843

Project No. 24110-0014

**SECTION 00 01 10**

**TABLE OF CONTENTS**

**290-GPM OAKS ROAD PUMP STATION  
ALONG OAKS ROAD IN  
CLARENDON COUNTY, SOUTH CAROLINA**

**FOR CLARENDON COUNTY**

**PROJECT NO. 24110-0014  
March 2025**

---

**DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS**

00 01 01	Project Title and Seals Page
00 01 10	Table of Contents
00 01 15	Drawings Index
00 11 13	Advertisement for Bids
00 21 13	Instructions to Bidders
00 31 43	Permits Obtained and Required
00 41 00	Bid Form
00 43 00	Bid Bond
00 45 13	Bidder's Qualifications Statement
00 45 36	EEO Contract Compliance Notices
00 51 02	Notice of Award
00 52 00	Contract
00 55 00	Notice to Proceed
00 61 13.13	Performance Bond
00 61 13.16	Payment Bond
00 62 76	Contractor's Application for Payment
00 63 36	Field Order
00 63 49	Work Change Directive
00 63 63	Change Order
00 65 16	Certificate of Substantial Completion
00 65 19.13	Contractor's Affidavit
00 70 00	Standard General Conditions of the Construction Contract
00 73 00	Supplementary Conditions

**DIVISION 01 – GENERAL REQUIREMENTS**

01 06 00	Regulatory Requirements
01 23 00	Bid Alternates and Substitutes
01 30 00	Administrative Requirements
01 31 00	Construction Schedules
01 32 00	Project Construction Sequence and Provisions
01 40 00	Quality Requirements
01 41 26	Permits and Rights-of-Way
01 42 19	Reference Standards
01 45 29	Testing Laboratory Services
01 50 00	Temporary Facilities and Controls
01 55 10	Vehicular Access and Parking
01 60 00	Product Requirements
01 61 00	General Equipment Requirements
01 70 00	Execution Requirements
01 71 23	Field Engineering
01 75 16	Start-up Requirements

01 78 00 Closeout Submittals

**DIVISION 03 – CONCRETE**

03 40 00 Precast Concrete  
03 48 10 Precast Concrete Manholes

**DIVISION 05 – METALS**

05 53 10 Aluminum Hatches

**DIVISION 09 – FINISHES**

09 97 23.12 Epoxy Lining for Wetwell and Manhole Interiors

**DIVISION 26 – ELECTRICAL**

26 05 00 Electrical, General  
26 05 43 Underground Electrical Work  
26 20 00 Wiring System  
26 32 13 Emergency Power System  
26 43 13 Surge Protection Devices  
26 51 00 Lighting System

**DIVISION 31 – EARTHWORK**

31 00 00 Earthwork  
31 10 00 Site Preparation  
31 11 00 Clearing and Grubbing  
31 23 16 Excavation  
31 23 16.13 Trenching for Site Utilities  
31 23 23.13 Backfill and Compaction  
31 25 00 Erosion and Sedimentation Controls  
31 50 00 Excavation Support and Protection

**DIVISION 32 – EXTERIOR IMPROVEMENTS**

32 11 23 Aggregate Base Course  
32 12 16 Asphalt Paving  
32 92 00 Turf and Grasses

**DIVISION 33 – UTILITIES**

33 01 30.13 Acceptance Testing for Sanitary Sewers  
33 05 13 Manholes and Structures  
33 05 23.16 Jack and Bore Crossings  
33 05 40 Casing Pipes for Utilities  
33 11 00.11 Polyvinyl Chloride (PVC) Pipe  
33 11 00.15 Ductile Iron Pipe & Fittings  
33 31 00.11 Gravity Sanitary Sewers  
33 32 19 WW Pump Station  
33 34 00 Sanitary Utility Sewerage Force Mains  
33 39 13 Sanitary Utility Sewerage Manholes, Frames and Grates

**END OF SECTION**

**SECTION 00 01 15**

**DRAWINGS INDEX**

290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina (Project No. 24110-0014, dated August 2024 for all drawing sections).

<b><u>TITLE</u></b>	<b><u>SHEET NO.</u></b>
Cover Sheet	
Overall Site Plan & General Notes	C-1.0
Pump Station Site Plan	C-2.0
Pump Station Grading Plan	C-3.0
Pump Station Details	C-4.0 – C-4.2
Wastewater Plan and Profiles	C-5.0 – C-5.1
Erosion Control Details	C-6.0 – C-6.1
Wastewater Construction Details	C-7.0 – C-7.1
SCDOT Traffic Control Details	C-8.0
SCDOT Driveway Details	C-8.1
Electrical Plans and Details	E001 – E102

**END OF SECTION**

**SECTION 00 11 13**

**ADVERTISEMENT FOR BIDS**

**Owner:** Clarendon County

**Alliance Consulting Engineers, Inc. Project No.:** 24110-0014

Separate sealed bids for construction of the 290-GPM Oaks Road Pump Station along Oaks Road for Clarendon County will be received by the Clarendon County Procurement Office, 3 South Church Street, Manning, South Carolina until **2:00 PM (Local Time) on Thursday April 10, 2025**, and then publicly opened and read aloud at said location. Oral statements may not be relied upon and will not be binding or legally effective. The deadline for submitting questions is **5:00 PM (Local Time) on Monday March 31, 2025**.

Sealed BIDS may be mailed to:

Attention: Jeffrey A. Hyde, Procurement Director  
Clarendon County Procurement Office  
3 South Church Street  
Manning, South Carolina 29102

Or, Sealed BIDS may be hand delivered to:

Attention: Jeffrey A. Hyde, Procurement Director  
Clarendon County Procurement Office  
3 South Church Street  
Manning, South Carolina 29102

This project consists of providing all required materials to complete the construction of the new 290-GPM Oaks Road Pump Station. Generally, the project includes the construction of a new 290-GPM Pump Station at an existing easement within the Willow Oaks Hunting LLC Property (TMS # 062-00-00-014-00) including site work and grading, precast structures, pumps, piping, electrical, and all associated work. Specific details are included within the Construction Plans and Technical Specifications.

The Instructions to Bidders, Bid Form, Contract, Plans, Specifications, Bid Bond, Performance Bond, Payment Bond and other Contract Documents may be examined at the following locations:

Clarendon County Procurement Office: 3 South Church Street, Manning, South Carolina 29102

iSqFt Planroom Partnership Offices: Columbia, SC, Greenville, SC, Charleston, SC, Charlotte, NC, and Raleigh, NC (via scanned Images to FTP Site).

Dodge Plan Rooms: Columbia, SC, Charleston, SC, Charlotte, NC, and Atlanta, GA (via scanned Images to FTP Site).

Engineers: Alliance Consulting Engineers, Inc., 1201 Main Street, Suite 2020, Columbia, SC 29201-3297

Drawings, Specifications, and Contract Documents may be obtained from the office of Alliance Consulting Engineers, Inc., Post Office Box 8147, Columbia, South Carolina 29202-8147 upon a non-refundable payment of **\$250** for each set. When requesting drawings, specifications or contract documents, provide the following information about your company: Mailing address; street (FedEx) address; telephone number; FAX number (if applicable) and email address to Ms. Wendy Culley at [wculley@allianceCE.com](mailto:wculley@allianceCE.com) and Ms. Sarah Horn at [shorn@allianceCE.com](mailto:shorn@allianceCE.com).

Bidders must deposit security with all bids. Security shall be in the form of a certified check or bid bond made payable to the Owner, and shall be for an amount equal to not less than five percent (5%) of the amount of the bid. Provisions of the security shall be as described in the Information for Bidders.

No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Contractor's Licensing Law (SC Code of Laws as amended in 1999, Chapter 11, Sections 40-11-10 through 40-11-428).

NOTICE TO BIDDERS: Each bidder shall fully acquaint themselves with the conditions relating to the scope and restrictions attending the execution of the work under the conditions of this Bid. The failure or omission of a bidder to acquaint themselves with existing conditions shall in no way relieve them of any obligation with respect to this Bid or to the contract. All amendments to and interpretations of this solicitation shall be in writing and issued by Alliance Consulting Engineers, Inc. Neither Clarendon County nor Alliance Consulting Engineers, Inc. shall be legally bound by any amendment or interpretation that is not in writing.

Contractors shall have a South Carolina Contractor License Classification of WP. The Group Limitation shall be Group 4 or above.

No bidder may withdraw the bid within sixty (60) days after the actual date of the opening and thereof.

The Owner reserves the right to waive any informality or to reject any or all bids. Clarendon County reserves the right to accept or reject any, all or any part of bids received as a result of this request, to waive any informalities or to cancel in part or in its entirety this request, if it is in its best interest to do so. Clarendon County will be sole judge as to whether bids submitted meet all requirements. All bids submitted shall become the property of Clarendon County. This solicitation does not commit Clarendon County to award a contract, to pay any cost incurred in the preparation of bids or to procure or contract for goods or services. Clarendon County is an Equal Opportunity Employer.

ENGINEERS

Alliance Consulting Engineers, Inc.  
Post Office Box 8147  
Columbia, South Carolina 29202-8147 and  
124 Verdae Boulevard, Suite 505  
Greenville, South Carolina 29607-3843 (Physical)

OWNER

Clarendon County  
411 Sunset Drive  
Manning, South Carolina 29102



**SECTION 00 21 13**

**INSTRUCTIONS TO BIDDERS**

**TABLE OF CONTENTS**

ARTICLE 1 - DEFINED TERMS..... 2

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS ..... 2

ARTICLE 3 - QUALIFICATIONS OF BIDDERS ..... 2

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE ..... 2

ARTICLE 5 - PRE-BID CONFERENCE ..... 4

ARTICLE 6 - SITE AND OTHER AREAS ..... 4

ARTICLE 7 - INTERPRETATIONS AND ADDENDA ..... 4

ARTICLE 8 - BID SECURITY ..... 5

ARTICLE 9 - CONTRACT TIMES ..... 5

ARTICLE 10 - LIQUIDATED DAMAGES ..... 5

ARTICLE 11 - SUBSTITUTE AND “OR-EQUAL” ITEMS..... 5

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS ..... 6

ARTICLE 13 - PREPARATION OF BID ..... 6

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS ..... 7

ARTICLE 15 - SUBMITTAL OF BID..... 7

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID ..... 8

ARTICLE 17 - OPENING OF BIDS ..... 8

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE ..... 8

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT ..... 8

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE..... 9

ARTICLE 21 - SIGNING OF AGREEMENT..... 9

ARTICLE 22 - SALES AND USE TAXES ..... 9

ARTICLE 23 - CONTRACTS TO BE ASSIGNED ..... 9

ARTICLE 24 - WAGE RATE REQUIREMENTS..... 9

**ARTICLE 1 - DEFINED TERMS**

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. Issuing Office - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

## **ARTICLE 2 - COPIES OF BIDDING DOCUMENTS**

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from Alliance Consulting Engineers, Inc., 1201 Main Street, Suite 2020, Columbia, SC 29201. The deposit will be nonrefundable and a FedEx account number must be provided for FedEx delivery of Plan Sets.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

## **ARTICLE 3 - QUALIFICATIONS OF BIDDERS**

- 3.01 To demonstrate Bidder's qualifications to perform the Work, within five (5) days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, and present commitments.

## **ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE**

- 4.01 Subsurface and Physical Conditions
- A. The General Conditions identify:
1. The reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.
  2. The drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in Paragraph 4.01.A are included herein. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.
- 4.02 Underground Facilities
- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

- A. The General Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.
- B. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates. Engineer and Owner shall be notified prior to any site visits.

4.06 Reference is made to Article 7 of the General Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

- A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda.
- B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in Paragraph 4.06 of the General Conditions.
- E. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which

may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

- F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
  - G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
  - H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
  - I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder.
  - J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

#### **ARTICLE 5 – PRE-BID CONFERENCE – NONE – INTENTIONALLY OMITTED**

#### **ARTICLE 6 - SITE AND OTHER AREAS**

- 6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional land and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

#### **ARTICLE 7 - INTERPRETATIONS AND ADDENDA**

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than seven (7) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

#### **ARTICLE 8 - BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Agreement or sixty-one (61) days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven (7) days after the Bid opening.

#### **ARTICLE 9 - CONTRACT TIMES**

- 9.01 The time allotted for completion of the 290-GPM Oaks Road Pump Station, including alternate(s) approved by the Owner and the Engineer is as follows:
- Substantial Completion: 180 calendar days after the Notice to Proceed has been issued.  
Final Payment: 240 calendar days after the Notice to Proceed has been issued.

#### **ARTICLE 10 - LIQUIDATED DAMAGES**

- 10.01 Provisions for liquidated damages are set forth in the Agreement

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

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for the receipt of Bids. No items of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

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

- 12.01 If the General Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (5) days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, without an increase in Bid.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.
- 12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 6.06.

## **ARTICLE 13 - PREPARATION OF BID**

- 13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.
- 13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president, vice-president, or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 13.08 All names shall be typed or printed in ink below the signatures.

- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 The postal address and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

#### **ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS**

##### 14.02 Lump Sum

- A. Bidder shall submit a Bid on a lump sum basis for the Base Bid and include a separate price for each alternate (if applicable) described in the Bidding Documents as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the Base Bid if Owner selects the alternate. In the comparison of Bids, alternates will be applied in the same order as in the Bid Form. Lump Sum bid project require that the apparent low three (3) bidders provide a Schedule of Values per the requirements in Section 00 62 73 within seven (7) days after the bid opening.
- B. Discrepancies between words and figures will be resolved in favor of the words.

##### 14.03 Allowances

- A. For Cash Allowances the Base Bid Price shall include such amounts as the Bidder deems proper for the Contractor's overhead, cost, profit and other expenses on account of cash allowances, if any, named in the Contract Documents as provided in paragraph 11.02 of the General Conditions.

- 14.04 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

#### **ARTICLE 15 - SUBMITTAL OF BID**

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one (1) separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with all the attachments outlined in Article 7 of the Bid Form.
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED". When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

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

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

- 16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the work. The provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the bid.

#### **ARTICLE 17 - OPENING OF BIDS**

- 17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids in the form of a Bid Tabulation and Bid Comparison. The Bid Opening Minutes will also be provided to all in attendance.

#### **ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

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

#### **ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the General Conditions.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered. If detailed in the bid form, factors such as discounts, transportation costs, and life cycle costs may be used to determine which bidder, if any, is to be offered award.
- 19.07 The Owner reserves the right not to Award the Project.

#### **ARTICLE 20 - CONTRACT SECURITY AND INSURANCE**



20.01 Article 5 of the General Conditions sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

**ARTICLE 21 - SIGNING OF AGREEMENT**

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within 10 days thereafter, Owner shall deliver one (1) fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

**ARTICLE 22 - SALES AND USE TAXES - INTENTIONALLY OMITTED**

**ARTICLE 23 - CONTRACTS TO BE ASSIGNED - INTENTIONALLY OMITTED**

**ARTICLE 24 - WAGE RATE REQUIREMENTS - INTENTIONALLY OMITTED**

**END OF SECTION**

**SECTION 00 31 43  
PERMITS OBTAINED AND REQUIRED**

**FOR**

**290-GPM OAKS ROAD PUMP STATION  
ALONG OAKS ROAD**

**FOR  
CLARENDON COUNTY**

**PROJECT NO. 24110-0014  
March 2025**

---

- 1.0 Work included: This section outlines the requirements of the Contractor for the payment for any fees and the acquisition of any required licenses, building permits, rights-of-ways, easements, etc., that may be required for the construction of the project.
- 2.0 Contractor is to fully comply and provide required notifications for all referenced permits.
- 3.0 Clarendon County has obtained permits related to the 290-GPM Oaks Road Pump Station. Those Permits obtained, attached to this section are listed as follows:
1. The South Carolina Department of Environmental Services (SCDES) Non-Coastal Stormwater Less Than One-Acre (LTOA) Notification Receipt issued on December 20, 2024
  2. The South Carolina Department of Transportation (SCDOT) Utility Encroachment Permit (Permit No. 287743) issued on January 2, 2025.
  3. The South Carolina Department of Transportation (SCDOT) Driveway Encroachment Permit (Permit No. 290026) issued on February 25, 2025.
  4. The South Carolina Department of Environmental Services (SCDES) Wastewater Construction Permit Bureau of Water (Permit No. WW046421) issued January 24, 2025.
  5. Santee Lynches Council of Governments (SLCOG) 208 Plan Conformation Approval Issued on January 14, 2025.
- 4.0 Work not included: The Contractor shall be responsible for obtaining and providing the following permits in conjunction with final approval to build on the site.
1. Necessary Building Permits (Electrical, HVAC, etc.), if required.
  2. BUSINESS LICENSE - Verify licenses that are required to perform the work within the project area, and obtain at no additional cost to the Owner.
  3. RIGHTS-OF-WAY, UTILITY LINES
    - a. The Contractor shall confine his activities to the project limits as illustrated in the Technical Specifications, construction drawings, and contract documents.
    - b. The Owner will provide no right-of-way over other property.
  4. LAND/PROPERTY – The necessary land for construction of the proposed improvements will be provided by the Owner.

The South Carolina Department of Environmental Services (SCDES) Non-Coastal Stormwater Less Than  
One-Acre (LTOA) Notification Receipt – Cover Page

---

**We are in receipt of your Non-Coastal Stormwater Less than One-Acre (LTOA) Notification.**

**Please allow this email to serve as confirmation of the Department's receipt of the notification form. Via submittal of this form, you have complied with your obligation for notification under the S.C. Stormwater Management Regulations and your notification has been placed on file with the Department (SCDES).**

**If you are certain your site meets all LTOA program requirements, you may proceed with construction activities identified in the notification submitted to the Department. Please note that ONLY construction activities identified in your notification may be performed at your site. The operator of the activity is responsible for compliance with the plan and assuring no sediment is discharged off-site or to Waters of the State. The operator is also responsible for obtaining any additional approvals that may be necessary for the planned activity.**

**Please be aware, the Department may conduct periodic inspections of your project/site and failure to meet all applicable requirements, as defined by the Department or the respective MS4, or failure to comply resulting in discharge of sediment to Waters of the State and/or adjacent properties may subject you to applicable penalties under the S. C. Pollution Control Act.**

**If you are not certain your site meets all LTOA program requirements or if you have additional questions, do not proceed with construction activities. Please review the information on the following links and contact the Department or, if applicable, the respective MS4.**

**<http://www.scdhec.gov/Environment/WaterQuality/Stormwater/WherettoApply/>**

<http://www.scdhec.gov/environment/WaterQuality/Stormwater/lessthan1acre/>

<http://www.scdhec.gov/Environment/docs/nonCoastal-LT1A.pdf>

**If you have further questions, please call 803-898-4300 and ask for Stormwater Permitting.**

**Sincerely,**

**The Division of Dam Safety and Stormwater Permitting**

The South Carolina Department of Transportation (SCDOT) Utility Encroachment Permit – Cover Page

**SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
Encroachment Permit**

Permit No : 287743  
Permit Decision Date : 1/2/2025  
Expiration Date : 1/2/2026

Type Permit :SEWER

Location:

<u>District</u>	<u>Work County</u>	<u>Type</u>	<u>Route</u>	<u>Aux</u>	<u>Begin MP</u>	<u>End MP</u>
7	Clarendon, SC	S-	664	None	1.887	1.946

Contact Information

Applicant: ClarendonCounty

Phone: (803)433-3254

Contact: Hunter Denny

Address: 411 Sunset Drive,

City: Manning

State: SC

Zip: 29102

Comments

Approximately 4,600-FT north of the intersection of Oaks Road and Dingle Pond Road. Approximately 4,750-FT south of the intersection of Oaks Road and Whitlock Road.

Special Provisions:

9999 - See Attached for Additional Special Provisions

The South Carolina Department of Transportation (SCDOT) Driveway Encroachment Permit – Cover Page



**SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
Encroachment Permit**

Permit No : 290026  
Permit Decision Date :  
2/25/2025  
Expiration Date : 2/25/2026

Type Permit :DRIVEWAY -  
COMMERCIAL

Location:

<u>District</u>	<u>Work County</u>	<u>Type</u>	<u>Route</u>	<u>Aux</u>	<u>Begin MP</u>	<u>End MP</u>
7	Clarendon, SC	S-	664	None	1.532	1.556

Contact Information

Applicant: ClarendonCounty Phone: (803)433-3254  
Contact: Hunter Denny  
Address: 411 Sunset Drive,  
City: Manning State: SC Zip: 29102

Comments

Approximately 50-LF of proposed driveway to connect to Oaks Road (S-664) for access to the proposed Oaks Road Pump Station. The proposed driveway will encroach onto Oaks Road (S-664) approximately 4,600-FT north of the intersection of Oaks Road and Dingle Pond Road (S-400) and approximately 4,750-FT south of the intersection of Oaks Road and Whitlock Road.

Special Provisions:

0004 - SCDOT SHALL BE NOTIFIED WHEN WORK DEFINED IN THE PERMIT STARTS AS WELL AS WHEN THE WORK IS COMPLETED. REFERENCE SHALL BE MADE BY PERMIT NUMBER.

0005 - APPLICANT SHALL PROVIDE TO THE DEPARTMENT THE OPPORTUNITY OF ATTENDING ANY PRE-CONSTRUCTION MEETING PRIOR TO THE BEGINNING OF WORK.

0301 - THE DITCHES AND/OR SHOULDERS DISTURBED DURING THE INSTALLATION SHALL BE RE-ESTABLISHED TO PROPER GRADE, ORIGINAL CROSS SECTION, STABILIZED, AND ALL DRAIN PIPES CLEARED.

0303 - THE ENTIRE DISTURBED AREA SHALL BE TOP-SOILED USING 3" OF SELECTED MATERIAL AND RE-GRASSED TO SCDOT SPECIFICATIONS.

0304 - PAVEMENT MARKINGS ALTERED DURING THIS INSTALLATION SHALL BE RESTORED BY THE APPLICANT.

0306 - TRAFFIC CONTROL, LIGHTS, SIGNS AND FLAG-MEN WILL BE FURNISHED BY APPLICANT AND WILL CONFORM TO PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

0310 - FIELD CHANGES, IF NECESSARY, MUST BE APPROVED IN WRITING BEFORE

ACTUAL CONSTRUCTION OF PROPOSED CHANGES.

0311 - SEDIMENT AND EROSION CONTROL DEVICES SHALL BE USED TO MINIMIZE THE MOVEMENT OF SEDIMENT.

0312 - THE PERMITTEE SHALL HOLD THE DEPARTMENT HARMLESS FOR DAMAGES TO BOTH UPSTREAM AND DOWNSTREAM PROPERTIES.

9999 - See Attached for Additional Special Provisions

**Additional Special Provisions**  
**Application #200147350 -- Permit #290026**

- **Prior to commencement of work, the permittee will have a pre-construction conference with all appropriate parties to discuss the project requirements. Items to be discussed and forwarded to SCDOT shall include at a minimum:**
  - **Work schedule that shows the start and end dates for work within SCDOT rights-of-way.**
  - **Contact list that include names and phone numbers of Permittee and Superintendent in charge of daily activities.**
- **The Permittee shall contact the County Permit Manager, David Casselman, with the local SCDOT Maintenance Office at [casselmaCD@scdot.org](mailto:casselmaCD@scdot.org) or call (803) 435-4431 before any work begins within SCDOT Right-of-Way.**
- **Any review of information associated with the application for this Application by the South Carolina Department of Transportation (SCDOT) is completed for conformance with generally accepted policies and standards. The SCDOT reviews do not in any way absolve the Permittee of the responsibility for providing complete and accurate construction documents and practicing proper construction practices. Review and subsequent approval of this Application by the SCDOT does not establish any liability by the Department for errors or omissions identified at a later date. If at any time the permitted project is found to be delinquent in standard or performance the Permittee will be responsible for taking all necessary steps to correct issues to the satisfaction of the SCDOT.**
- Reference shall be made by permit number.
- SCDOT is to be notified 24 hours in advance prior to any construction activities within the state right-of-way.
- Except as may otherwise be specified on the plans or in the special provisions, all materials and workmanship within the South Carolina Department of Transportation right-of-way shall conform to the SCDOT Standard Specifications for Highway Construction (latest edition), SCDOT's Standard Drawings for Highway Construction (latest edition), and the latest Traffic Signal Special Provisions and Specifications for Traffic Signal Installation.
- Permittee will provide competent project management staff and SCDOT certified inspection staff that have authority to make decisions on site during construction.
- Permittee will provide competent CEPSCI certified inspector to perform weekly Erosion Control Inspections as required.
- The permittee will follow the latest SCDOT materials testing and sampling requirements as set forth in the SCDOT Construction Manual <https://www.scdot.org/business/scdot-construction-manual.aspx> and provide SCDOT staff with copies of all testing and inspection reports during construction.

**Additional Special Provisions – Cont.**  
**Application #200147350 -- Permit #290026**

- Permittee will have certified traffic control supervisor on site during traffic control operations.
- Applicant is responsible for any changes upstream or downstream and holds the SCDOT harmless for any and all damages.
- Traffic Control is to be implemented before job starts every day
- All backfill shall be placed in 6 inch layers and compacted to 95% AASHTO using mechanical tamping equipment, requiring compaction testing in ROW
- Placement of equipment and/or materials shall not block sight distance from driveway.
- The Permittee shall be responsible for any and all damages that occur as a result of this driveway installation.
- Revisions to this permit must be requested in writing along with a revised plan. No changes shall be performed until written permission is received by the Permittee.
- Traffic control shall not be set up in poor or hazardous weather conditions (including but not limited to light/heavy rain, high winds, fog, sleet, snow, etc.) in ROW.
- All persons on foot or on or within work equipment whose duties place them on highway right-of-way and expose them to potential risks of moving roadway traffic or construction equipment shall wear high visibility safety apparel meeting the requirements of ISEA “American National Safety Standard for High-Visibility Safety Apparel,” also referred to as ANSI / ISEA 107-2004, standard performance for Class 2 or 3 risk exposure or the latest revisions. (For daytime operations, these garments shall be fabricated with a fluorescent red-orange background material.)
- SCDOT does not authorize any work outside the right-of-way without obtaining written permission from the property owner.
- Locate utilities and drainage structures in the project area prior to starting work.
- This permit shall not increase storm water runoff to the SCDOT right-of-way.
- Install and maintain erosion prevention and sediment control barriers to minimize damage to undisturbed areas.
- The Permittee shall be responsible for the immediate removal and proper disposal of traffic hazards including but not limited to mud, debris, stone, and trash that may be washed or tracked in the travel lane as result of this permit.
- Ditches and/or shoulders disturbed under this permit shall be restored to the original grade and cross section to ensure positive drainage.
- Reseed as needed all disturbed areas void of vegetation until grass is sufficient to stop erosion.
- Monitor restored areas through and after construction including but not limited to grassing, ditches, and drainage structures until final stabilization is achieved.
- Failure to comply with all the permit requirements will result in a stop work order until these issues are in compliance.
- Prior to the commencement of any digging, excavating, trenching, boring, etc., within 500 feet of a signalized intersection, the permittee will be responsible for contacting the SCDOT Traffic Signal Shop at 803-395-7188.
- Permittee is required to obtain written approval by SCDOT for any field changes affecting referenced permit prior to implementation in field.



**Additional Special Provisions – Cont.**  
**Application #200147350 -- Permit #290026**

- The SCDOT will at their discretion provide competent staff to sporadically monitor projects and review testing and inspection reports as necessary to confirm reasonable compliance.
- Permittee is required to follow all SCDOT Department Safety Standards and Guidelines when working on State Roads.
- Permanent construction signs are to be placed for all construction activities on State routes unless otherwise approved by SCDOT and shall be placed in accordance with appropriate traffic control plan of the current SCDOT Standard Drawings for Road Design.
- All existing drainage structures should be cleaned upon completion of construction activities.
- Soil and debris is to be cleaned daily from roadway during construction activities.
- The existing pavement and shoulders on the established construction route(s) is to be monitored daily for any signs of distress caused by the construction operations. It will be the Permittee's responsibility to ensure pavement integrity and safe shoulders during the life of construction operations for this project.
- The Permittee agrees to make any and all repairs created by construction activities along the State Route. When pavement failures or shoulder failures/issues are detected all construction activities shall be halted until repairs of the roadway(s) are completed. Repairs must be in accordance with current SCDOT specification and shall be approved by the SCDOT. If the Permittee fails to make repairs in a timely manner, SCDOT reserves the right to shutdown construction activities until repairs are made to the satisfaction of the Department.
- The Permittee shall use a SCDOT pre-qualified contractor for all work to be completed within SCDOT's rights-of-way. The permittee's contractor shall be responsible for the Quality Control testing and sampling and material certifications as per the SCDOT Construction Manual (latest edition) and SCDOT's Standard Specifications for Highway Construction (latest edition). A preconstruction meeting shall be held with the RME or CPM prior to the commencement of work. The agenda for the preconstruction conference should include, at a minimum, the work schedule to include the start work and end work dates within SCDOT's right-of-way and a contact list of names and phone numbers of the Permittee and superintendent in charge of the daily activities. Upon completion of all work, the permittee shall contact the RME or CPM for a final inspection of the work. If the work has been completed satisfactorily, a letter of acceptance will be issued. If the work is not completed satisfactorily, a punch list will be developed noting all deficiencies. Once the deficiencies have been corrected by the permittee, a follow up inspection will be conducted for verification. Upon correction of all deficiencies and all materials are certified, a letter of acceptance will be issued.



# SCDOT ACCESS WAIVER

This form is a request for approval of waiver from the access guidelines found in SCDOT's *Access and Roadside Management Standards*. This form shall be accompanied by an Encroachment Permit Application

Submitted By: Adam Hogan, PE Date: 02/18/25

To: \_\_\_\_\_  
Resident Maintenance Engineer



## PROJECT CHARACTERISTICS

County: Clarendon City: \_\_\_\_\_

Road/Route: S-664 Description of Location: Oaks Road

Work Type: One Driveway along Oaks Road to serve the proposed Oaks Road Pump Station

Type of Terrain: (Level / Rolling / Mountainous)

Posted Speed Limit of Road: 45 (mph)

Average Daily Traffic of Road: 150

Driveway Classification:

- |  |  |                                      |                                       |
|--|--|--------------------------------------|---------------------------------------|
| <input checked="" type="checkbox"/> Low Volume | <input type="checkbox"/> Medium Volume | <input type="checkbox"/> High Volume | <input type="checkbox"/> Major Volume |
| 1-20 trips/day                                 | 21-600 trips/day                       | 601-4,000 trips/day                  | >4,000 trips/day                      |
| 1-5 trips/hour                                 | 6-60 trips/hour                        | 61-400 trips/hour                    | >400 trips/hour                       |

Site Land Use: Pump Station

## CHECK APPROPRIATE BOX(ES) FOR ACCESS WAIVER(S)

- |  |  |
|--|--|
| <input type="checkbox"/> Sight Distance    | <input type="checkbox"/> Driveway Grade                      |
| <input type="checkbox"/> Driveway Spacing  | <input type="checkbox"/> Driveway Width / Radius             |
| <input type="checkbox"/> Corner Clearance  | <input type="checkbox"/> Driveway Throat Length              |
| <input type="checkbox"/> Driveway Location | <input checked="" type="checkbox"/> <u>Stormwater Runoff</u> |

## DESCRIBE ELEMENT(S) FOR ACCESS WAIVER(S)

(Attach additional sheets as needed) Stormwater from the proposed pump station will be draining to an existing ditch within the SCDOT right-of-way along Oaks Road, causing an increase in the runoff to the SCDOT right-of-way

---

---

---

---

---

---

---

---

**JUSTIFICATION FOR ACCESS WAIVER(S)**

(Attach additional sheets as needed) The existing property where the pump station is being proposed drains toward Oaks Road to an existing ditch within the SCDOT right-of-way. The proposed pump station will maintain the existing drainage pattern, but the sites impervious area will increase by approximately 0.11 AC, causing an increase in the runoff to the SCDOT right-of-way. The pump station site does not have room for the installation of any stormwater detention systems. Because the increase in the peak flow is less than 0.5 cfs, it is our engineering judgement that minor increase in the peak flow to the existing right-of-way ditch will not have any negative impacts.

**DESCRIBE STEPS TO ELIMINATE ACCESS WAIVER(S), INCLUDE COST**

(Attach additional sheets as needed) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RECORD OF DECISION**

<b>Resident Maintenance Engineer</b>	<b>HQ Section Head/DEA</b>	<b>Other</b> <u>ADPE HORSEY</u>
<input type="checkbox"/> Recommended	<input type="checkbox"/> Recommended	<input checked="" type="checkbox"/> Recommended <u>2-21-25</u>
<input type="checkbox"/> Not Recommended	<input type="checkbox"/> Not Recommended	<input type="checkbox"/> Not Recommended

**JUSTIFICATION FOR DENIAL OF ACCESS WAIVER**

(Attach additional sheets as needed) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_1/1 Susan V. Keyser 2/20/25 \_\_\_\_\_1/1  
(Resident Maintenance Engineer) (HQ Section Head/DEA) Other

- cc:
- Resident Maintenance Engineer (RME)
  - District Traffic Engineer (DTE)
  - District Engineering Administrator (DEA)
  - Director of Traffic Engineering
  - \_\_\_\_\_
  - \_\_\_\_\_

<b>Final Decision</b>
<input type="checkbox"/> <b>Approved</b>
<input type="checkbox"/> <b>Denied</b>

Central File

The South Carolina Department of Environmental Services (SCDES) Wastewater Construction Permit  
Bureau of Water – Cover Page



# Wastewater Construction Permit

## Bureau of Water



PROJECT NAME: 290-GPM Oaks Road Pump Station	COUNTY: Clarendon
LOCATION:	

**PERMISSION IS HEREBY GRANTED TO:** Clarendon County  
411 Sunset Drive  
Manning, SC 29102

For the construction of a sanitary sewer system in accordance with the construction plans, specifications, design calculations and the Construction Permit Application signed by Adam Hogan, Registered Professional Engineer, S.C. Registration Number: 25472.

**Project Description:** New 290-GPM Pump Station to intercept and re-pump flow within an existing six (6)-inch force main including approximately 220-linear feet of new six (6)-inch force main, approximately 80-linear feet of new eight (8)-inch gravity wastewater line, and one (1) new manhole.

**TREATMENT FACILITY:** The wastewater will be discharged to the MANNING WWTF - SC0020419 at a design flow rate of 0 GPD.

**STANDARD CONDITION:**

**NOTE:** In accepting this permit, the owner agrees to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection. This is a permit for construction only and does not constitute SCDES approval, temporary or otherwise, to place the system in operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the Pee Dee EA Sumter at 803-778-6548. Additional permits may be required prior to construction (e.g., Stormwater).

**SPECIAL CONDITIONS:**

- All construction/materials for this project must conform to the Standard Specifications for ALLIANCE CONSULTING ENGINEERS.

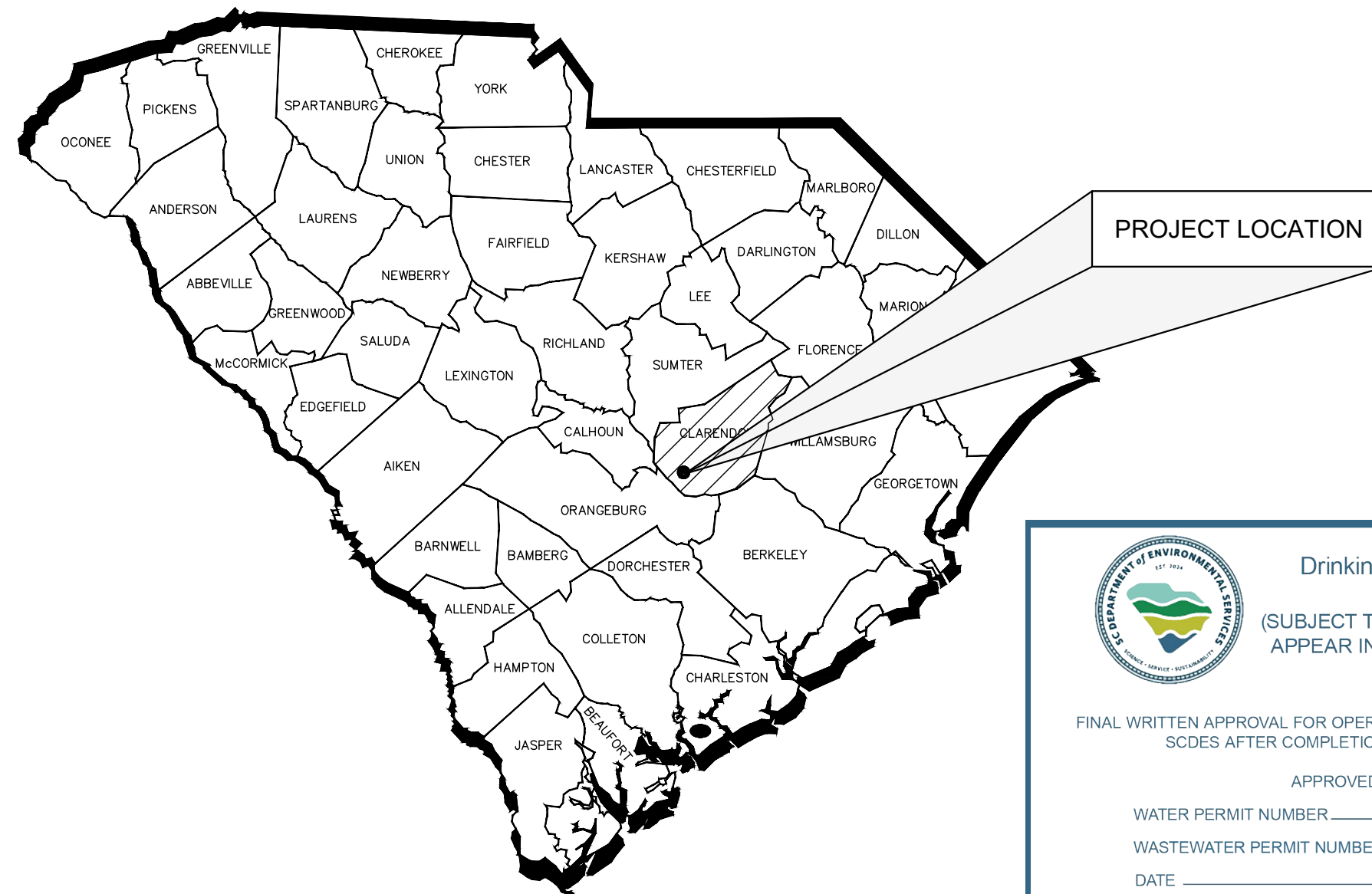
PERMIT NUMBER:	WW046421
ISSUANCE DATE:	January 24, 2025
EXPIRATION DATES:	Construction must be completed and the Approval to Place in Operation granted prior to January 24, 2028 or this permit will expire.

Douglas B. Kinard, P.E., Director  
Drinking Water and Recreational  
Waters Protection Division

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.

# 290-GPM OAKS ROAD PUMP STATION

## CLARENDON COUNTY, SOUTH CAROLINA



VICINITY MAP  
NOT TO SCALE

**Drinking Water and Recreational Waters Protection**  
(SUBJECT TO ANY PROVISIONS WHICH MAY APPEAR IN THE CONSTRUCTION PERMIT)

FINAL WRITTEN APPROVAL FOR OPERATION MUST BE OBTAINED FROM SCDES AFTER COMPLETION OF CONSTRUCTION

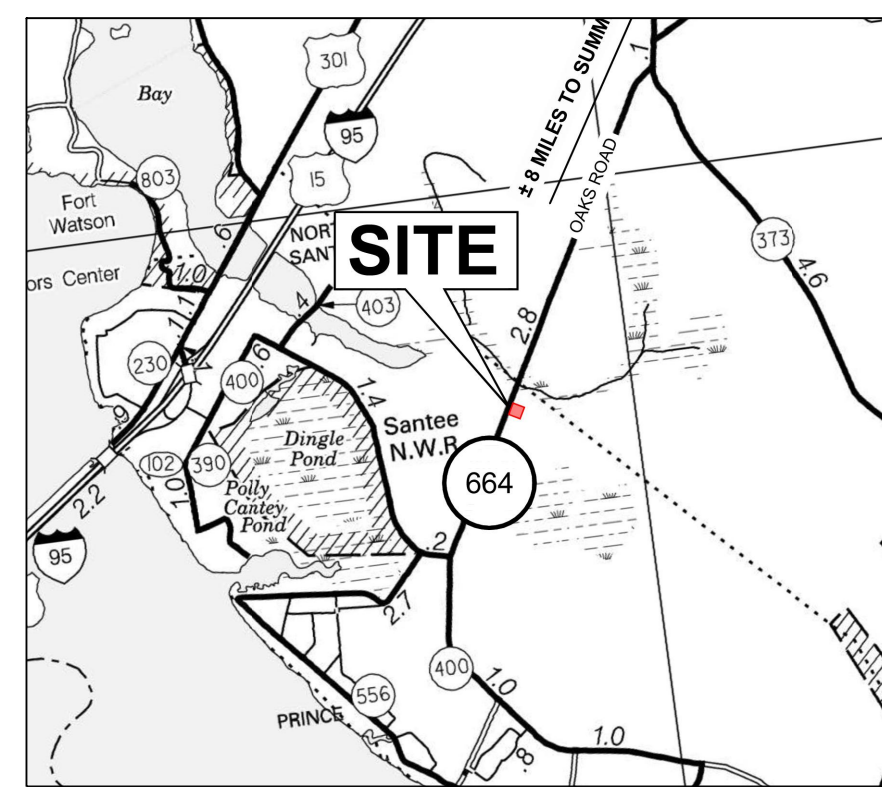
APPROVED FOR:

WATER PERMIT NUMBER \_\_\_\_\_

WASTEWATER PERMIT NUMBER WW046421

DATE 1/24/25

REVIEWER MTH

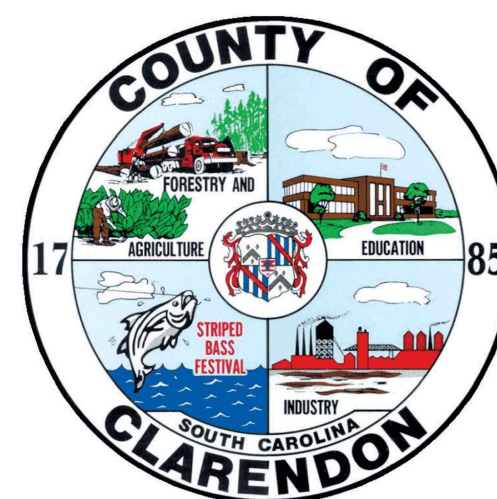


SITE LOCATION  
1" = 1/2 MILE

CLIENT  
CLARENDON COUNTY DEVELOPMENT BOARD  
411 SUNSET DRIVE,  
MANNING, SOUTH CAROLINA 29102  
(803) 433-8813  
CONTACT: MR. GEORGE KOSINSKI, SCED, EXECUTIVE DIRECTOR

UTILITY  
CLARENDON COUNTY WATER & SEWER  
411 SUNSET DRIVE,  
MANNING, SOUTH CAROLINA 29102  
(803) 433-3254  
CONTACT: MR. HUNTER DENNY, ENGINEERING COORDINATOR

CIVIL ENGINEER  
ALLIANCE CONSULTING ENGINEERS, INC.  
124 VERDAE BOULEVARD, BONAVENTURE II - SUITE 505  
GREENVILLE, SOUTH CAROLINA 29607-3843  
(864) 284-1740  
CONTACT: ADAM R. HOGAN, P.E.



### SHEET INDEX

COVER SHEET	OVERALL SITE PLAN & GENERAL NOTES
C-1.0	PUMP STATION SITE PLAN
C-2.0	PUMP STATION GRADING PLAN
C-3.0	PUMP STATION DETAILS
C-4.0 - C-4.2	WASTEWATER PLAN AND PROFILES
C-5.0 - C-5.1	EROSION CONTROL DETAILS
C-6.0 - C-6.1	WASTEWATER CONSTRUCTION DETAILS
C-7.0 - C-7.1	SCDOT TRAFFIC CONTROL DETAILS
C-8.0	SCDOT DRIVEWAY DETAIL
C-8.1	ELECTRICAL PLANS AND DETAILS (PENDING)
E-1.0 - E-4.0	



Know what's below.  
Call before you dig.

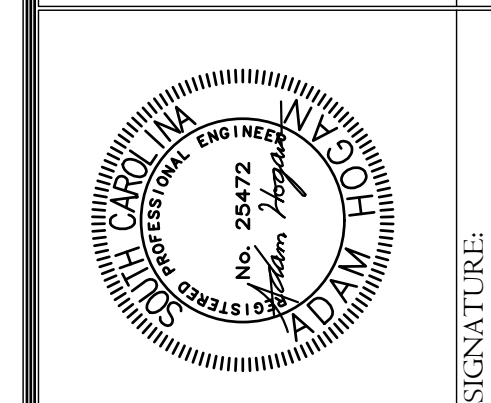
THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. SC LAW REQUIRES THE CONTRACTOR TO CALL THE UTILITY PROTECTION CENTER AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE RELOCATION OF ALL THE UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

### CERTIFICATION STATEMENTS

I, *Adam Hogan*, HAVE PLACED MY SIGNATURE AND SEAL ON THE DESIGN DOCUMENTS SUBMITTED SIGNIFYING THAT I ACCEPT RESPONSIBILITY FOR THE DESIGN OF THE SYSTEM. FURTHER, I CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THE DESIGN IS CONSISTENT WITH THE REQUIREMENTS OF TITLE 48, CHAPTER 14 OF THE CODE OF LAWS OF SC, 1976 AS AMENDED, PURSUANT TO REGULATION 72-300 ET SEQ. (IF APPLICABLE), AND IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF SCR100000.

LEGEND			
---	EXISTING CONTOUR MAJOR	---	PROPOSED CONTOUR MAJOR
---	EXISTING CONTOUR MINOR	---	PROPOSED CONTOUR MINOR
⊗	EXISTING WATER/GAS VALVE	⊗	PROPOSED WATER VALVE
⊗	EXISTING WATER/GAS METER	⊗	PROPOSED WATER METER
⊗	EXISTING TREE LINE	---	PROPOSED FORCE MAIN
⊗	EXISTING POWER POLE	---	PROPOSED ARV
⊗	EXISTING LIGHT POLE	---	PROPOSED GRAVITY WASTEWATER LINE
---	EXISTING OVERHEAD ELECTRICAL LINE	---	PROPOSED MANHOLE
---	EXISTING FIBER-OPTIC CABLE LINE	---	PROPOSED WATER LINE
---	EXISTING UNDERGROUND TELECOM LINE	---	PROPOSED HYDRANT
---	EXISTING TELECOM/FIBER-OPTIC BOX	---	PROPOSED STORM DRAIN
---	EXISTING GAS LINE	---	PROPOSED STORM DRAIN STRUCTURE
---	EXISTING FENCE	---	PROPOSED DEMOLITION
---	EXISTING FORCEMAIN	---	PROPOSED EROSION CONTROL MATTING
---	EXISTING ARV	---	PROPOSED RIP RAP
---	EXISTING GRAVITY WASTEWATER LINE	---	PROPOSED INLET PROTECTION
---	EXISTING MANHOLE	---	PROPOSED SILT FENCE
---	CLEANOUT	---	PROPOSED FENCE
---	EXISTING WATER LINE	---	RIGHT-OF-WAY
---	EXISTING HYDRANT	---	PROPERTY LINE
---	EXISTING STORM DRAIN	---	LIMITS OF DISTURBANCE
---	EXISTING STORM DRAIN STRUCTURE	---	EASEMENT
---	EXISTING BUILDING	---	WETLANDS AND BUFFER
---	CONCRETE	---	WATERWAY
---	GRAVEL		
---	ASPHALT		
---	GUARDRAIL		
---	BOLLARD		

REVISION	DATE	DESCRIPTION
12/18/24		ISSUE FOR PERMITTING
01/22/25		SCORE COMMENTS



**ALLIANCE CONSULTING ENGINEERS**

Alliance Consulting Engineers, Inc.  
124 Verdae Boulevard, Suite 505 - Greenville, SC 29607  
Phone: (864) 284-1740 • Fax: (864) 284-1741

PROJECT SHEET  
290-GPM OAKS ROAD PUMP STATION  
CLARENDON COUNTY, SOUTH CAROLINA  
SCALE: AS SHOWN  
DATE: AUGUST 2024

FILE NAME: 24110-Cover and Details.dwg  
REFERENCE FILE: 24110-Base.dwg  
PROJECT NO.: 24110-0014

SHEET COVER OF C-8.1

DWG NO. 01.1695-D29

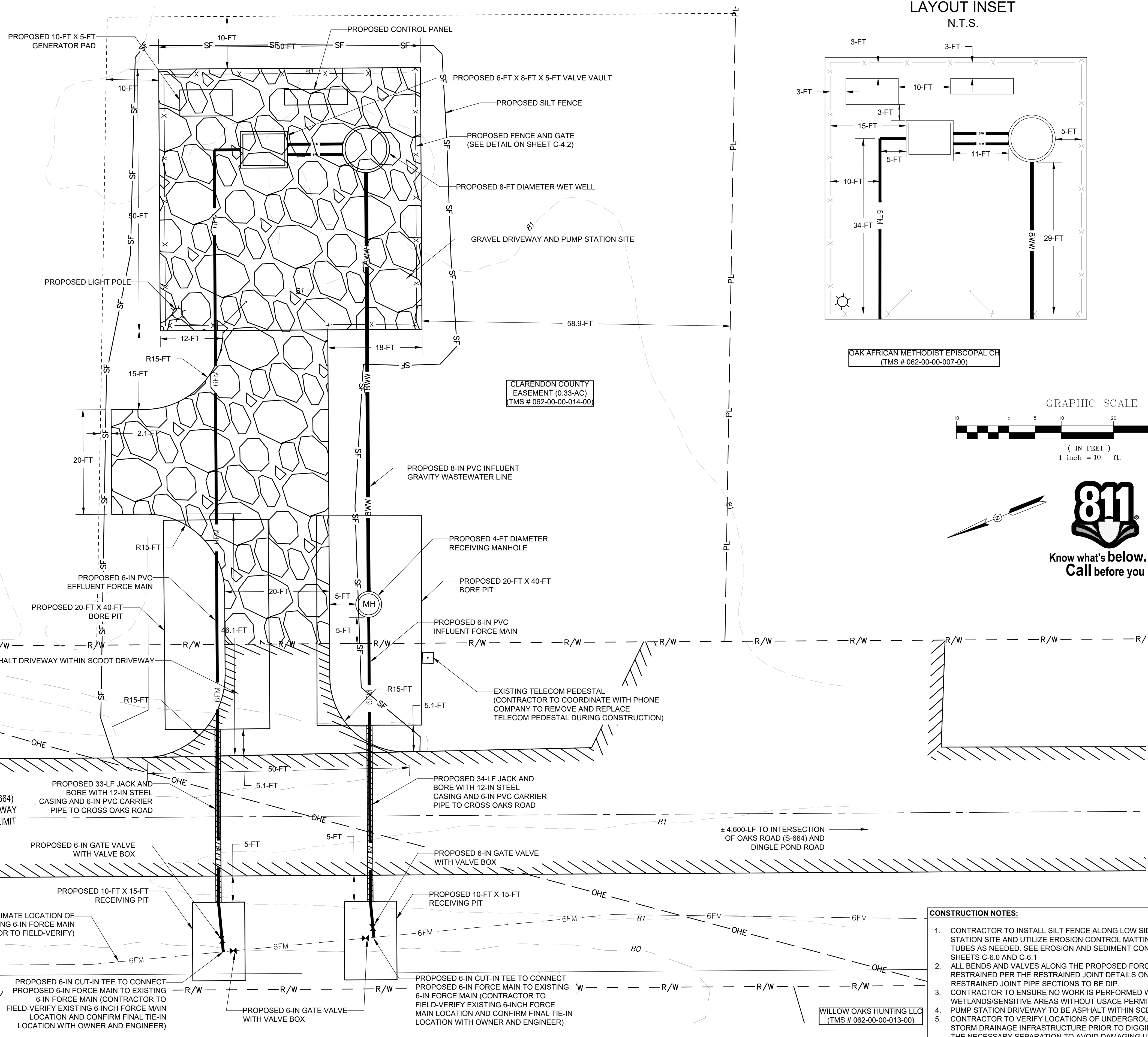


THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE DISTRIBUTED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.

**FLOODPLAIN NOTE:**  
PROPOSED PUMP STATION TO BE CONSTRUCTED OUTSIDE OF THE LIMITS OF THE 100-YEAR FLOODPLAIN AND AS SUCH WILL REMAIN OPERATIONAL AND PROTECTED FROM FLOODING DURING 25-YEAR AND 100-YEAR STORM EVENTS.

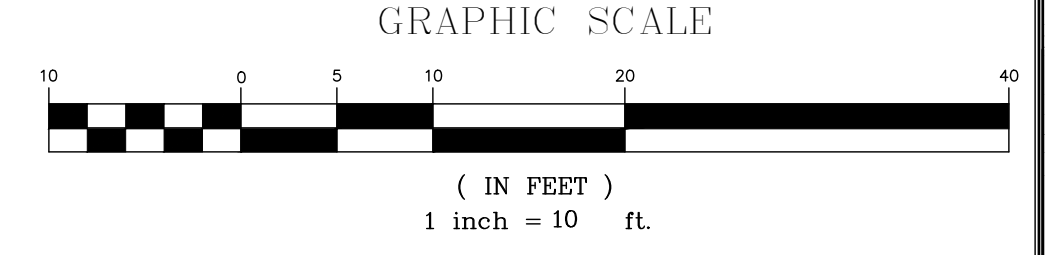
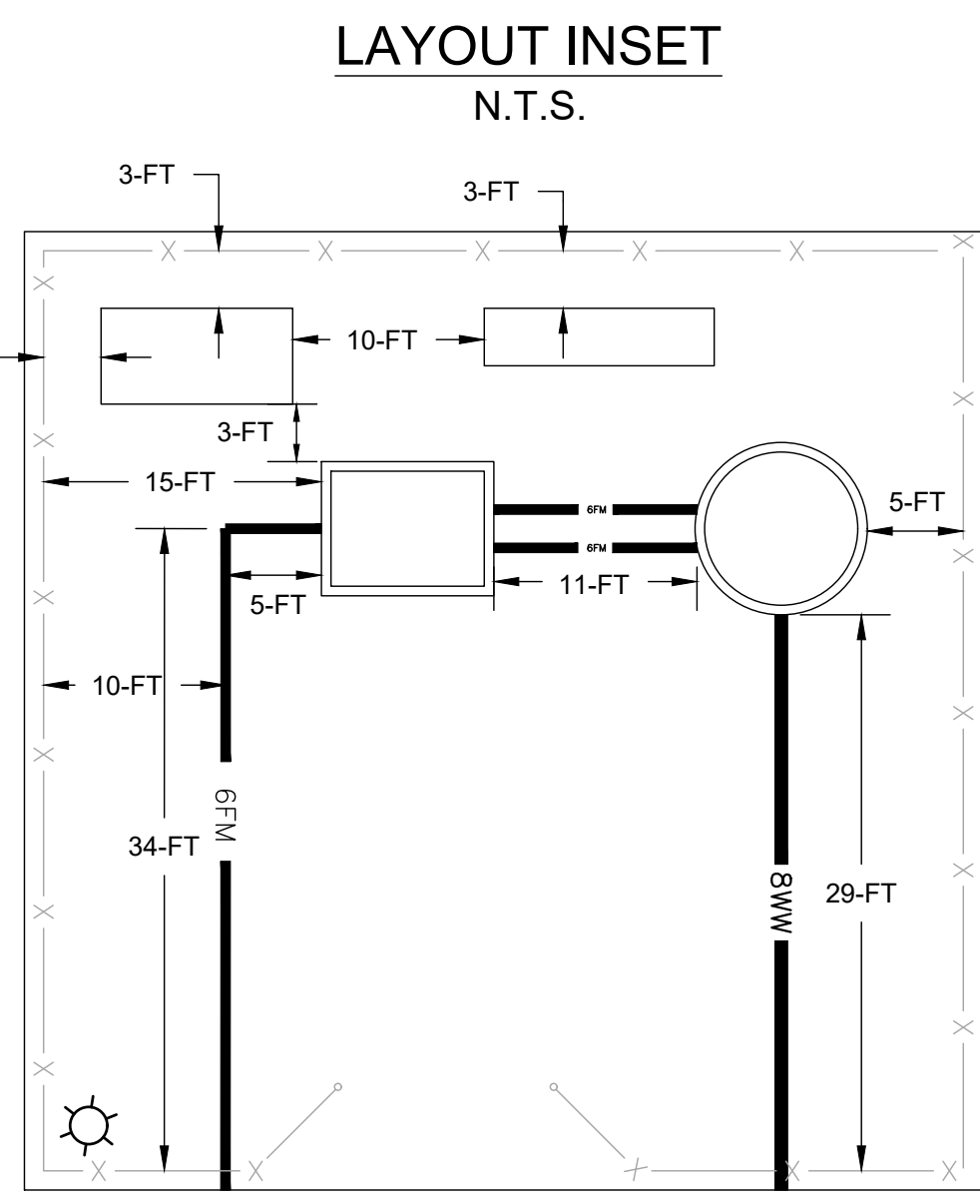
WILLOW OAKS HUNTING LLC  
(TMS # 062-00-00-014-00)

DEER & DUCK LLC  
(TMS # 061-00-00-001-00)



CLARENDON COUNTY  
EASEMENT (0.33-AC)  
(TMS # 062-00-00-014-00)

OAK AFRICAN METHODIST EPISCOPAL CH  
(TMS # 062-00-00-007-00)



- CONSTRUCTION NOTES:**
- CONTRACTOR TO INSTALL SILT FENCE ALONG LOW SIDE OF THE PUMP STATION SITE AND UTILIZE EROSION CONTROL MATTING AND SEDIMENT TUBES AS NEEDED. SEE EROSION AND SEDIMENT CONTROL DETAILS ON SHEETS C-6.0 AND C-6.1
  - ALL BENDS AND VALVES ALONG THE PROPOSED FORCE MAIN TO BE RESTRAINED PER THE RESTRAINED JOINT DETAILS ON SHEET C-7.1. ALL RESTRAINED JOINT PIPE SECTIONS TO BE DIP.
  - CONTRACTOR TO ENSURE NO WORK IS PERFORMED WITHIN WETLANDS/SENSITIVE AREAS WITHOUT USACE PERMIT.
  - PUMP STATION DRIVEWAY TO BE ASPHALT WITHIN SCDOT DRIVEWAY. CONTRACTOR TO VERIFY LOCATIONS OF UNDERGROUND UTILITIES AND STORM DRAINAGE INFRASTRUCTURE PRIOR TO DIGGING AND MAINTAIN THE NECESSARY SEPARATION TO AVOID DAMAGING UTILITIES OR DRAINAGE INFRASTRUCTURE. CONTRACTOR IS RESPONSIBLE FOR REMEDIATION OF ANY DAMAGES WHICH OCCUR DURING CONSTRUCTION.

REVISION DATE	
DATE	REVISION DESCRIPTION
12/18/24	ISSUE FOR PERMITTING
01/22/25	SCHEM COMMENTS
APPROVALS	ENGINEER
DISIGNER	HMW
TECHNICIAN	MRT
CHECKED BY	ARH
APPROVED	ARH

DATE: 12/18/24

SIGNATURE:

**ALLIANCE CONSULTING ENGINEERS**  
Alliance Consulting Engineers, Inc.  
124 Verdie Blvd., Mount Airy, NC 28551  
Phone: (864) 284-1740 • Fax: (864) 284-1741

**PUMP STATION SITE PLAN**

SCALE: AS SHOWN

DATE: AUGUST 2024

SOUTH CAROLINA

CLARENDON COUNTY

PROJECT: 290-GPM OAKS ROAD PUMP STATION

FILE NAME: 24110-Plans.dwg

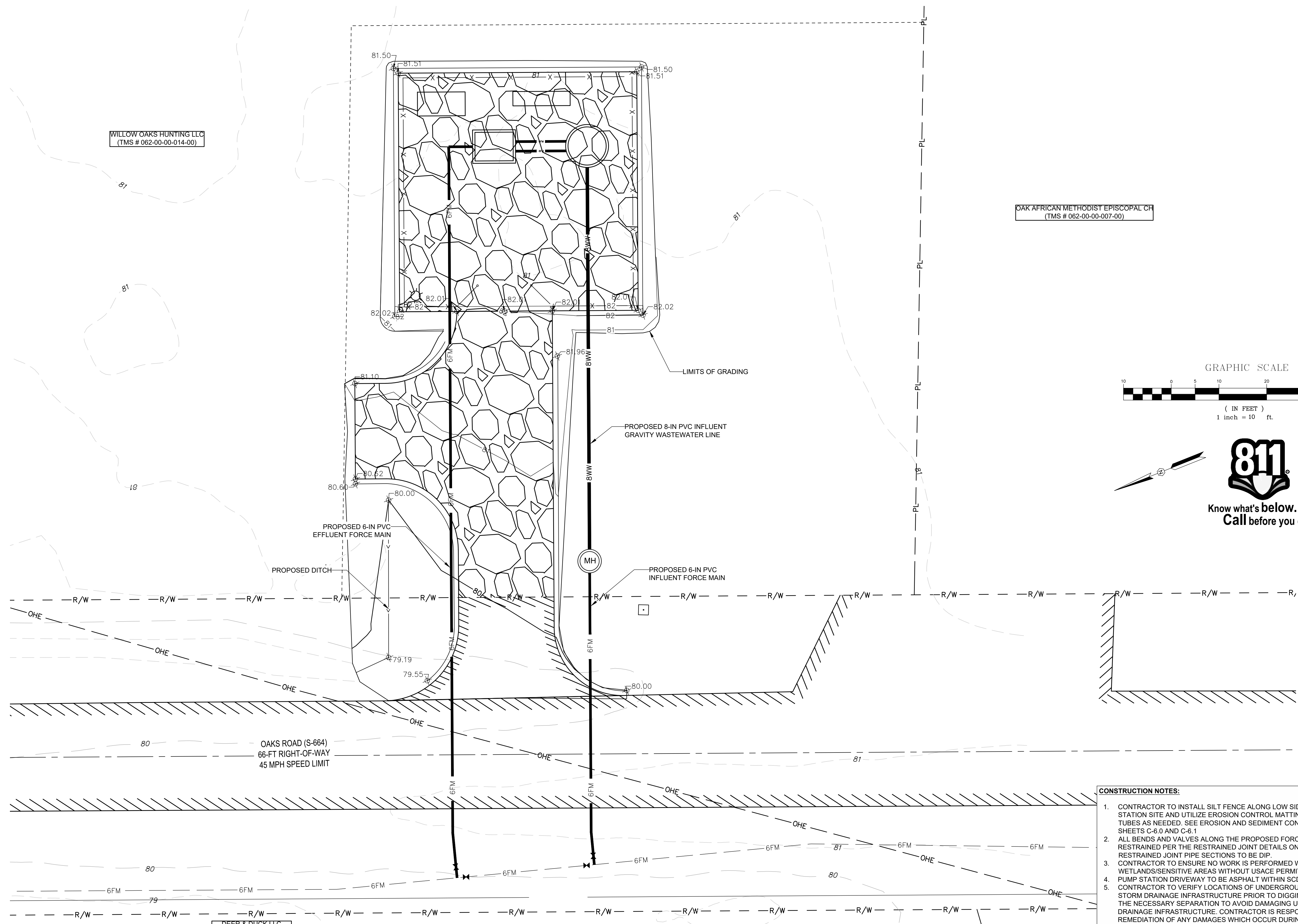
REFERENCE FILE: 24110-Base.dwg

PROJECT NO: 24110-0014

DWG NO. 01.1695-D29

SHEET C-2.0 OF C-8.1

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



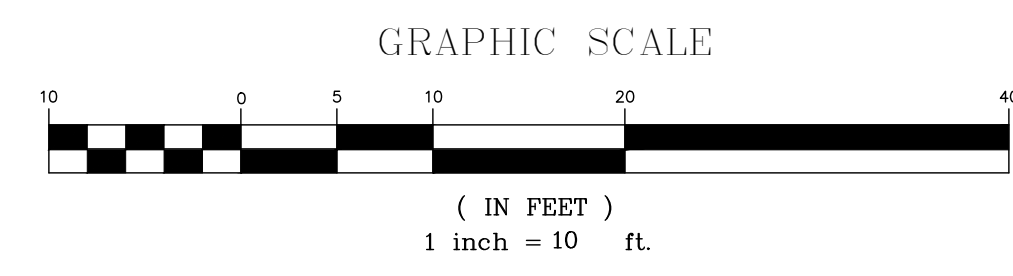
WILLOW OAKS HUNTING LLC  
(TMS # 062-00-00-014-00)

OAK AFRICAN METHODIST EPISCOPAL CH  
(TMS # 062-00-00-007-00)

DEER & DUCK LLC  
(TMS # 061-00-00-001-00)

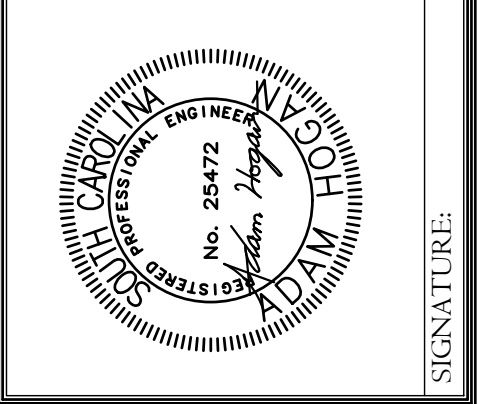
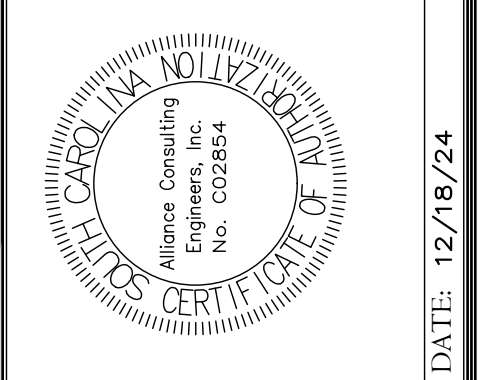
WILLOW OAKS HUNTING LLC  
(TMS # 062-00-00-013-00)

OAKS ROAD (S-664)  
66-FT RIGHT-OF-WAY  
45 MPH SPEED LIMIT



- CONSTRUCTION NOTES:**
1. CONTRACTOR TO INSTALL SILT FENCE ALONG LOW SIDE OF THE PUMP STATION SITE AND UTILIZE EROSION CONTROL MATTING AND SEDIMENT TUBES AS NEEDED. SEE EROSION AND SEDIMENT CONTROL DETAILS ON SHEETS C-6.0 AND C-6.1
  2. ALL BENDS AND VALVES ALONG THE PROPOSED FORCE MAIN TO BE RESTRAINED PER THE RESTRAINED JOINT DETAILS ON SHEET C-7.1. ALL RESTRAINED JOINT PIPE SECTIONS TO BE DIP.
  3. CONTRACTOR TO ENSURE NO WORK IS PERFORMED WITHIN WETLANDS/SENSITIVE AREAS WITHOUT USACE PERMIT.
  4. PUMP STATION DRIVEWAY TO BE ASPHALT WITHIN SCDOT DRIVEWAY.
  5. CONTRACTOR TO VERIFY LOCATIONS OF UNDERGROUND UTILITIES AND STORM DRAINAGE INFRASTRUCTURE PRIOR TO DIGGING AND MAINTAIN THE NECESSARY SEPARATION TO AVOID DAMAGING UTILITIES OR DRAINAGE INFRASTRUCTURE. CONTRACTOR IS RESPONSIBLE FOR REMEDIATION OF ANY DAMAGES WHICH OCCUR DURING CONSTRUCTION. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING AND PROPOSED GRADES SHOWN. IN EXISTING GRADE ELEVATIONS ON-SITE DIFFER FROM THOSE SHOWN ON THESE PLANS AND IF ELEVATIONS AND GRADES PROPOSED ARE NOT ACHIEVABLE, CONTRACTOR SHALL NOTIFY ENGINEER ON RECORD.
  - 6.

REVISION		DATE	DESCRIPTION
1	DATE	12/18/24	ISSUE FOR PERMITTING
2	DATE	01/22/25	SCHEM COMMENTS



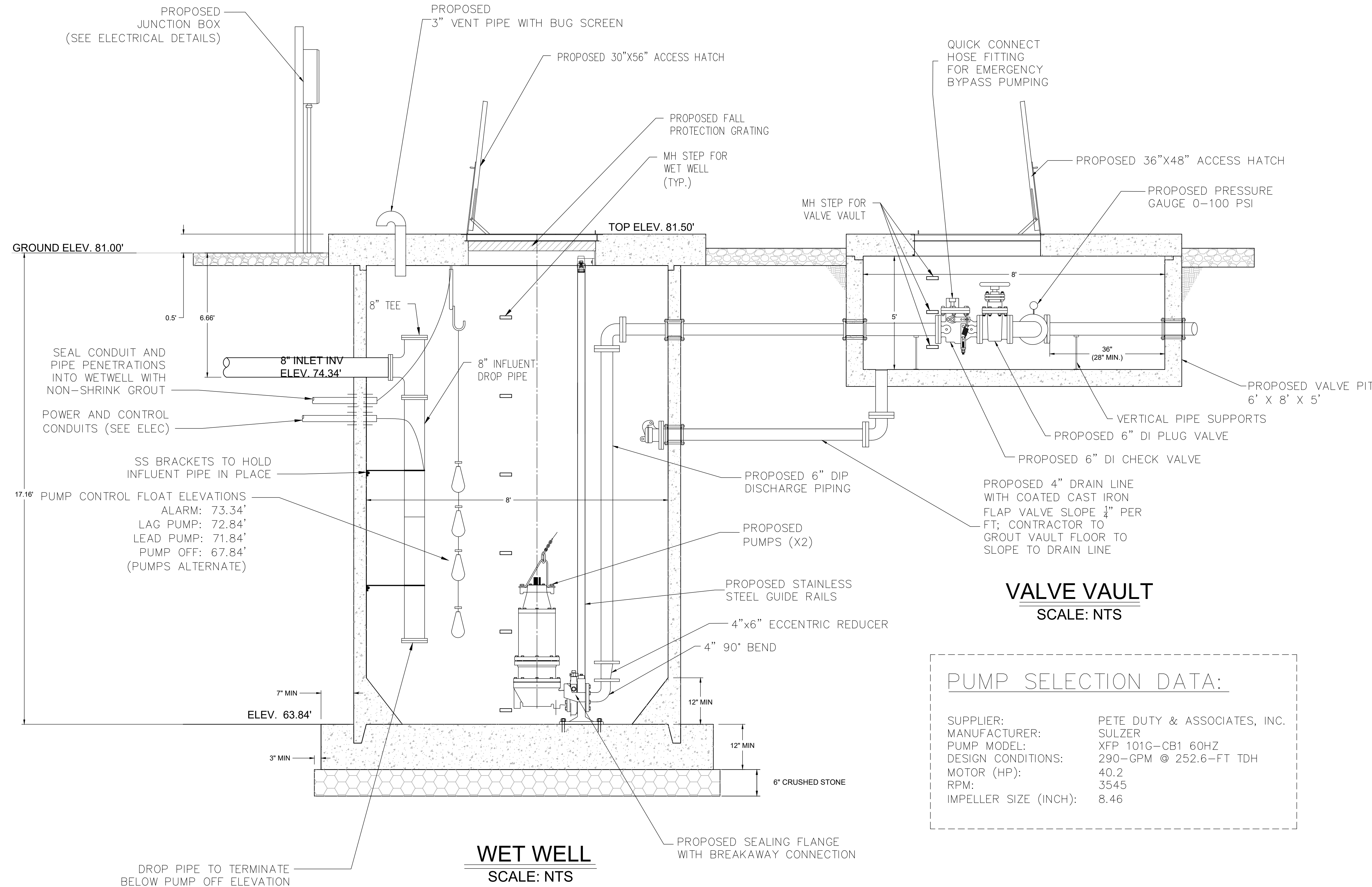
**ALLIANCE CONSULTING ENGINEERS**  
Alliance Consulting Engineers, Inc.  
124 Verdine Blvd., Greenville, SC 29607  
Phone: (864) 284-1740 • Fax: (864) 284-1741

PUMP STATION GRADING PLAN  
SCALE: AS SHOWN  
DATE: AUGUST 2024

PROJECT: 290-GPM OAKS ROAD PUMP STATION  
CLARENDON COUNTY, SOUTH CAROLINA

FILE NAME: 24110-Plans.dwg  
REFERENCE FILE: 24110-Base.dwg  
PROJECT NO: 24110-0014  
SHEET OF SHEET C-3.0 OF C-8.1  
DWG NO. 01.1695-D29

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



**VALVE VAULT**  
SCALE: NTS

**PUMP SELECTION DATA:**

SUPPLIER:	PETE DUTY & ASSOCIATES, INC.
MANUFACTURER:	SULZER
PUMP MODEL:	XFP 101G-CB1 60HZ
DESIGN CONDITIONS:	290-GPM @ 252.6-FT TDH
MOTOR (HP):	40.2
RPM:	3545
IMPELLER SIZE (INCH):	8.46

**WET WELL**  
SCALE: NTS

REVISION	
DATE	DESCRIPTION
12/18/24	ISSUE FOR PERMITTING
01/22/25	SCHEM COMMENTS

APPROVALS	ENGINEER	DISIGNER	TECHNICIAN
	ARH	HMW	MRT

**ALLIANCE CONSULTING ENGINEERS**  
Alliance Consulting Engineers, Inc.  
124 Verdine Blvd., Suite 305 - Columbia, SC 29607  
Phone: (864) 284-1740 • Fax: (864) 284-1741

DATE: 12/18/24

SIGNATURE: \_\_\_\_\_

PROJECT: 290-GPM OAKS ROAD PUMP STATION

CLARENDON COUNTY SOUTH CAROLINA

SCALE: AS SHOWN

DATE: AUGUST 2024

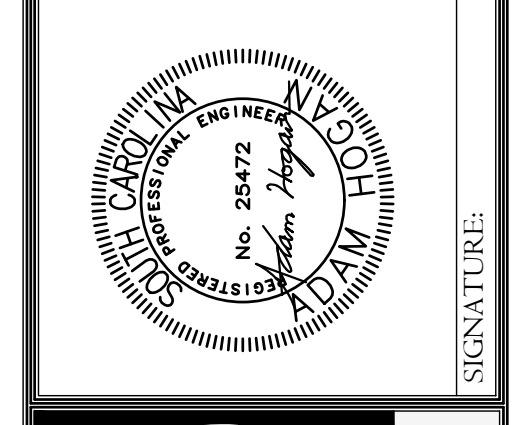
FILE NAME: 24110-Plans.dwg	SHEET C-4.0
REFERENCE FILE: 24110-Base.dwg	OF
PROJECT NO: 24110-0014	C-8.1

DWG NO. 01.1695-D29

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.

REVISION		DATE
1	ISSUE FOR PERMITTING	12/18/24
2	SCHS COMMENTS	01/22/25

APPROVALS	ENGINEER	DISCUSSOR	TECHNICIAN	CHECKED BY	APPROVED
	ARH	HMW	MRT	ARH	ARH



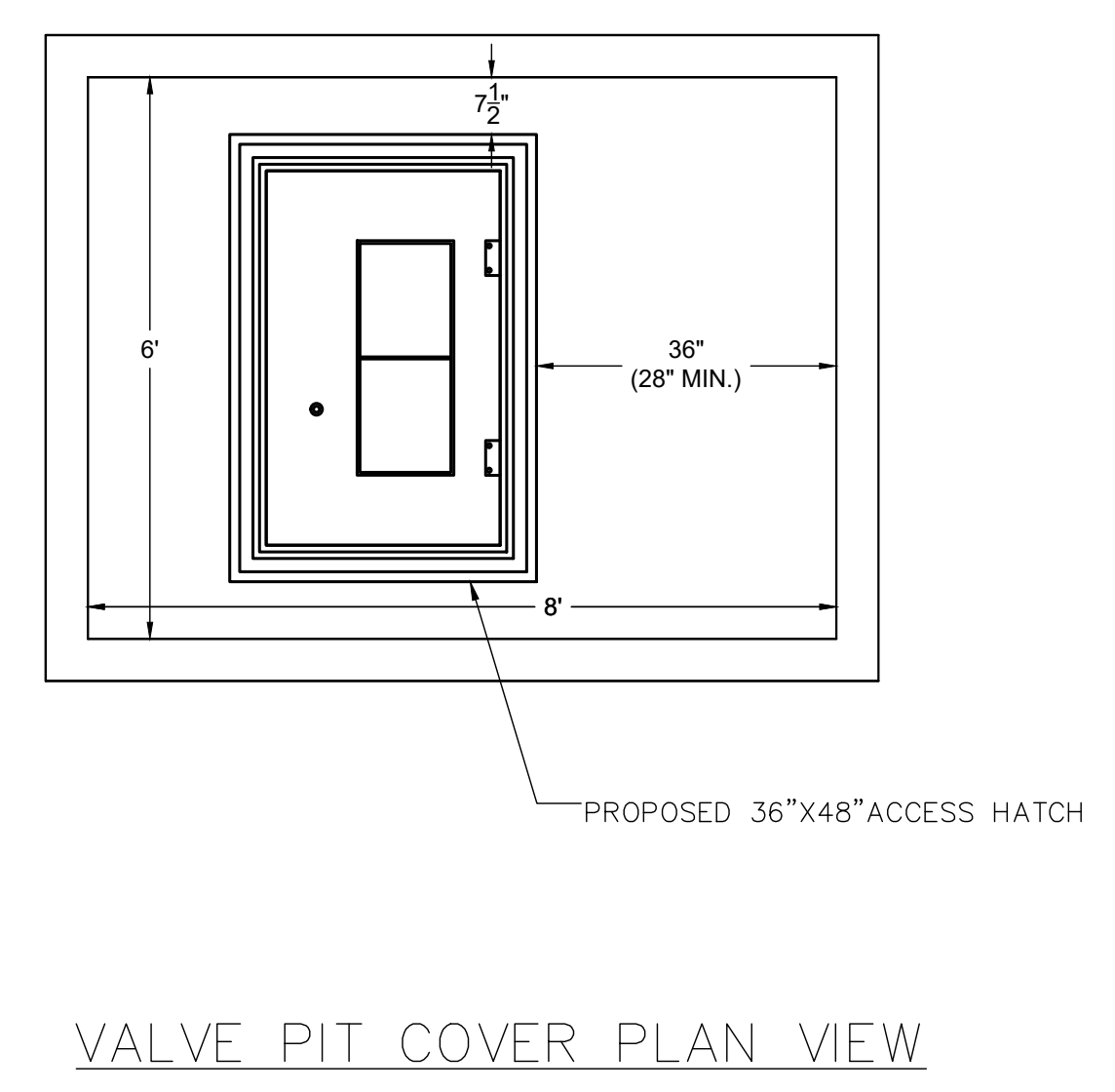
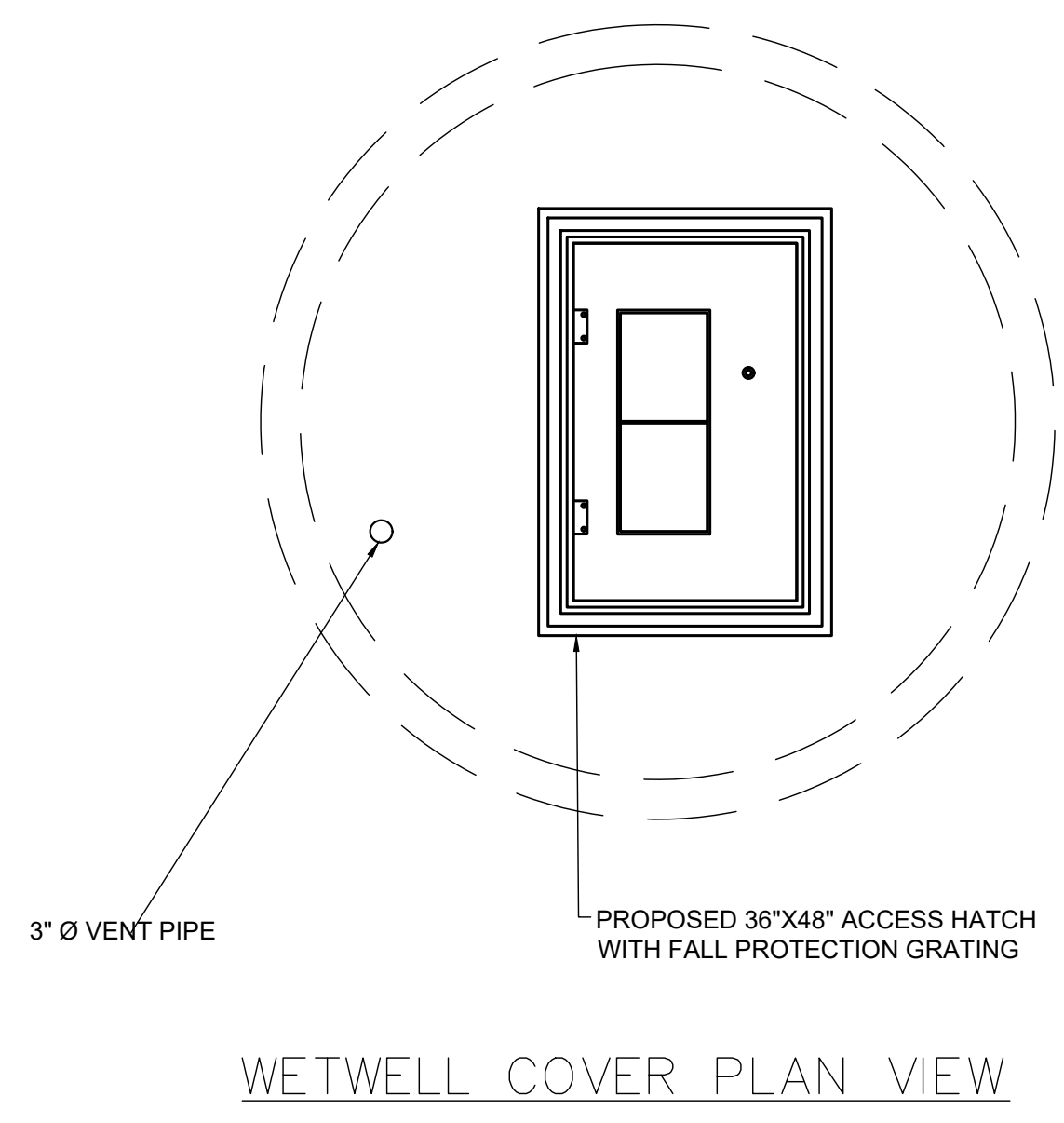
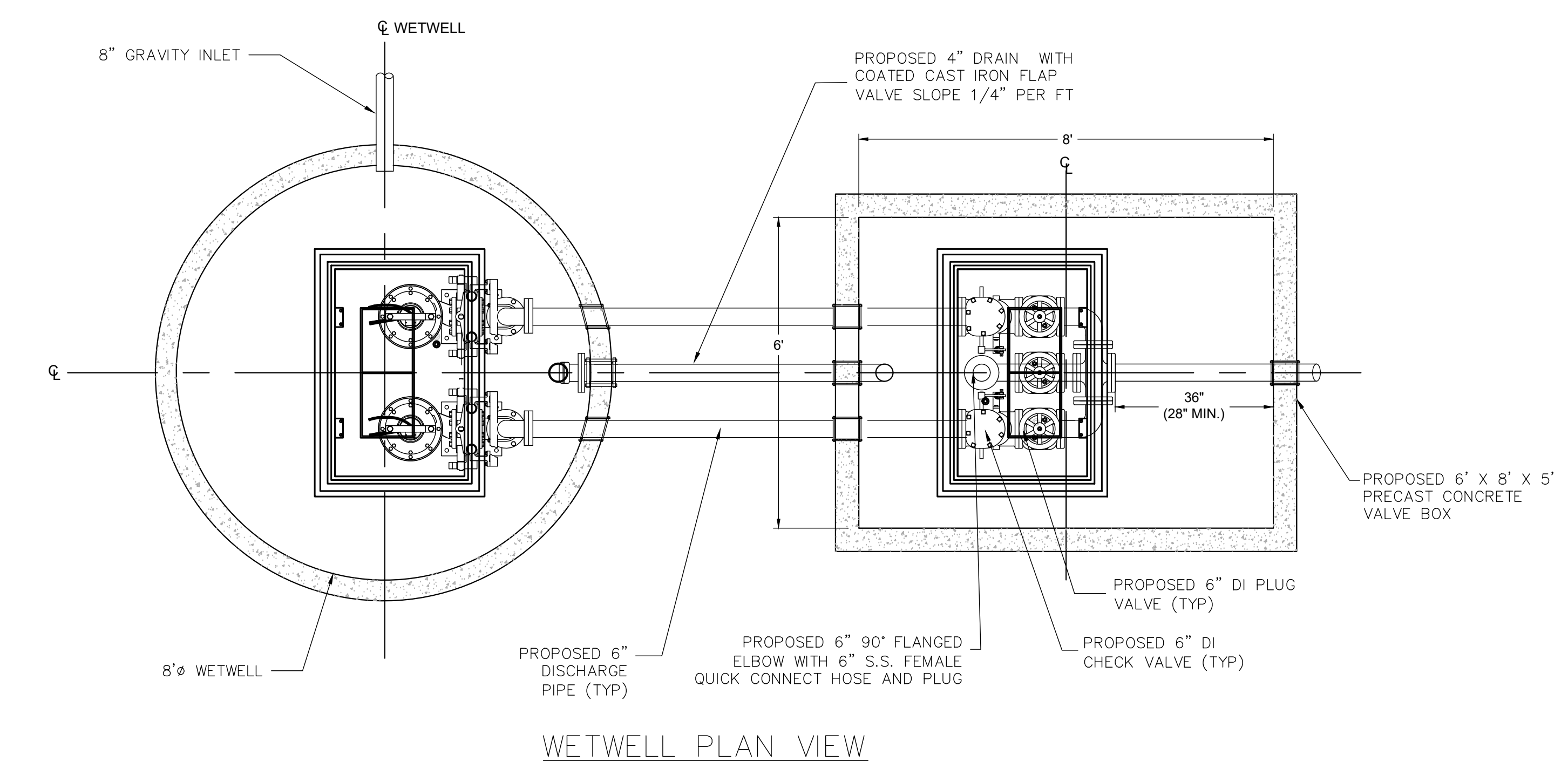
**ALLIANCE CONSULTING ENGINEERS**  
 Alliance Consulting Engineers, Inc.  
 124 Verdine Blvd., Greenville, SC 29607  
 Phone: (864) 284-1740 • Fax: (864) 284-1741

PROJECT: 290-GPM OAKS ROAD PUMP STATION  
 CLARENDON COUNTY, SOUTH CAROLINA  
 SHEET: PUMP STATION DETAILS (2 OF 3)  
 DATE: AUGUST 2024  
 SCALE: AS SHOWN

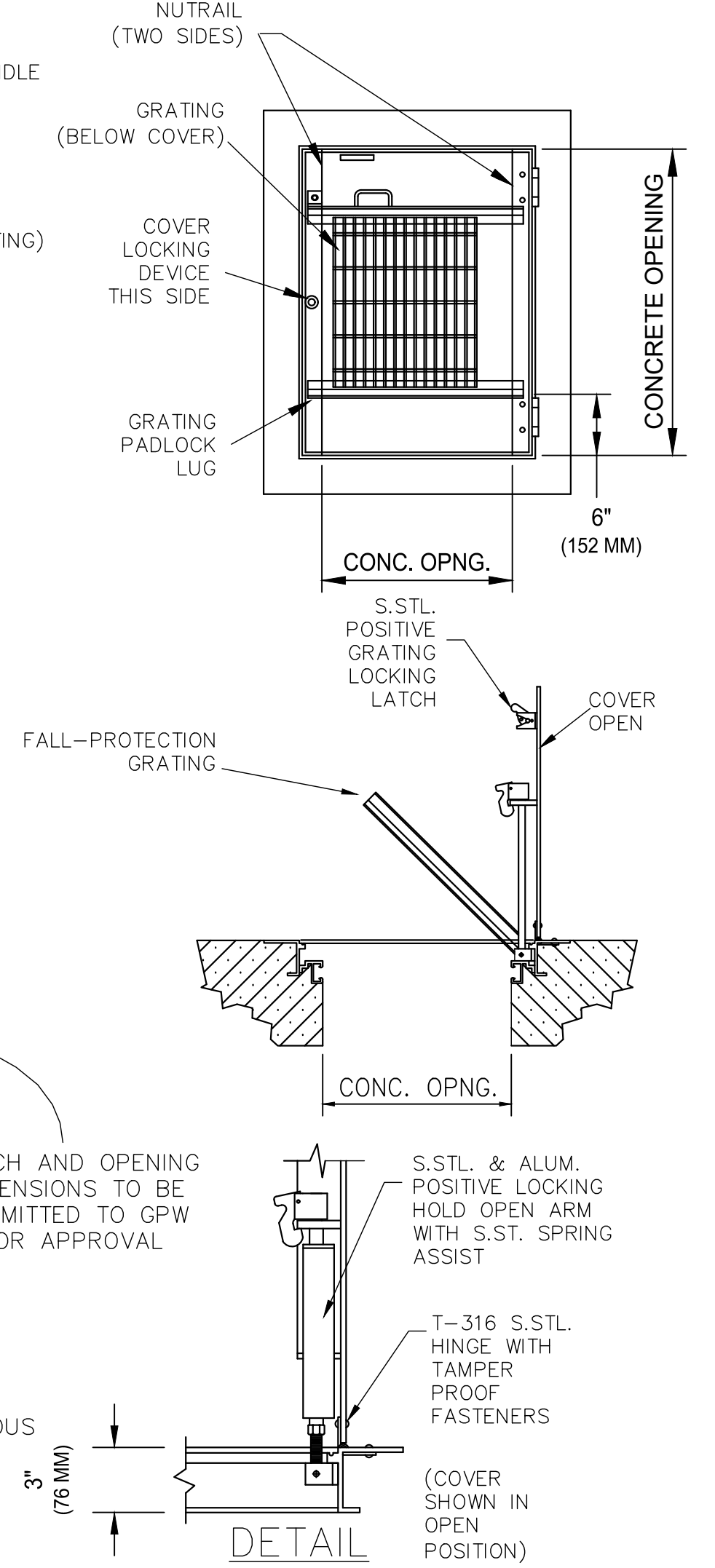
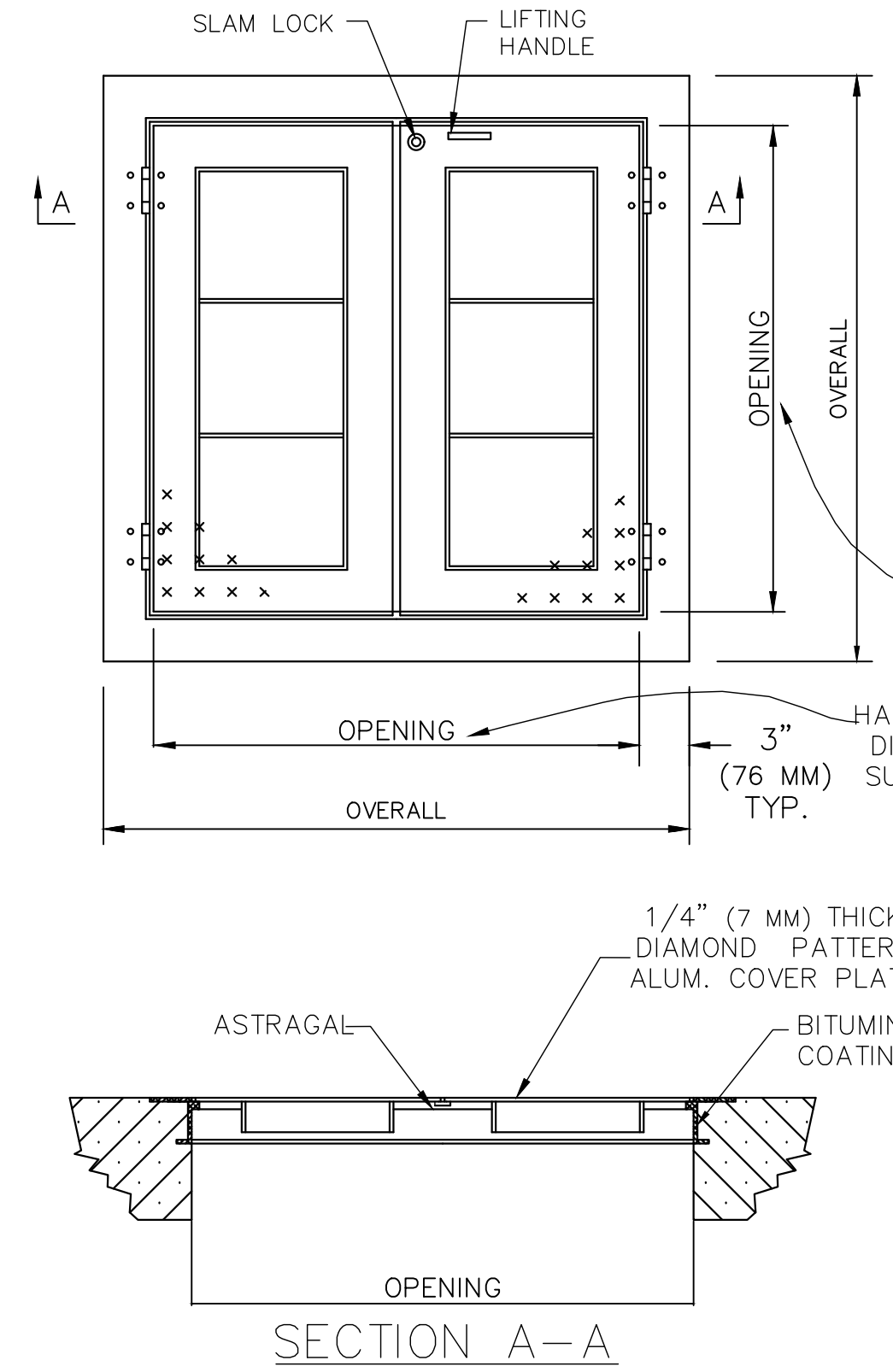
DATE: 12/18/24  
 SIGNATURE:

FILE NAME:	24110-Plans.dwg	SHEET	C-4.1
REFERENCE FILE:	24110-Base.dwg	OF	C-8.1
PROJECT NO.:	24110-0014		

DWG NO. 01.1695-D29

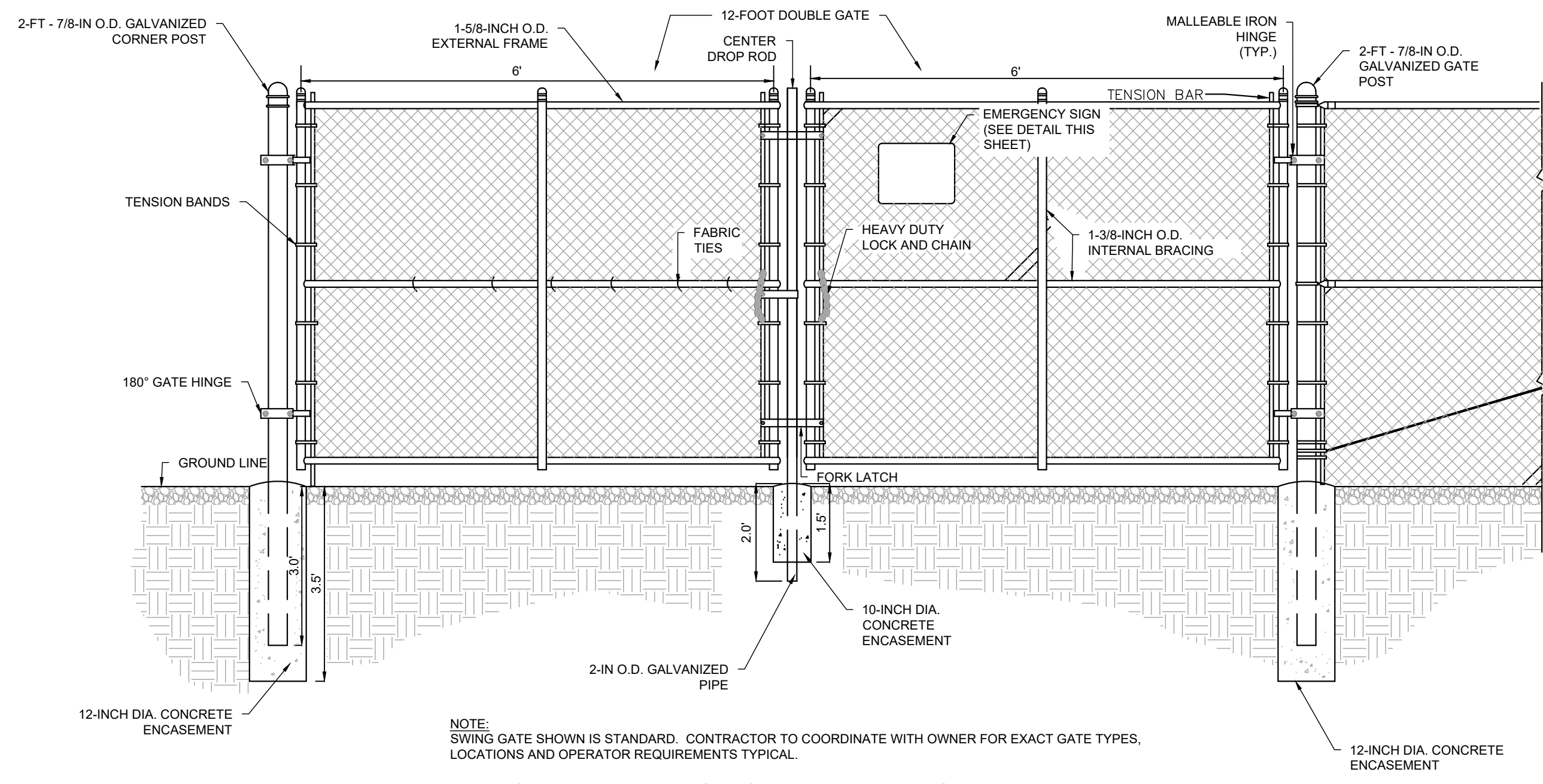


- STANDARD FEATURES:**
- AUTO-LOCK T-316 STAINLESS STEEL HOLD OPEN ARM WITH RELEASE HANDLE
  - T-316 STAINLESS STEEL HINGES AND ATTACHING HARDWARE
  - T-316 STAINLESS STEEL SLAM LOCK WITH REMOVABLE KEY
  - STAINLESS STEEL COMPRESSION SPRING ASSIST
  - BUILT-IN NEOPRENE CUSHION/GASKET
  - NON-OZONE DEPLETING BITUMINOUS COATING
  - DOUBLE LEAF CONSTRUCTION
  - 300 LBS. PER SQ. FT. LOAD RATING (1464 KG. PER SQ. METER LOAD RATING)
  - EXTRUDED ALUMINUM FRAME
  - RECESSED LIFTING HANDLE
  - ALUMINUM FALL-PROTECTION GRATING
  - LIFETIME GUARANTEE
  - AS MANUFACTURED BY HALLIDAY, BILCO, US FOUNDRY, OR APPROVED EQUAL.

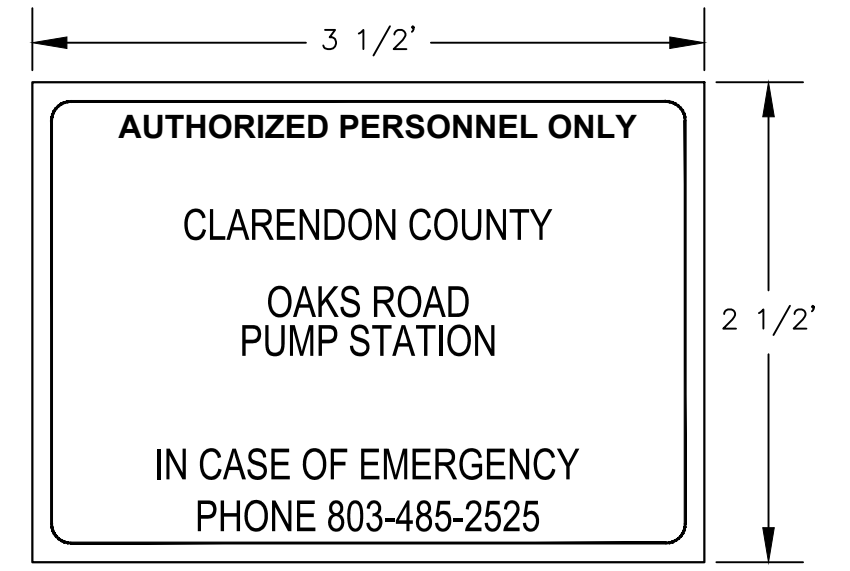


HATCH WITH FALL-PROTECTION GRATING

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.

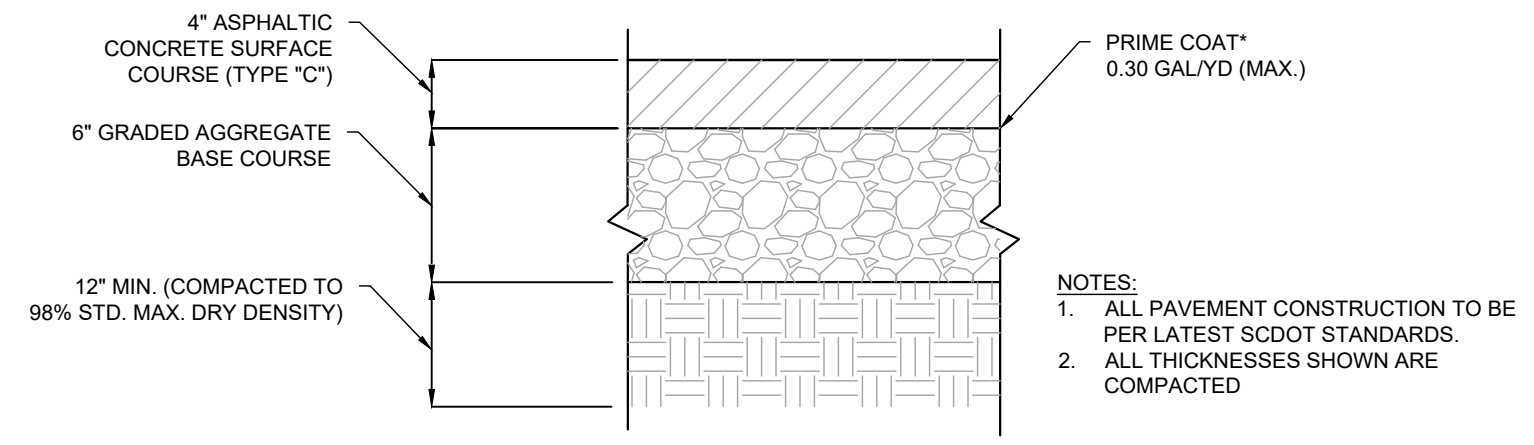


**CHAIN LINK SECURITY FENCE DETAIL**  
N.T.S.

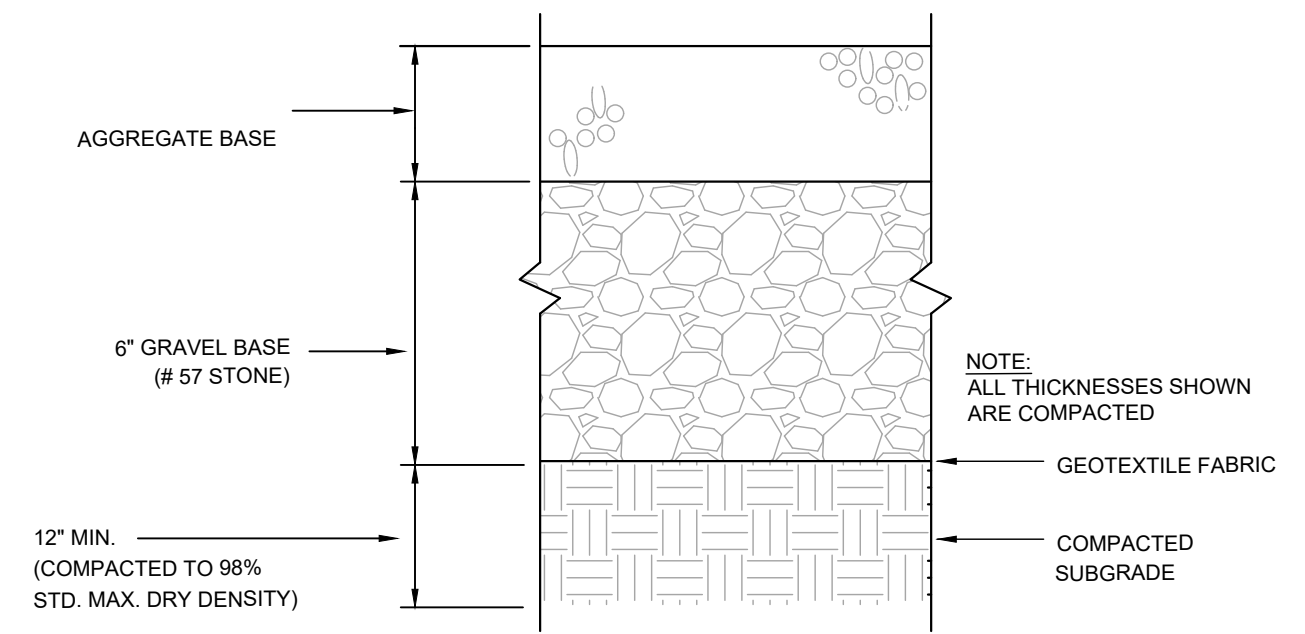


- NOTES:  
 1. CONSTRUCT FROM 16 GA. ALUMINUM  
 2. PROVIDE WHITE BACKGROUND WITH THREE COATS OF PAINT.  
 3. PROVIDE 1/2" LETTERS (MIN).  
 4. ALL LETTERING SHALL CONSIST OF TWO COATS OF THE APPROPRIATE ENAMEL.  
 5. DIMENSIONS SHOWN APPROXIMATE.  
 6. ALL SIGNS MUST BE APPROVED PRIOR TO INSTALLATION.

**EMERGENCY SIGN DETAIL**  
N.T.S.



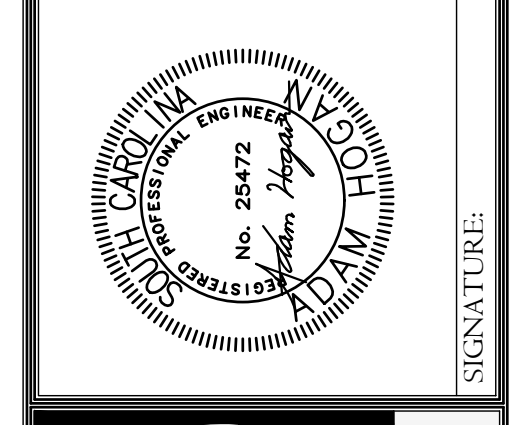
**ASPHALT PAVEMENT SECTION - LIGHT DUTY DETAIL**  
N.T.S.



**TYPICAL GRAVEL SECTION DETAIL**  
N.T.S.

REVISION		DATE	DESCRIPTION
1	DATE	12/18/24	ISSUE FOR PERMITTING
2	DATE	01/22/25	SCHEMATIC COMMENTS

APPROVALS	ENGINEER	DRAWN	CHECKED	APPROVED
ARH	ARH	HMW	MRT	ARH



**ALLIANCE CONSULTING ENGINEERS**  
 Alliance Consulting Engineers, Inc.  
 124 Verdine Blvd., Suite 505 - Columbia, SC 29607  
 Phone: (864) 284-1740 • Fax: (864) 284-1741

PUMP STATION DETAILS  
(3 OF 3)

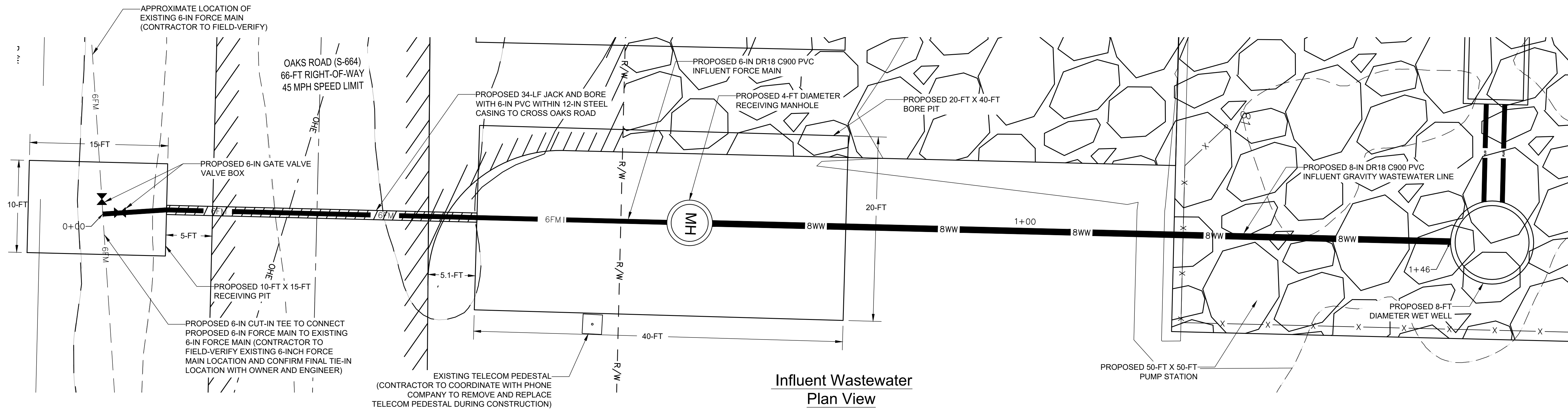
PROJECT: 290-GPM OAKS ROAD PUMP STATION  
 CLARENDON COUNTY, SOUTH CAROLINA

FILE NAME:	24110-Plans.dwg	SHEET	C-4.2
REFERENCE FILE:	24110-Base.dwg	OF	C-8.1
PROJECT NO.:	24110-0014		

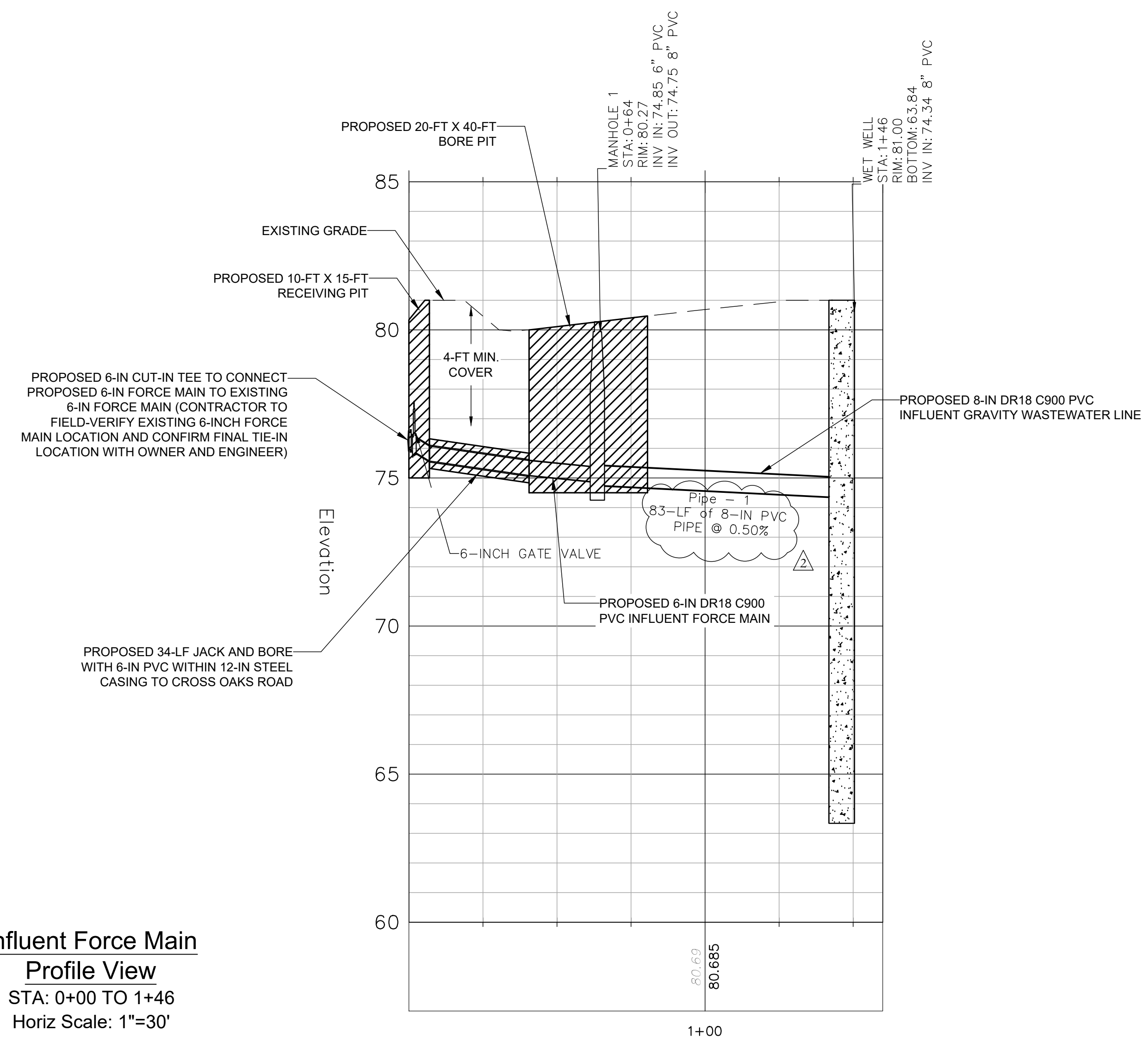
DWG NO. 01.1695-D29



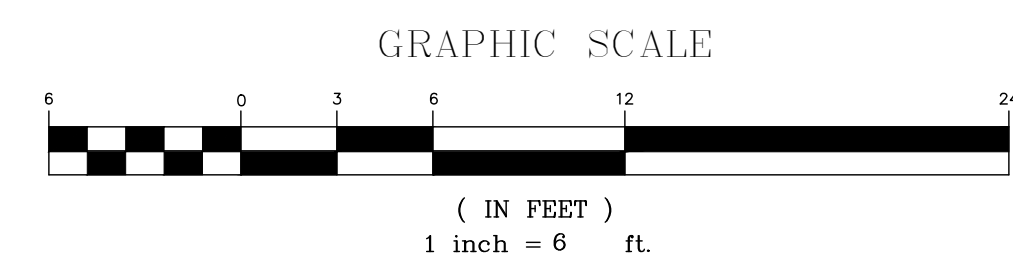
THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE DISTRIBUTED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THE DRAWINGS ARE INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



**Influent Wastewater  
Plan View  
STA: 0+00 TO 1+46**



**Influent Force Main  
Profile View  
STA: 0+00 TO 1+46  
Horiz Scale: 1"=30'  
Vert Scale: 1"=3'**



- CONSTRUCTION NOTES:**
- CONTRACTOR TO INSTALL SILT FENCE ALONG LOW SIDE OF THE PUMP STATION SITE AND UTILIZE EROSION CONTROL MATTING AND SEDIMENT TUBES AS NEEDED. SEE EROSION AND SEDIMENT CONTROL DETAILS ON SHEETS C-8.0 AND C-8.1
  - ALL BENDS AND VALVES ALONG THE PROPOSED FORCE MAIN TO BE RESTRAINED PER THE RESTRAINED JOINT DETAILS ON SHEET C-7.1. ALL RESTRAINED JOINT PIPE SECTIONS TO BE DIP.
  - CONTRACTOR TO ENSURE NO WORK IS PERFORMED WITHIN WETLANDS/SENSITIVE AREAS WITHOUT USACE PERMIT.
  - PUMP STATION DRIVEWAY TO BE ASPHALT WITHIN SCDOT DRIVEWAY.
  - CONTRACTOR TO VERIFY LOCATIONS OF UNDERGROUND UTILITIES AND STORM DRAINAGE INFRASTRUCTURE PRIOR TO DIGGING AND MAINTAIN THE NECESSARY SEPARATION TO AVOID DAMAGING UTILITIES OR DRAINAGE INFRASTRUCTURE. CONTRACTOR IS RESPONSIBLE FOR REMEDIATION OF ANY DAMAGES WHICH OCCUR DURING CONSTRUCTION.

<b>REVISION</b>		<b>DATE</b>
▲	DATE	REVISION DESCRIPTION
▲	12/18/24	ISSUE FOR PERMITTING
▲	01/22/25	SCHEM COMMENTS
▲	APPROVALS	DATE: 12/18/24
▲	ENGINEER	
▲	DISCUSSOR	
▲	HMW	
▲	TECHNICIAN	
▲	MRT	
▲	CHECKED BY	
▲	ARH	
▲	APPROVED	
▲	ARH	

**ALLIANCE CONSULTING ENGINEERS**  
Alliance Consulting Engineers, Inc.  
124 Verdine Blvd., Mount Pleasant, SC 29508  
Phone: (864) 284-1740 • Fax: (864) 284-1741

WASTEWATER  
PLAN AND PROFILE  
(I OF 2)

290-GPM OAKS ROAD  
PUMP STATION

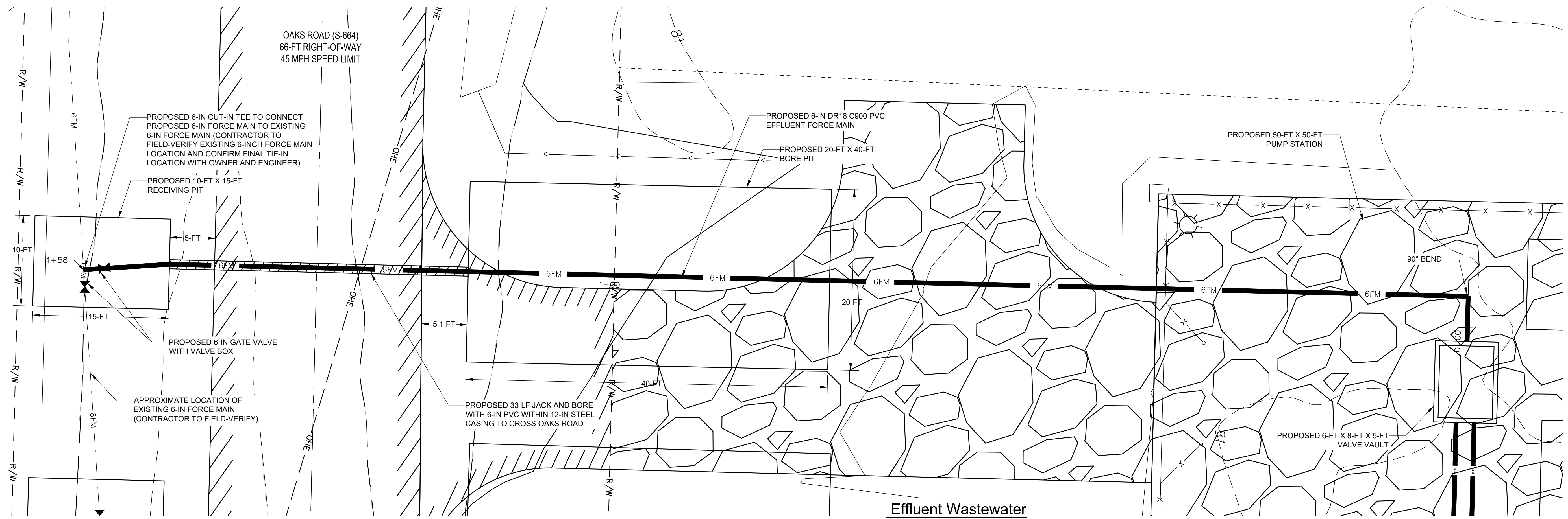
CLARENDON COUNTY  
SOUTH CAROLINA

DATE: AUGUST 2024  
SCALE: AS SHOWN

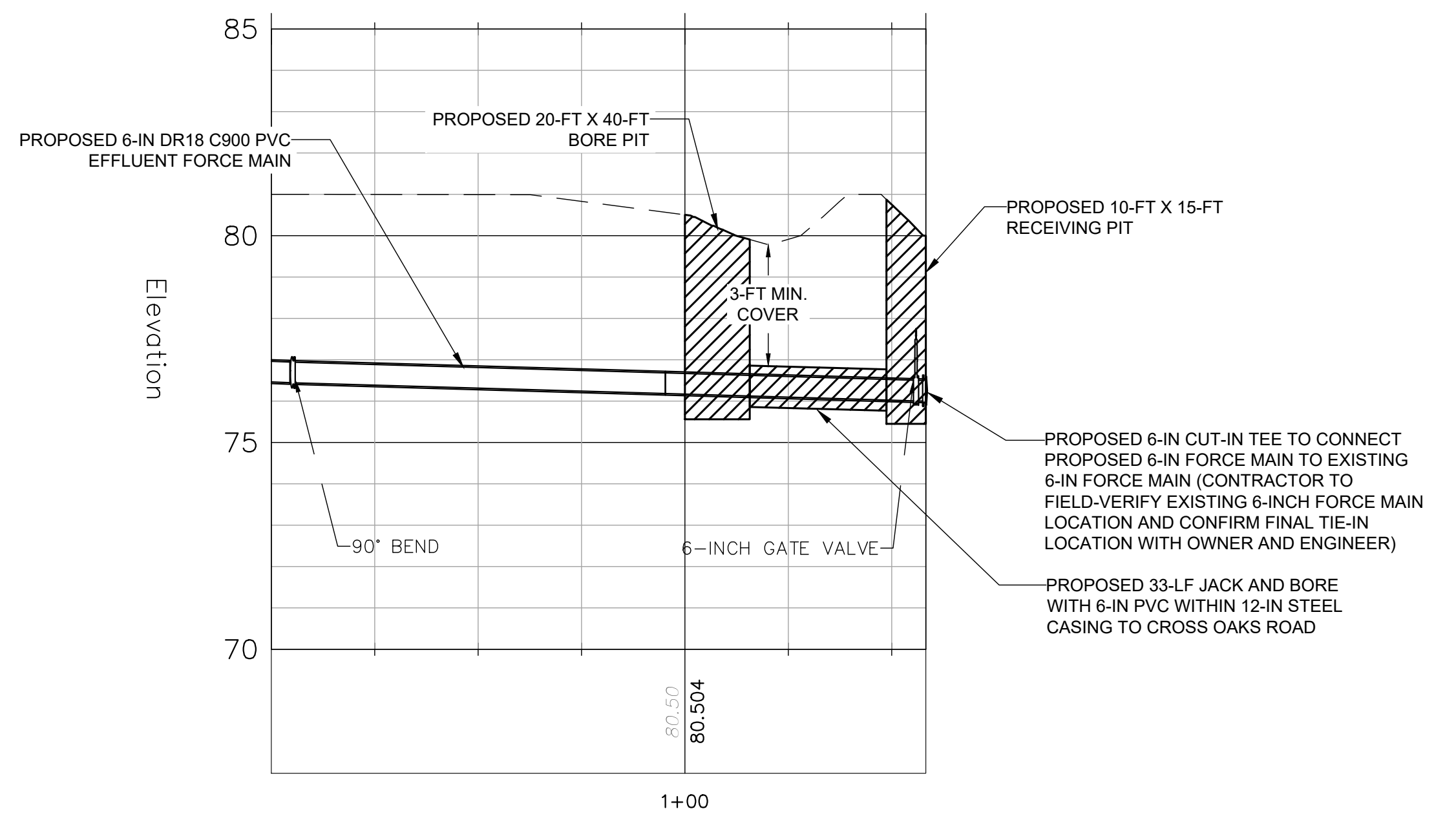
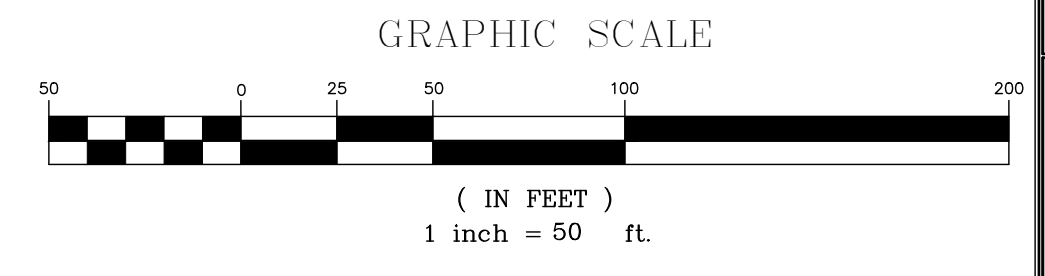
FILE NAME: 24110-Plans.dwg	SHEET C-5.0
REFERENCE FILE: 24110-Base.dwg	OF C-8.1
PROJECT NO. 24110-0014	

DWG NO. 01.1695-D29

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



**Effluent Wastewater  
Plan View**  
STA: 0+00 TO 1+58

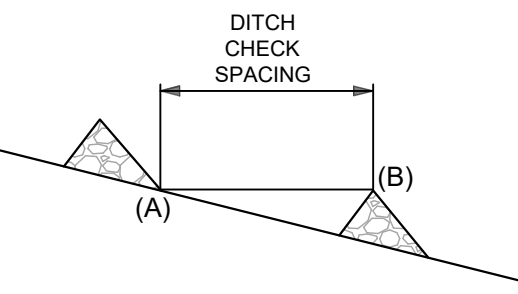
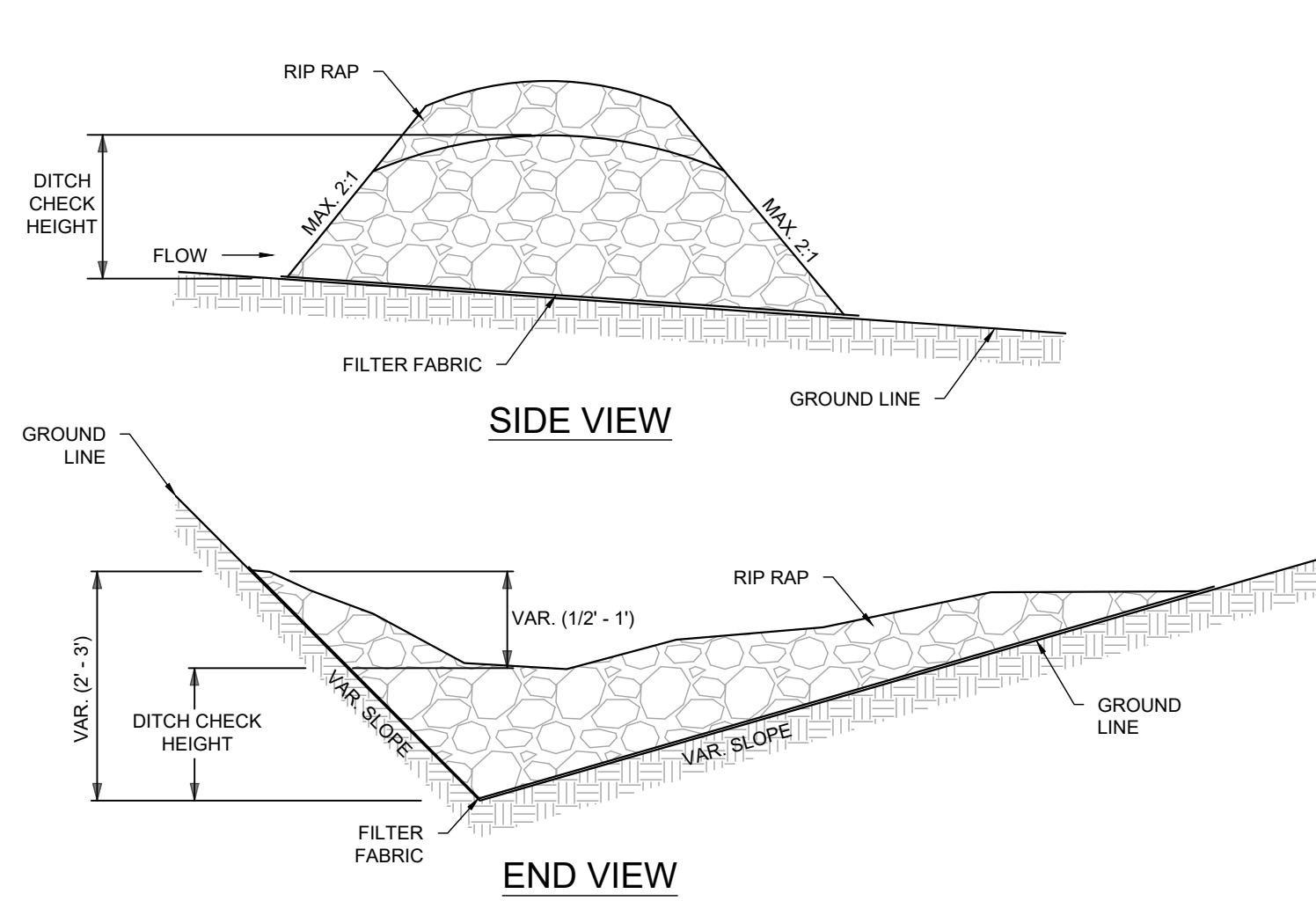


**Effluent Force Main  
Profile View**  
STA: 0+00 TO 1+58  
Horiz Scale: 1"=30'  
Vert Scale: 1"=3'

- CONSTRUCTION NOTES:**
1. CONTRACTOR TO INSTALL SILT FENCE ALONG LOW SIDE OF THE PUMP STATION SITE AND UTILIZE EROSION CONTROL MATTING AND SEDIMENT TUBES AS NEEDED. SEE EROSION AND SEDIMENT CONTROL DETAILS ON SHEETS C-8.0 AND C-8.1
  2. ALL BENDS AND VALVES ALONG THE PROPOSED FORCE MAIN TO BE RESTRAINED PER THE RESTRAINED JOINT DETAILS ON SHEET C-7.1. ALL RESTRAINED JOINT PIPE SECTIONS TO BE DIP.
  3. CONTRACTOR TO ENSURE NO WORK IS PERFORMED WITHIN WETLANDS/SENSITIVE AREAS WITHOUT USACE PERMIT.
  4. PUMP STATION DRIVEWAY TO BE ASPHALT WITHIN SCDOT ROADWAY.
  5. CONTRACTOR TO VERIFY LOCATIONS OF UNDERGROUND UTILITIES AND STORM DRAINAGE INFRASTRUCTURE PRIOR TO DIGGING AND MAINTAIN THE NECESSARY SEPARATION TO AVOID DAMAGING UTILITIES OR DRAINAGE INFRASTRUCTURE. CONTRACTOR IS RESPONSIBLE FOR REMEDIATION OF ANY DAMAGES WHICH OCCUR DURING CONSTRUCTION.

REVISION DATE	
DATE	REVISION DESCRIPTION
12/18/24	ISSUE FOR PERMITTING
01/22/25	SCHEM COMMENTS
APPROVALS	
ENGINEER ARH	DISCUSSOR HMW
TECHNICIAN MRT	CHECKED BY ARH
APPROVED ARH	
DATE: 12/18/24	
SIGNATURE:	
Alliance Consulting Engineers, Inc. 124 Verdie Blvd., Mount Airy, NC 28551 Phone: (864) 284-1740 • Fax: (864) 284-1741	
WASTEWATER PLAN AND PROFILE (2 OF 2)	
SCALE: AS SHOWN	
290-GPM OAKS ROAD PUMP STATION	
DATE: AUGUST 2024	
SOUTH CAROLINA	
CLARENDON COUNTY	
FILE NAME:	SHEET
24110-Plans.dwg	C-5.1
REFERENCE FILE:	OF
24110-Base.dwg	C-8.1
PROJECT NO.:	
24110-0014	
DWG NO. 01.1695-D29	

THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



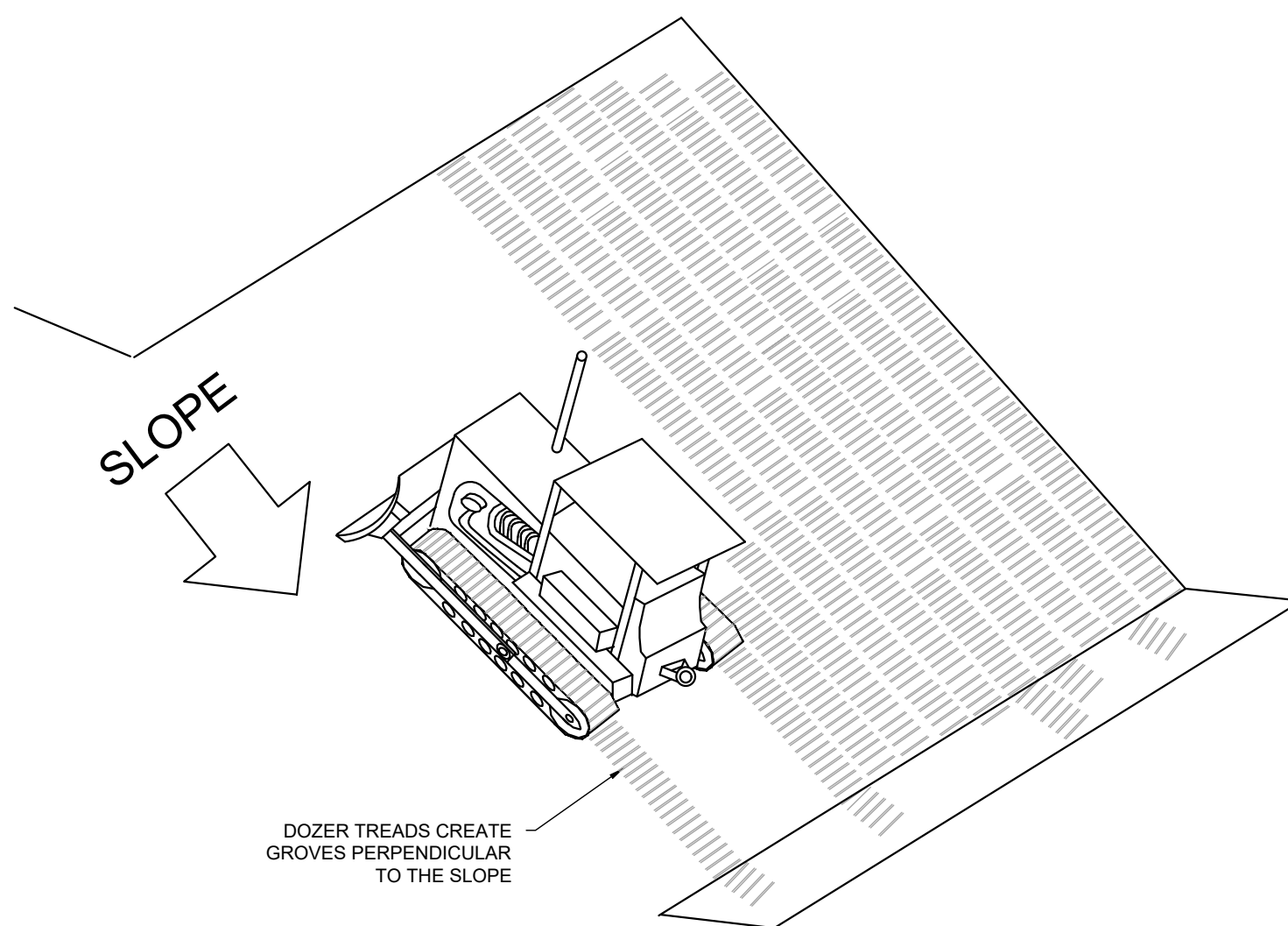
ELEVATION OF THE TOE OF DITCH CHECK (A) IS EQUAL TO THE ELEVATION OF THE TOP OF THE NEXT DITCH CHECK (B)

- NOTES:**
1. DITCH CHECK SHOULD NEVER BE USED IN LIVE STREAM.
  2. DITCH CHECK IS NOT ADEQUATE FOR MORE THAN 2 ACRES OF DRAINAGE.
  3. RIP RAP SHALL BE CLASS A
  4. RIP RAP MAP BE HAND PLACED OR MECHANICALLY PLACED AND SHAPED.
  5. REMOVAL AND DISPOSAL OF DITCH CHECK IS INCLUDED IN THE BID PRICE OF "DITCH CHECK".
  6. SLOPES OF DITCH CHECK SHALL BE NO STEEPER THAN 2:1, BUT MAY BE FLATTENED DUE TO TRAFFIC SAFETY, AS DIRECTED BY THE ENGINEER.
  7. HEIGHT OF DITCH CHECK SHALL BE NO MORE THAN 2.0 FEET.
  8. REMOVE COLLECTED SEDIMENT IN FRONT OF DITCH CHECK AS DETERMINED BY THE ENGINEER AT NO ADDITIONAL EXPENSE.



### CHECK DAMS DETAIL

N.T.S.



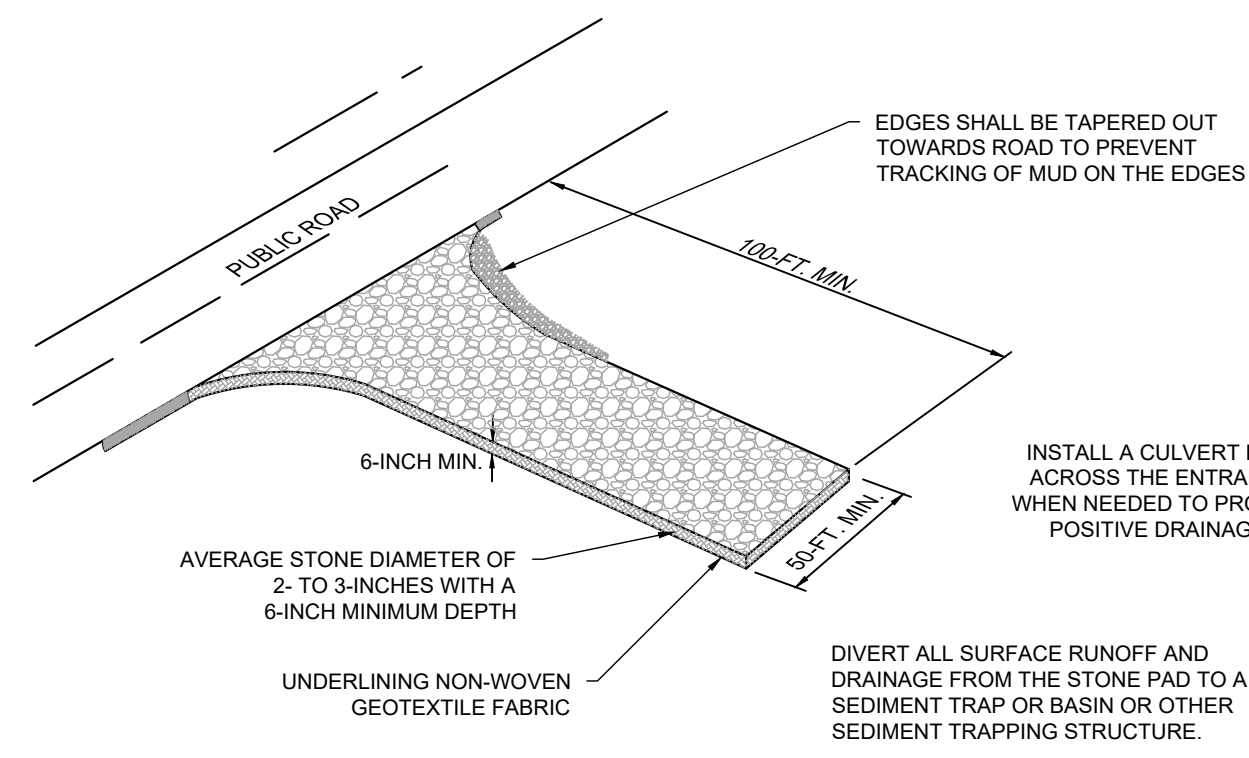
**DEFINITION:**  
PROVIDING A ROUGH SOIL SURFACE WITH HORIZONTAL DEPRESSIONS CREATED BY OPERATION A TILLAGE OR OTHER SUITABLE IMPLEMENT ON THE CONTOUR, OR BY LEAVING SLOPES IN A ROUGHENED CONDITION BY NOT FINE-GRADING THEM.

**PURPOSE:**  
THE PURPOSES OF SURFACE ROUGHENING ARE TO AID IN THE ESTABLISHMENT OF VEGETATIVE COVER WITH SEED, TO REDUCE RUN-OFF VELOCITY AND INCREASE INFILTRATION AND TO REDUCE EROSION AND PROVIDE FOR SEDIMENT TRAPPING.

**CONDITIONS:**  
ALL SLOPES STEEPER THAN 3:1 REQUIRE SURFACE ROUGHENING, EITHER STAIR-STEP GRADING, GROOVING, FURROWING, OR TRACKING IF THEY ARE TO BE STABILIZED WITH VEGETATION. HOWEVER, IF THE SLOPE IS TO BE STABILIZED WITH EROSION CONTROL BLANKETS OR SOIL REINFORCING MATTING, THE SOIL SURFACE SHOULD NOT BE ROUGHENED. AREAS WITH GRADES LESS STEEP THAN 3:1 SHOULD HAVE THE SOIL SURFACE LIGHTLY ROUGHENED AND LOOSENEED TO A DEPTH OF 2 TO 4 INCHES PRIOR TO SEEDING. AREAS WHICH HAVE BEEN GRADED AND WILL NOT BE STABILIZED IMMEDIATELY MAY BE ROUGHENED TO REDUCE RUNOFF VELOCITY UNTIL SEEDING TAKES PLACE. SLOPES WITH A STABLE ROCK FACE DO NOT REQUIRE ROUGHENING OR STABILIZATION.

### SURFACE ROUGHENING DETAIL

N.T.S.



**WHEN STABILIZED AND WHERE TO USE IT:**  
STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD.

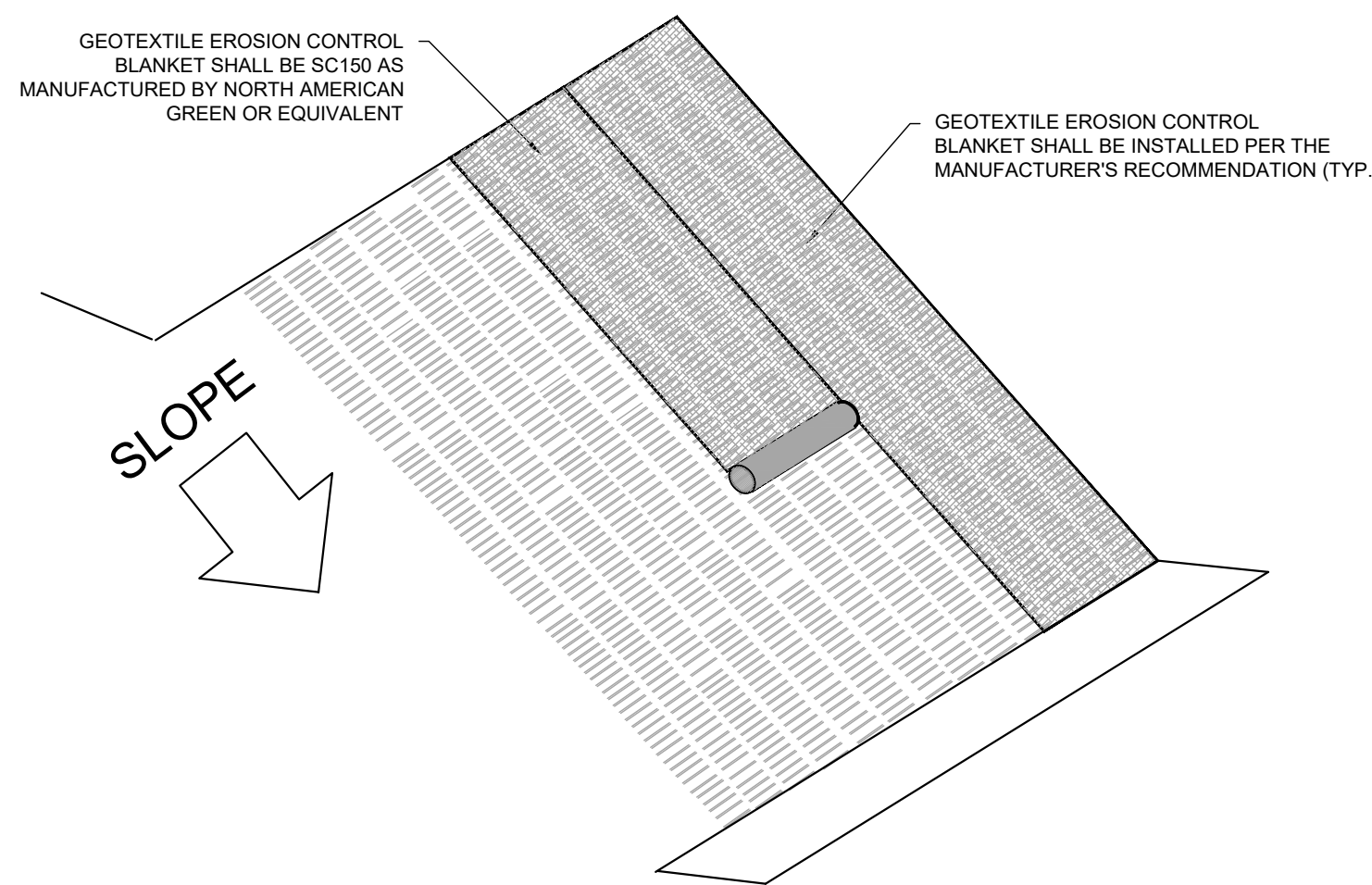
**IMPORTANT CONSIDERATIONS:**  
IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF-SITE. WASHDOWN FACILITIES SHALL BE REQUIRED AS DIRECTED BY SCDHEC AS NEEDED. WASHDOWN AREAS IN GENERAL MUST BE ESTABLISHED WITH CRUSHED GRAVEL AND DRAIN INTO A SEDIMENT TRAP OR SEDIMENT BASIN. CONSTRUCTION ENTRANCES SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY VEHICLES.

- INSTALLATION:**
1. REMOVE ALL VEGETATION AND ANY OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA.
  2. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM STONES TO A SEDIMENT TRAP OR BASIN.
  3. INSTALL A NON-WOVEN GEOTEXTILE FABRIC PRIOR TO PLACING ANY STONE.
  4. INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.
  5. THE ENTRANCE SHALL CONSIST OF 1-INCH TO 3-INCH D50 STONE PLACED AT A MINIMUM DEPTH OF 6-INCHES.
  6. MINIMUM DIMENSIONS OF THE ENTRANCE SHALL BE 24-FOOT WIDE BY 100-FOOT LONG, AND MAY BE MODIFIED AS NECESSARY TO ACCOMMODATE SITE CONSTRAINTS.
  7. THE EDGES OF THE ENTRANCE SHALL BE TAPERED OUT TOWARDS THE ROAD TO PREVENT TRACKING OF MUD AT THE EDGE OF THE ENTRANCE.

**INSPECTION AND MAINTENANCE:**  
INSPECT CONSTRUCTION ENTRANCES EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES 1/4-INCHES OR MORE OF PRECIPITATION, OR AFTER HEAVY USE. CHECK FOR MUD AND SEDIMENT BUILDUP AND PAD INTEGRITY. MAKE DAILY INSPECTIONS DURING PERIODS OF WET WEATHER. MAINTENANCE IS REQUIRED MORE FREQUENTLY IN WET WEATHER CONDITIONS. RESHAPE THE STONE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL. WASH OR REPLACE STONES AS NEEDED AND AS DIRECTED BY THE INSPECTOR. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE MUD BEING CARRIED OFF-SITE BY VEHICLES. FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN. REPAIR ANY BROKEN PAVEMENT IMMEDIATELY.

### STABILIZED CONSTRUCTION ENTRANCE DETAIL

(SCDHEC DETAIL SC-06)  
N.T.S.



**DEFINITION:**  
A PROTECTIVE COVERING (BLANKET) OR SOIL STABILIZATION MAT USED TO ESTABLISH VEGETATION ON STEEP SLOPES, CHANNELS, OR SHORELINES.

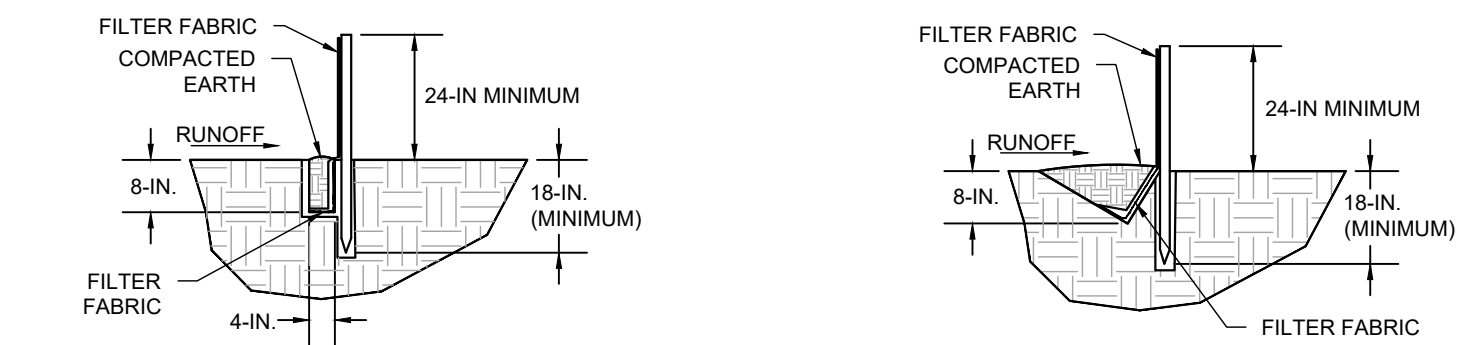
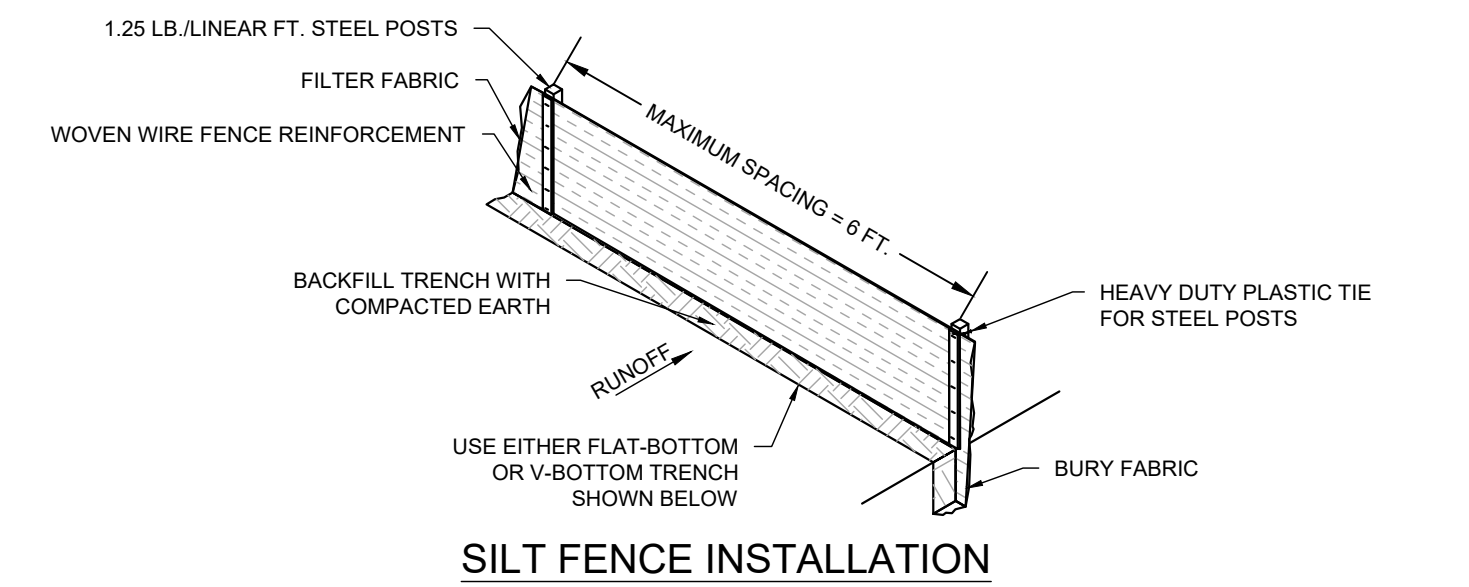
**PURPOSE:**  
TO PROVIDE A MICROCLIMATE WHICH PROTECTS YOUNG VEGETATION AND PROMOTES ITS ESTABLISHMENT, TO REINFORCE THE TURF TO RESIST FORCES OF EROSION DURING STORM EVENTS.

**CONDITIONS:**  
MATINGS AND BLANKETS CAN BE APPLIED ON STEEP SLOPES WHERE EROSION HAZARD IS HIGH AND PLANTING IS LIKELY TO BE SLOW IN PROVIDING ADEQUATE PROTECTIVE COVER. CONCENTRATED FLOW AREAS, ALL SLOPES STEEPER THAN 2.5:1 AND WITH A HEIGHT OF TEN FEET OR GREATER, AND CUTS AND FILLS WITHIN STREAM BUFFERS, SHALL BE STABILIZED WITH THE APPROPRIATE EROSION CONTROL MATTING OR BLANKETS. ON STREAMBANKS OR TIDAL SHORELINES WHERE MOVING WATER IS PRESENT, MATTING CAN PREVENT NEW PLANTINGS FROM BEING WASHED AWAY.

**MATERIALS:**  
GEOTEXTILE EROSION CONTROL BLANKET SHALL BE SC150 AS MANUFACTURED BY NORTH AMERICAN GREEN OR EQUIVALENT.

### EROSION CONTROL MATTING DETAIL

N.T.S.



### FLAT-BOTTOM TRENCH DETAIL V-SHAPED TRENCH DETAIL

- WHEN AND WHERE TO USE IT:**  
SILT FENCE IS APPLICABLE IN AREAS:
- WHERE THE MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE FENCE IS 100-FOOT
  - WHERE THE MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO FENCE LINE) IS 2H:1V
  - THAT DO NOT RECEIVE CONCENTRATED FLOWS GREATER THAN 0.5 CFS

DO NOT PLACE SILT FENCE ACROSS CHANNELS OR USE IT AS A VELOCITY CONTROL BMP.

- MATERIALS**
- STEEL POSTS**
- USE 48-INCH LONG STEEL POSTS THAT MEET THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS:
  - COMPOSED OF HIGH STRENGTH STEEL WITH MINIMUM YIELD STRENGTH OF 50,000 PSI.
  - HAVE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND NOMINAL "T" LENGTH OF 1.48-INCHES.
  - WEIGHT 1.25 POUNDS PER FOOT (± 8%)
  - HAVE A SOIL STABILIZATION PLATE WITH A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES ATTACHED TO THE STEEL POSTS.
  - PAINTED WITH A WATER BASED BAKED ENAMEL PAINT.

USE STEEL POSTS WITH A MINIMUM LENGTH OF 4-FOOT, WEIGHING 1.25 POUNDS PER LINEAR FOOT (± 8%) WITH PROJECTIONS TO AID IN FASTENING THE FABRIC. EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON SITE, STEEL POSTS WILL HAVE A METAL SOIL STABILIZATION PLATE WELDED NEAR THE BOTTOM SUCH THAT WHEN THE POST IS DRIVEN TO THE PROPER DEPTH, THE PLATE WILL BE BELOW GROUND LEVEL FOR ADDED STABILITY.

THE SOIL PLATES SHOULD HAVE THE FOLLOWING CHARACTERISTICS:

- BE COMPOSED OF MINIMUM 15 GAUGE STEEL.
- HAVE A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES.

- GEOTEXTILE FILTER FABRIC**
- GEOTEXTILE FILTER FABRIC IS:
- COMPOSED OF FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS COMPOSED OF AT LEAST 85% BY WEIGHT OF POLYOLEFINS, POLYESTERS, OR POLYAMIDES.
  - FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER.
  - FREE OF ANY TREATMENT OR COATING WHICH MIGHT ADVERSELY ALTER ITS PHYSICAL PROPERTIES AFTER INSTALLATION.
  - FREE OF DEFECTS OR FLAWS THAT SIGNIFICANTLY AFFECT ITS PHYSICAL AND/OR FILTERING PROPERTIES.
  - CUT TO A MINIMUM WIDTH OF 36 INCHES.

USE ONLY FABRIC APPEARING ON SCDOT APPROVAL SHEET #34 MEETING THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

**INSTALLATION**

EXCAVATE A TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP WHEN PLACING FABRIC BY HAND. PLACE 12-INCHES OF GEOTEXTILE FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT. BURY 12-INCHES OF FABRIC INTO THE GROUND WHEN PNEUMATICALLY INSTALLING SILT FENCE WITH A SLICING METHOD. PURCHASE FABRIC IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, WRAP THE FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 6-INCH MINIMUM OVERLAP. INSTALL POSTS TO A MINIMUM DEPTH OF 24-INCHES. INSTALL POSTS A MINIMUM OF 1- TO 2-INCHES ABOVE THE FABRIC, WITH NO MORE THAN 3- FEET OF THE POST ABOVE THE GROUND. SPACE POSTS TO MAXIMUM 6- FEET CENTERS. ATTACH FABRIC TO WOOD POSTS USING STAPLES MADE OF HEAVY-DUTY WIRE AT LEAST 1 1/4-INCH LONG, SPACED A MAXIMUM OF 6-INCHES APART. STAPLE A 2-INCH WIDE LATHE OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF WOODEN POSTS. ATTACH FABRIC 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 ALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES. INSTALL THE FABRIC 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 SPACINGS 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. INSTALL THE FENCE PERPENDICULAR TO THE DIRECTION OF FLOW AND PLACE THE FENCE AT THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.

**INSPECTION AND MAINTENANCE**

INSPECT EVERY SEVEN CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES 1/4-INCHES 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. IF THE FENCE FABRIC TEARS, BEGINS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE SECTION OF FENCE IMMEDIATELY. REMOVE SEDIMENT ACCUMULATED ALONG THE FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE, ESPECIALLY IF HEAVY RAINS ARE EXPECTED.

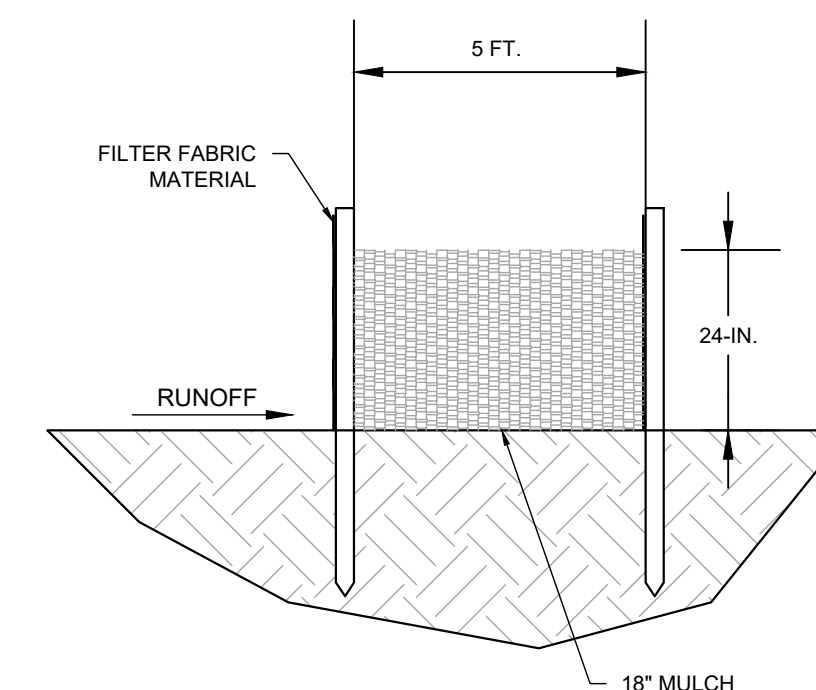
REMOVE TRAPPED SEDIMENT FROM THE SITE OR STABILIZE IT ON SITE.

REMOVE SILT FENCE WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED OR AFTER TEMPORARY BEST MANAGEMENT PRACTICES (BMPs) ARE NO LONGER NEEDED.

PERMANENTLY STABILIZE DISTURBED AREAS RESULTING FROM FENCE REMOVAL.

### SILT FENCE DETAIL

(SCDHEC DETAIL SC-03)  
N.T.S.

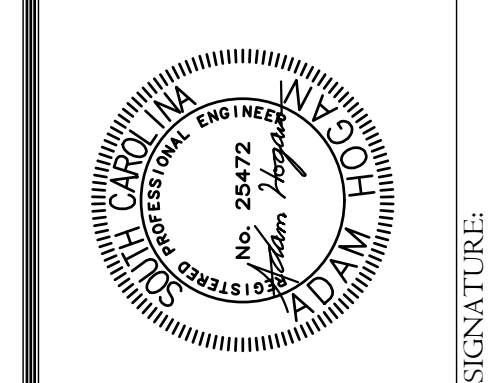


### DOUBLE ROW SILT FENCE DETAIL

N.T.S.

REVISION		DATE	REVISION DESCRIPTION
▲		12/18/24	ISSUE FOR PERMITTING
▲		01/22/25	SCORE COMMENTS

APPROVALS	ENGINEER	DISIGNER	HMW	TECHNICIAN	MRT	CHECKED BY	APPROVED	ARH
	ARH							ARH



**ALLIANCE CONSULTING ENGINEERS**

Alliance Consulting Engineers, Inc.  
124 Verdie Blvd., Suite 205 - Columbia, SC 29607  
Phone: (864) 284-1740 • Fax: (864) 284-1741

PROJECT: 290-GPM OAKS ROAD PUMP STATION

CLARENDON COUNTY, SOUTH CAROLINA

DATE: AUGUST 2024

SCALE: AS SHOWN

EROSION & SEDIMENT CONTROL DETAILS (1 OF 2)

SHEET

FILE NAME: 24110-Cover and Detail.dwg

REFERENCE FILE: 24110-Base.dwg

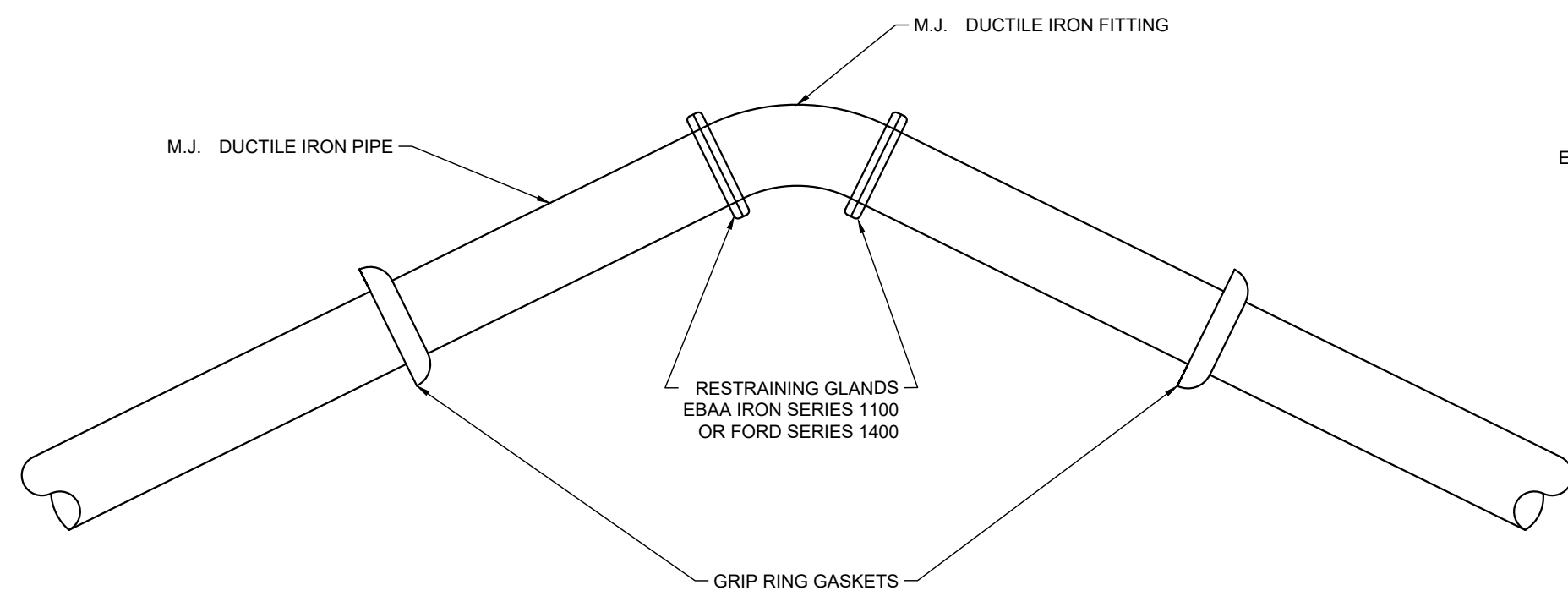
PROJECT NO.: 24110-0014

SHEET OF SHEET C-6.0 OF C-8.1

DWG NO. 01.1695-D29



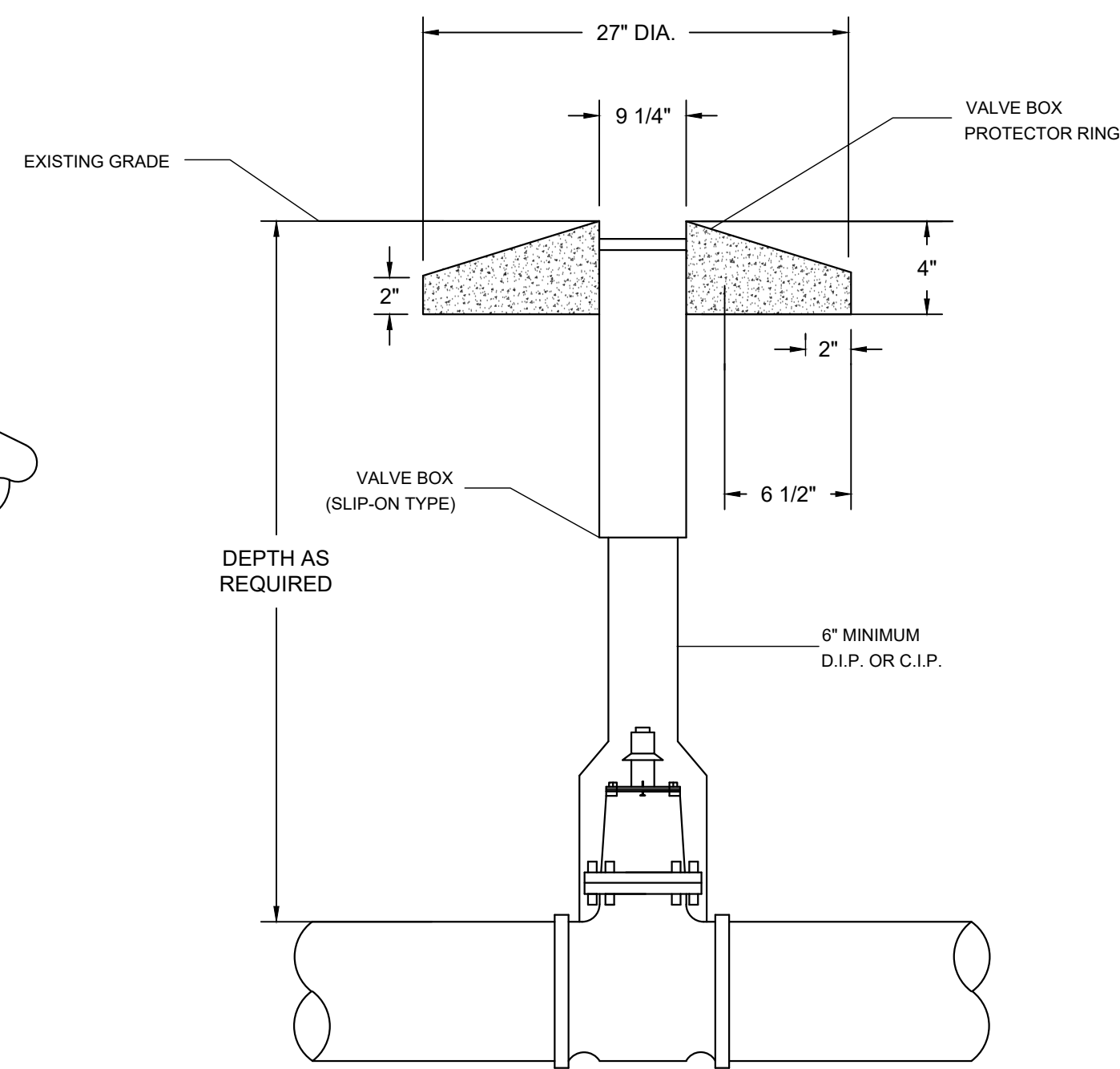
THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



RESTRAINT JOINT TABLE							
LENGTH OF RESTRAINED JOINT REQUIRED (IN L.F. EACH SIDE OF THE BEND)							
SIZE	11 1/4"	22 1/2"	45"	90"	TEE BRANCH	DEAD END	REDUCER
6"	3	7	14	33	64	85	46
8"	4	9	18	43	90	110	44
10"	5	10	21	51	113	133	45

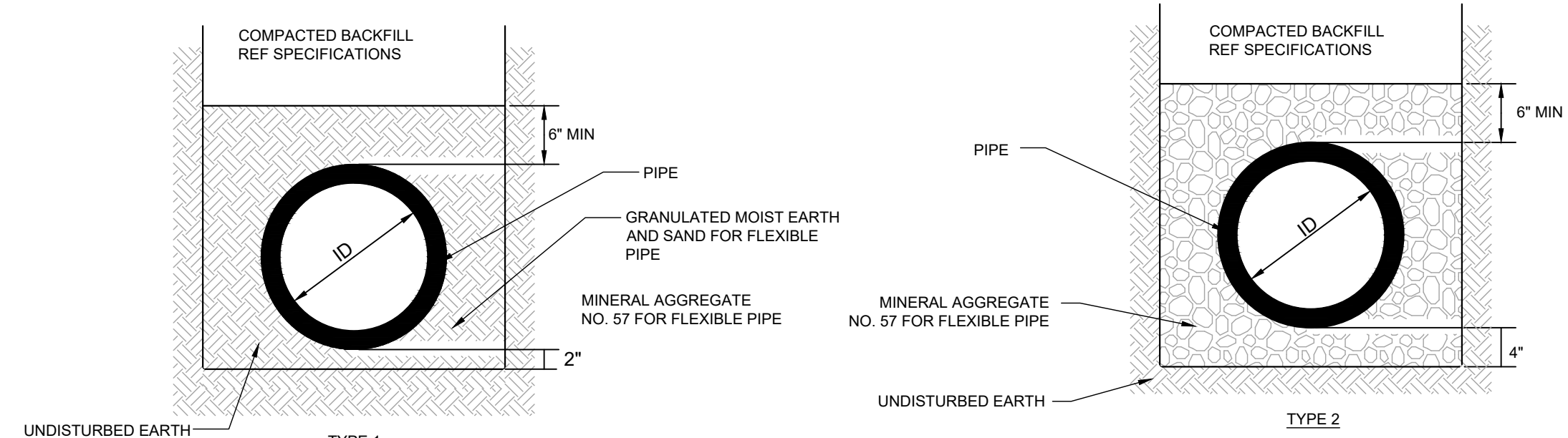
**NOTES:**  
 THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS:  
 LAYING CONDITION IS TYPE 3;  
 SOIL DESIGNED AS SAND-SILT;  
 DEPTH IS 3 FEET;  
 DESIGN PRESSURE (TEST) IS 150 PSI;  
 SAFETY FACTOR IS 1.5.  
 FOR THE TEE BRANCH AND REDUCER, LENGTHS ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.

**RESTRAINED JOINT FITTING DETAIL**  
N.T.S.



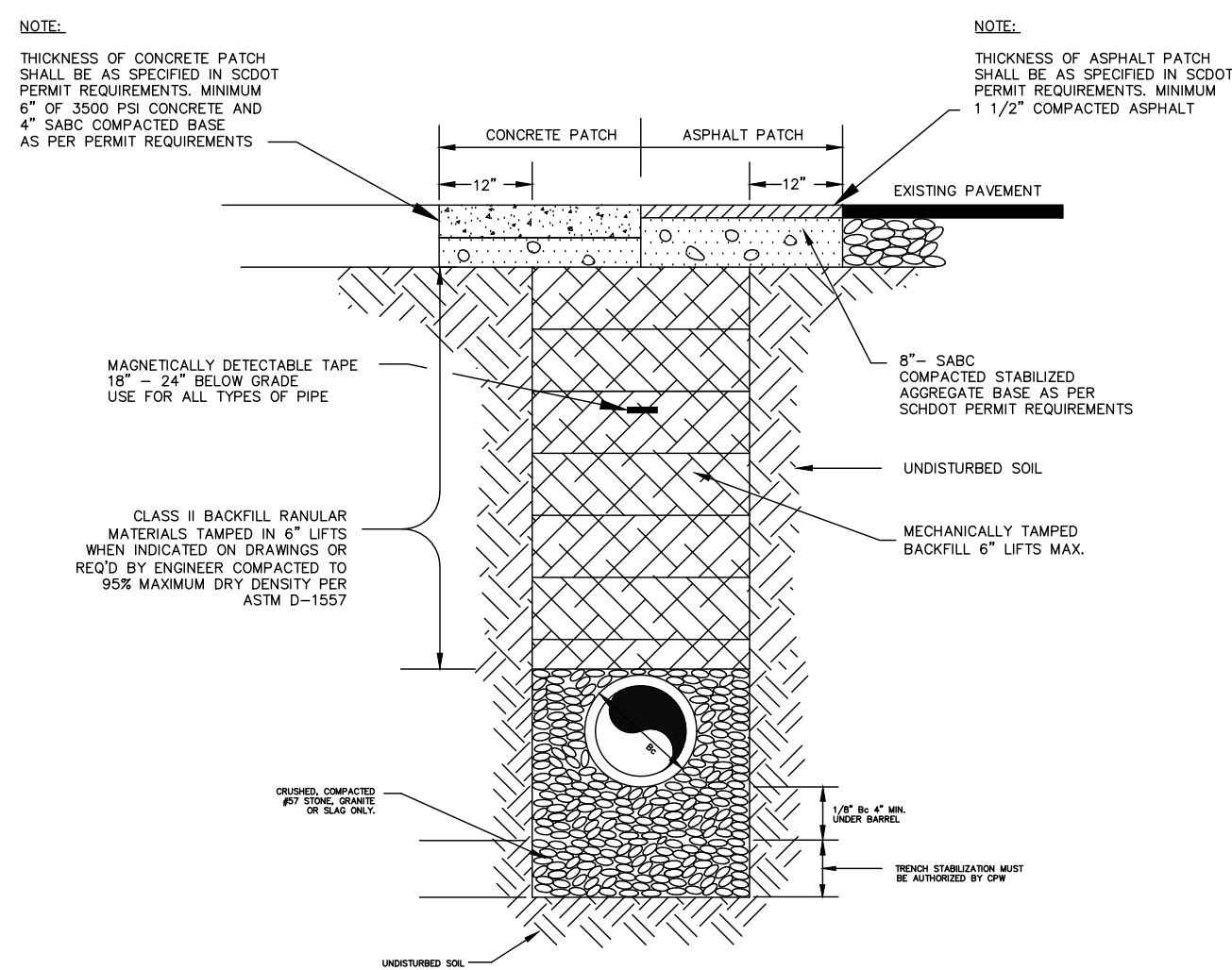
**NOTES:**  
 1-GATE VALVE SHALL BE MUELLER MODEL A2360  
 2-GATE VALVES SHALL OPEN LEFT.  
 3-SCREW TYPE VALVE BOX MAY BE USED AS ALTERNATE.  
 4-GATE VALVES 24" AND LARGER MUST BE MECHANICAL JOINT AND EQUIPPED WITH BY-PASS VALVES.

**GATE VALVE IN BOX DETAIL**  
N.T.S.



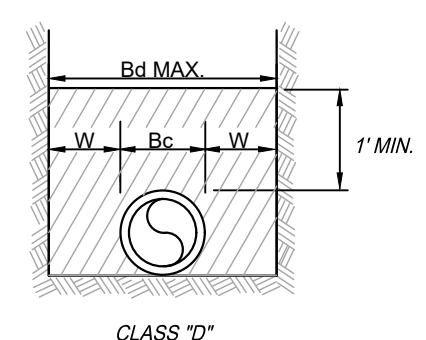
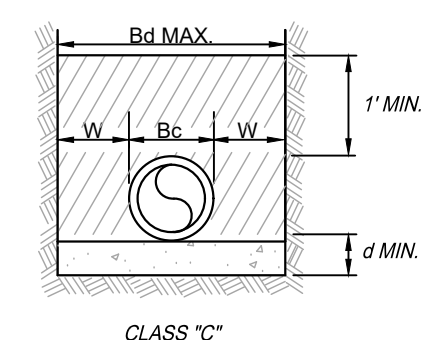
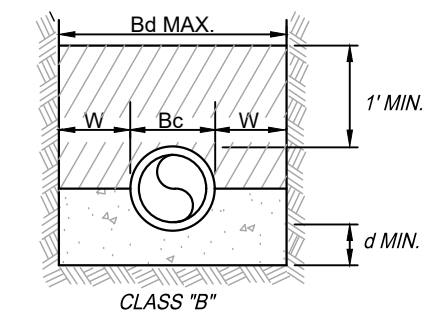
**NOTE:**  
 1. HAND SHAPED BOTTOM - SHAPE BELL HOLES FOR USE IN DRY EARTH TRENCHES ONLY. APPLICABLE TO BOTH EARTH AND ROCK TRENCHES.  
 2. B.C. = OUTSIDE BELL CIRCUMFERENCE GRAVEL OR CRUSHED STONE TO BE USED FOR BEDDING MATERIAL IF WATER IS ENCOUNTERED IN TRENCH BOTTOM.  
 3. TYPE 2 BEDDING USED IN MOIST AREAS (INDICATING GROUNDWATER) AND HIGH TRAFFIC AREAS.

**FORCE MAIN PIPE BEDDING DETAIL**  
N.T.S.



**SEWER MAIN UNDER DRIVEWAY DETAIL**  
N.T.S.

**NOTES:**  
 1. DITCH WIDTH NOT TO EXCEED Bd 2' OVER TOP OF THE PIPE.  
 2. PIPE SIZE 8" TO 30" DESIGN BASED ON (Bd MAX. DITCH WIDTH) NOT USING TRENCH BOX.  
 3. ALL PVC PIPE TO BE INSTALLED IN CLASS "B" DITCH BEDDING, UNLESS OTHERWISE NOTED.

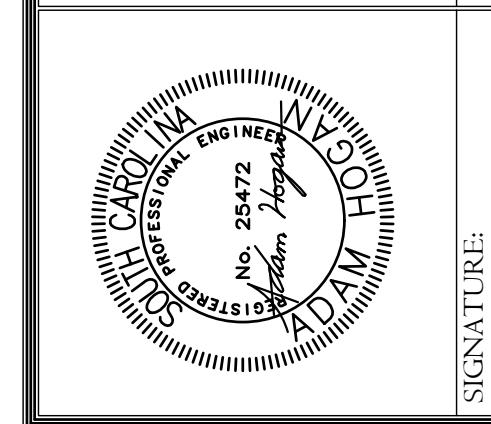


IMPROVED DITCH BEDDING DIMENSIONS FOR CLASS "B", "C" & "D"					
PIPE SIZE	Bc	W	Bd	d	DEPTH OF BEDDING UNDER PIPE
8"	8"	23"	4"		
10"	12"	28"	4"		
12"	14"	29"	4"		
15"	18"	30"	4"		
18"	22"	36"	6"		
21"	24"	36"	6"		
24"	27"	40"	9"		
27"	32"	46"	9"		
30"	38"	48"	9"		

**IMPROVED GRAVITY SEWER DITCH BEDDING DETAIL**  
N.T.S.

REVISION DATE	
DATE	REVISION DESCRIPTION
12/18/24	ISSUE FOR PERMITTING
01/22/25	SCORE COMMENTS

APPROVALS	ENGINEER	DISCUSSOR	TECHNICIAN	CHECKED BY	APPROVED
	ARH	HMW	MRT	ARH	ARH



**ALLIANCE CONSULTING ENGINEERS**  
 Alliance Consulting Engineers, Inc.  
 124 Verdie Blue Boulevard, II, Suite 505 - Columbia, SC 29607  
 Phone: (864) 284-1740 • Fax: (864) 284-1741

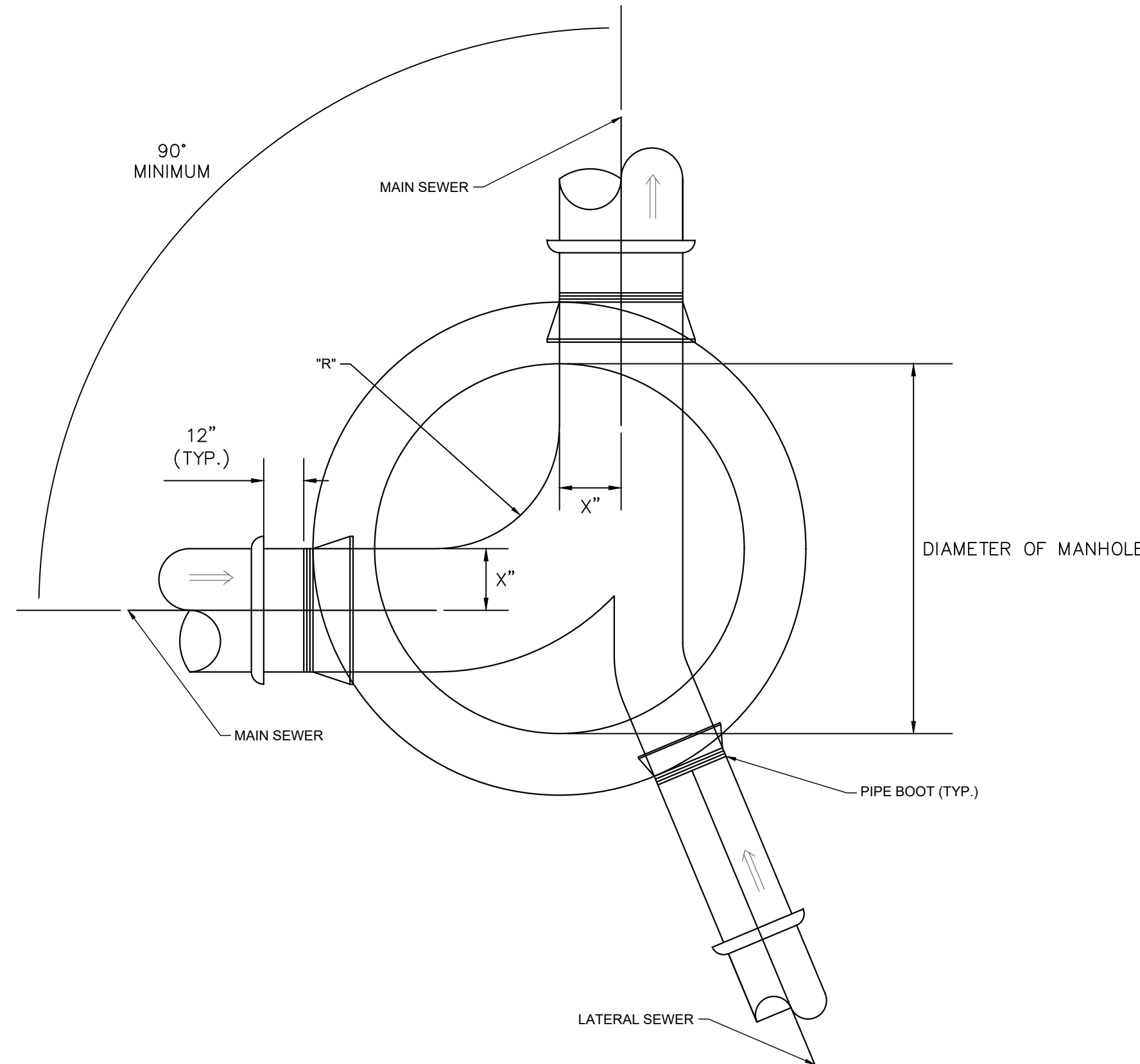
WASTEWATER CONSTRUCTION DETAILS (1 OF 2)

PROJECT: 290-GPM OAKS ROAD PUMP STATION  
 CLARENDON COUNTY SOUTH CAROLINA

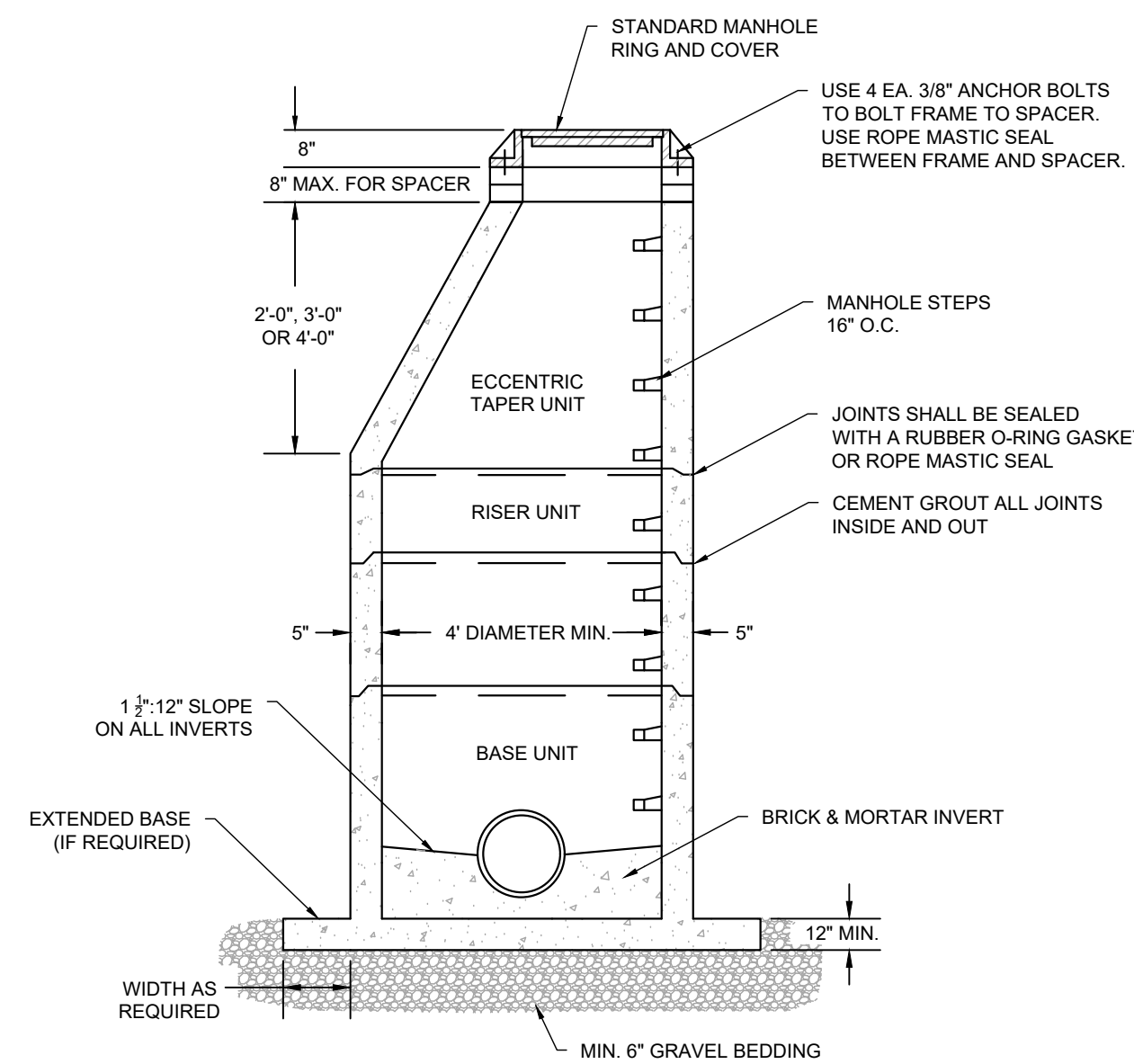
FILE NAME: 24110-Cover and Details.dwg  
 REFERENCE FILE: C-7.0  
 PROJECT NO.: 24110-0014  
 SHEET C-7.0 OF C-8.1

DWG NO. 01.1695-D29

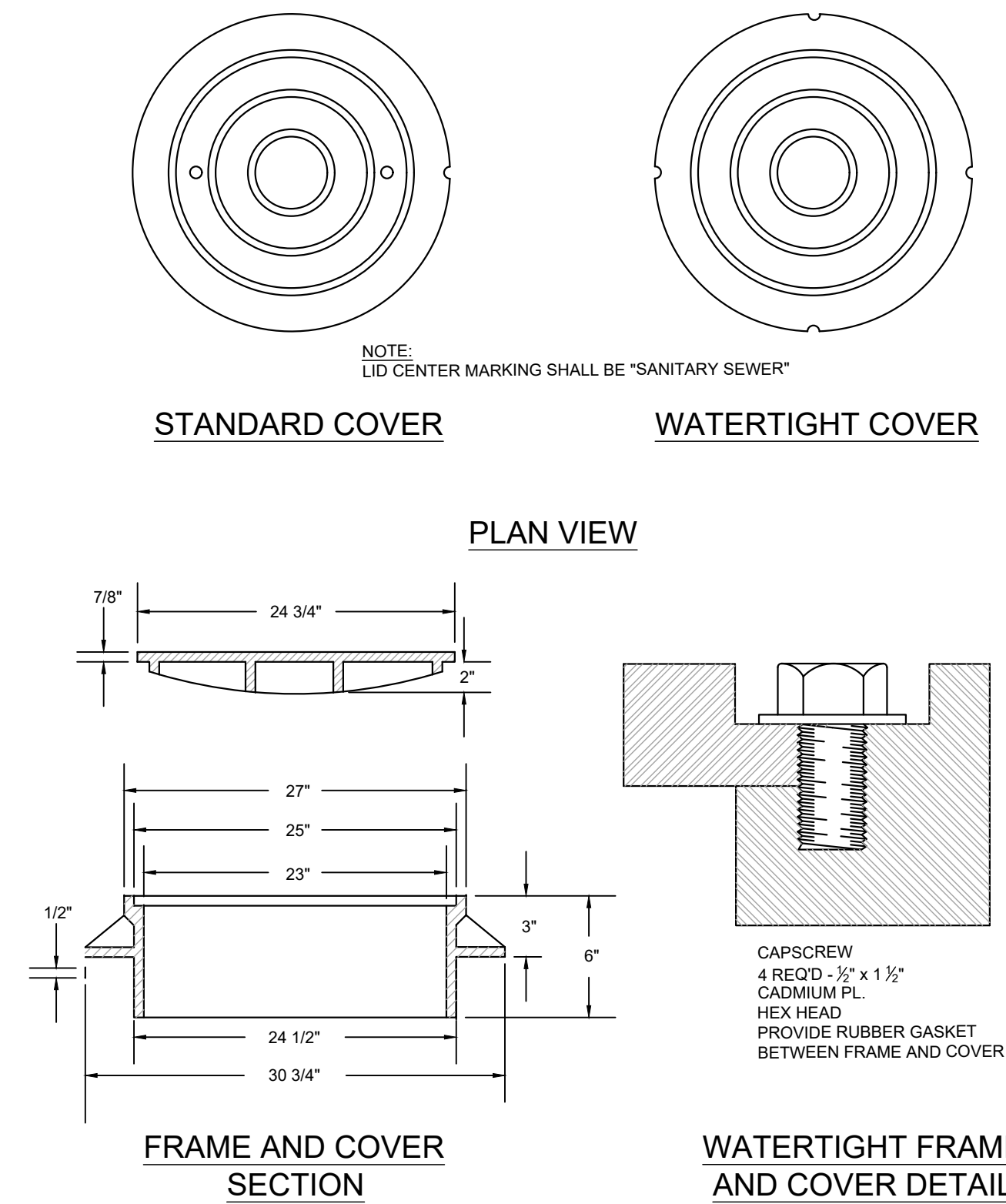
THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



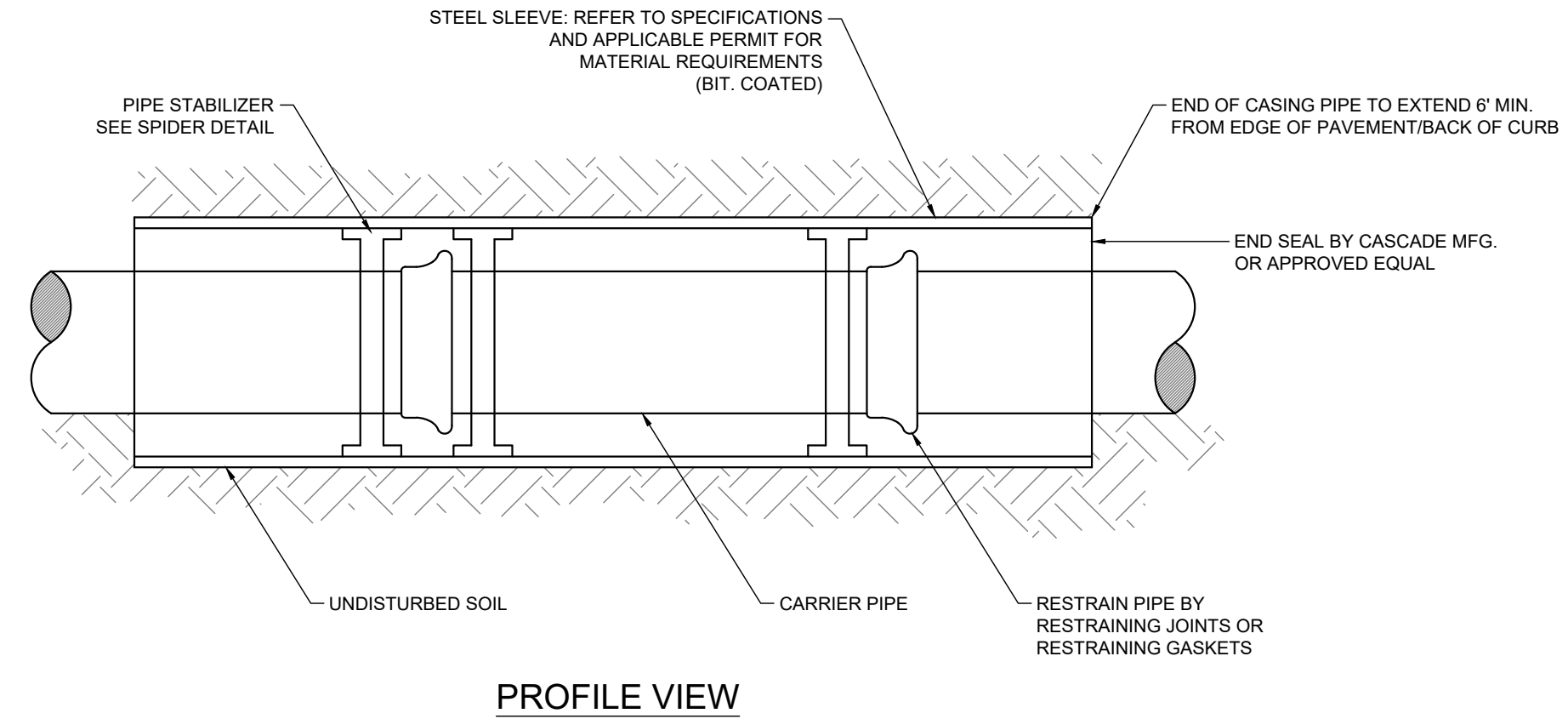
**TYPICAL PLAN STANDARD MANHOLE DETAIL**  
N.T.S.



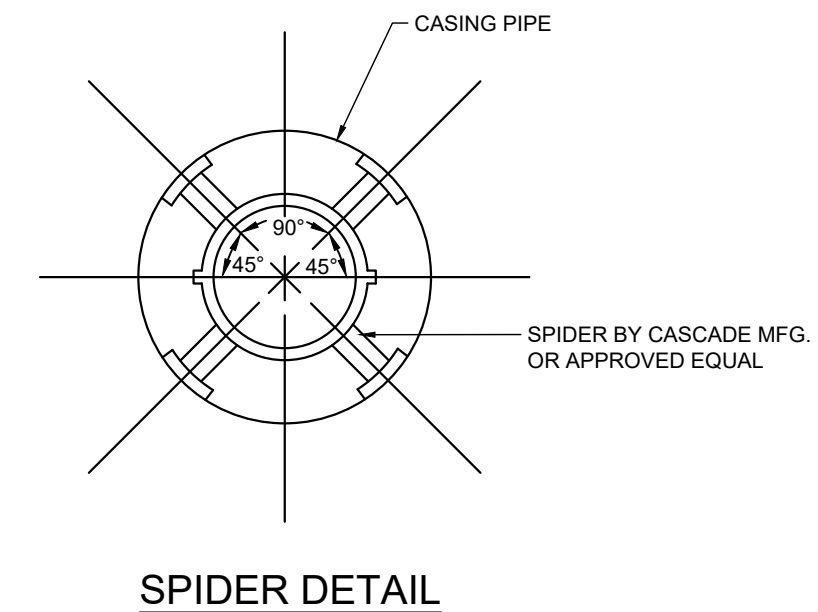
**MANHOLE - STANDARD PRECAST CONCRETE DETAIL**  
N.T.S.



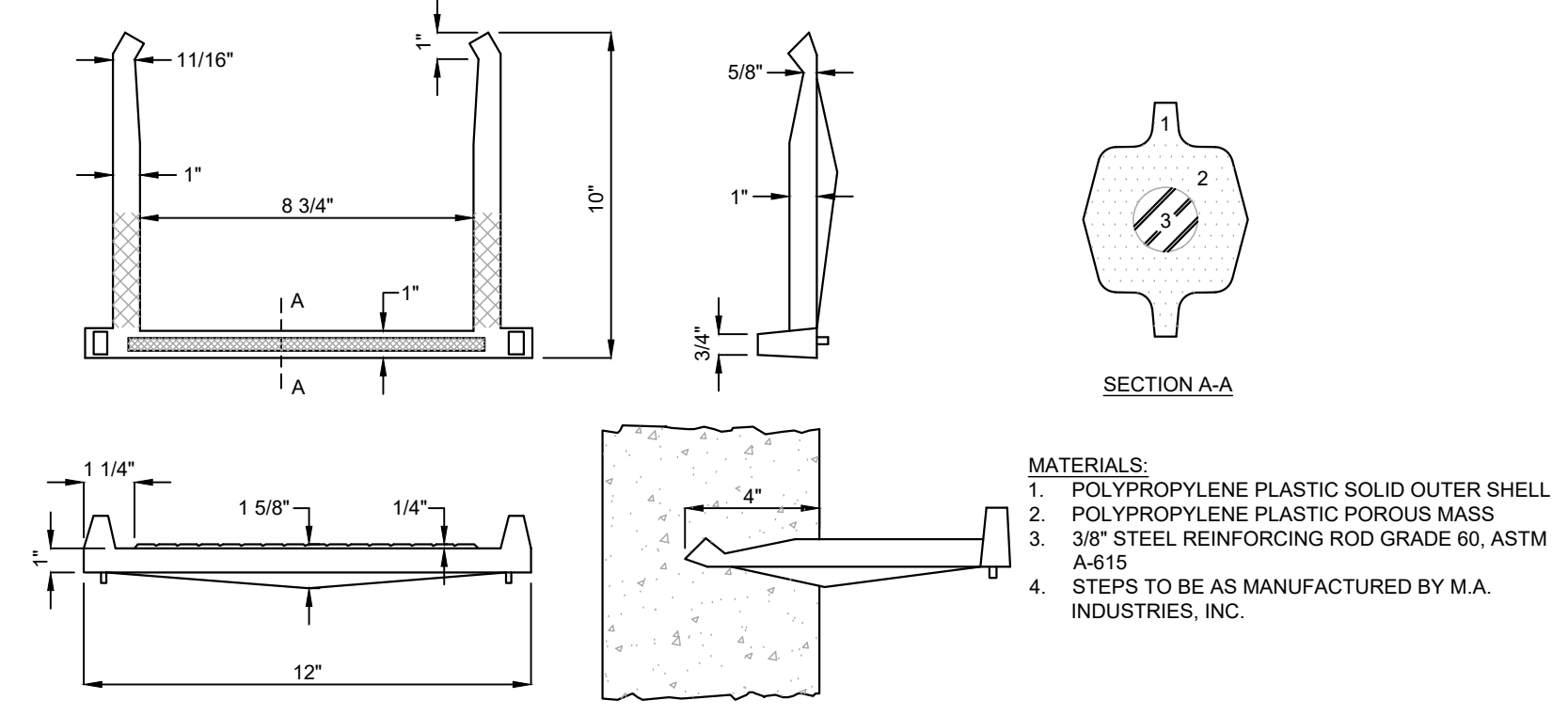
**MANHOLE FRAME AND COVER DETAIL**  
N.T.S.



**PROFILE VIEW**



**SPIDER DETAIL**



**MANHOLE STEP - REINFORCED PLASTIC DETAIL**  
N.T.S.

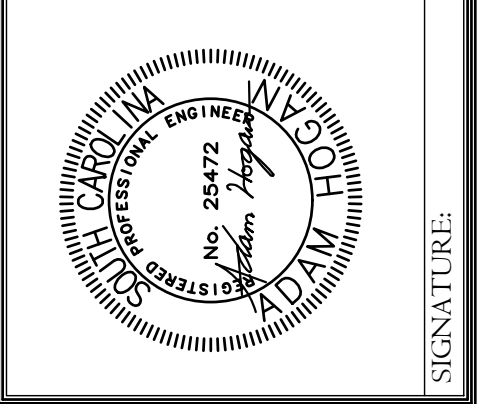
- NOTES:**
- REFER TO APPLICABLE PERMIT FOR MINIMUM REQUIREMENTS GOVERNING HIGHWAY OR RAILROAD UNDER CROSSINGS.
  - 2" MINIMUM BELL CLEARANCE FOR SLEEVES LESS THAN 60" LONG.
  - 4" MINIMUM BELL CLEARANCE FOR 60" AND LONGER SLEEVES.
  - THE INSIDE DIAMETER OF THE CASING PIPE SHALL BE A MINIMUM OF 2" LARGER THAN THE LARGEST OUTSIDE DIAMETER OF THE CARRIER PIPE (JOINTS OR COUPLINGS) IF THE CARRIER PIPE IS LESS THAN 6" IN DIAMETER. IF THE DIAMETER OF THE CARRIER PIPE IS 6" OR LARGER, THE DIAMETER OF THE CASING PIPE SHALL BE A MINIMUM OF 4" LARGER THAN THE LARGEST OUTSIDE DIAMETER OF CARRIER PIPE.
  - THE END OF THE CASING PIPE SHALL EXTEND A MINIMUM OF 25' FROM THE CENTERLINE OF RAIL.
  - THE TOP OF THE CASING PIPE SHALL BE A MINIMUM OF 5.6' BELOW THE BASE OF RAIL.
  - THE TOP OF THE CASING PIPE SHALL BE A MINIMUM OF 3' BELOW THE INVERT OF ROADSIDE DRAINAGE DITCHES.
  - USE SPIDER SUPPORTS (SEE DETAIL) TO MOVE CARRIER PIPE INTO CASING PIPE. SPACING OF SPIDERS WILL BE DICTATED BY THE LENGTH OF CASING PIPE AND NUMBER OF JOINTS OF CARRIER PIPE.
  - MINIMUM OF 2 SPACERS PER JOINT OF PIPE.
  - THERE SHALL BE NO WELDING OF CASING UNDER PAVEMENT.

MIN. STEEL CASING SCHEDULE		
DIP WL SIZE	STEEL CASING SIZE	MINIMUM WALL THICKNESS
4"	10"	0.250"
6"	12"	0.250"
8"	16"	0.250"
10"	18"	0.250"
12"	22"	0.250"
14"	24"	0.312"
15"	26"	0.312"
16"	30"	0.375"
18"	32"	0.375"
20"	36"	0.375"
24"	42"	0.500"
30"	48"	0.500"
36"	54"	0.500"

**JACK AND BORE DETAIL**  
N.T.S.

REVISION DATE	
DATE	REVISION DESCRIPTION
12/18/24	ISSUE FOR PERMITTING
01/22/25	SCDS COMMENTS

APPROVALS	ENGINEER	DISCUSSOR	TECHNICIAN	CHECKED BY	APPROVED
ARH	ARH	HMW	MRT	ARH	ARH



**ALLIANCE CONSULTING ENGINEERS**  
Alliance Consulting Engineers, Inc.  
124 Verdie Blue Boulevard, Suite 505 - Columbia, SC 29607  
Phone: (864) 284-1740 • Fax: (864) 284-1741

WASTEWATER CONSTRUCTION DETAILS  
2 OF 2

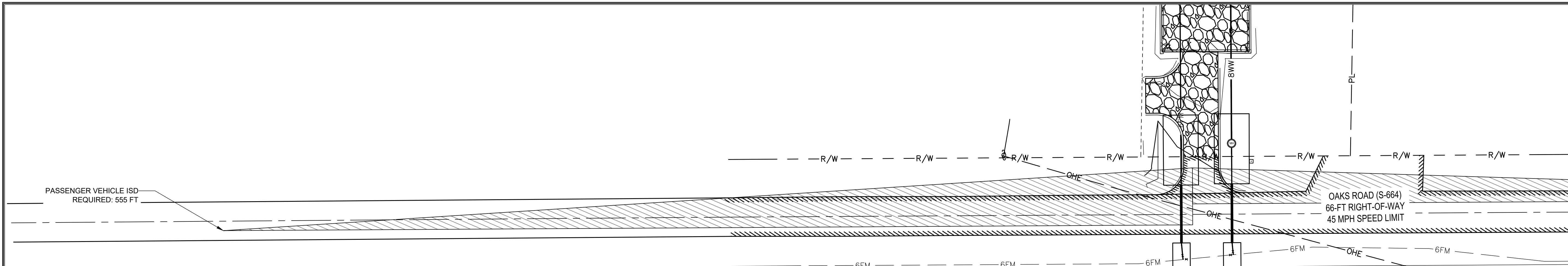
PROJECT: 290-GPM OAKS ROAD PUMP STATION  
SOUTH CAROLINA  
CLARENDON COUNTY

FILE NAME: 24110-Cover and Details.dwg  
REFERENCE FILE: 24110-Base.dwg  
PROJECT NO.: 24110-0014

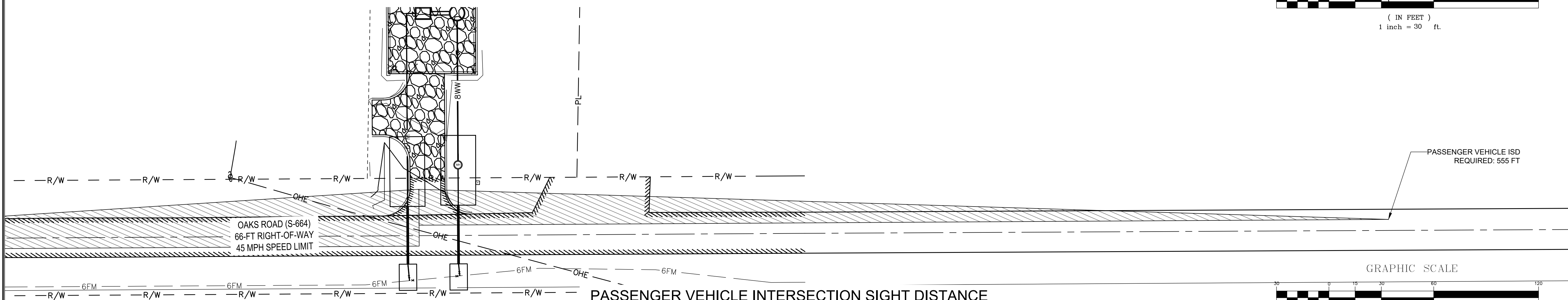
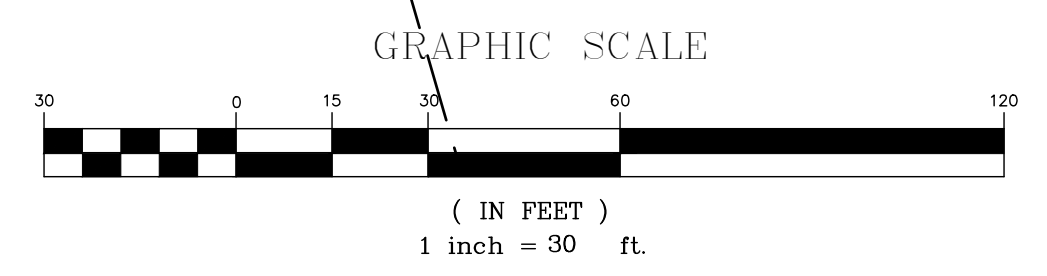
DWG NO. 01.1695-D29



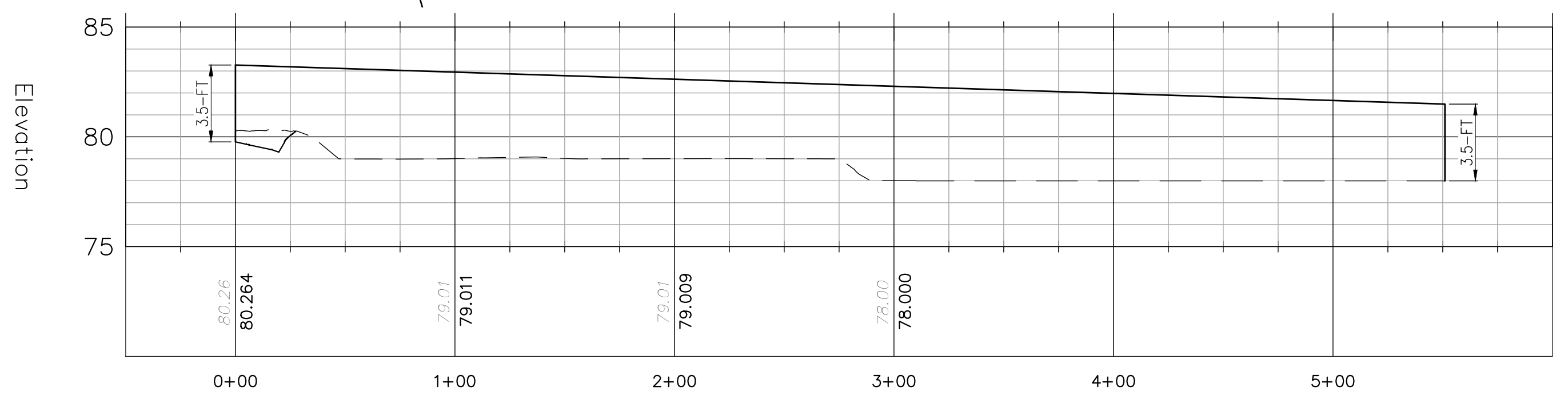
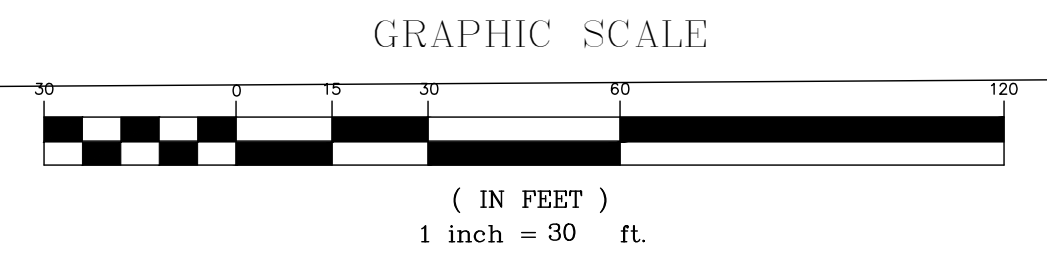
THIS DOCUMENT IS THE SOLE PROPERTY OF ALLIANCE CONSULTING ENGINEERS, INC. IT IS NOT TO BE REPRODUCED, COPIED OR OTHERWISE EDITED WITHOUT THE AUTHORIZATION OF ALLIANCE CONSULTING ENGINEERS, INC. THIS DRAWING IS INTENDED SPECIFICALLY FOR THE PROJECT REFERENCED HEREIN AND IS NOT TRANSFERABLE TO ANOTHER PROJECT.



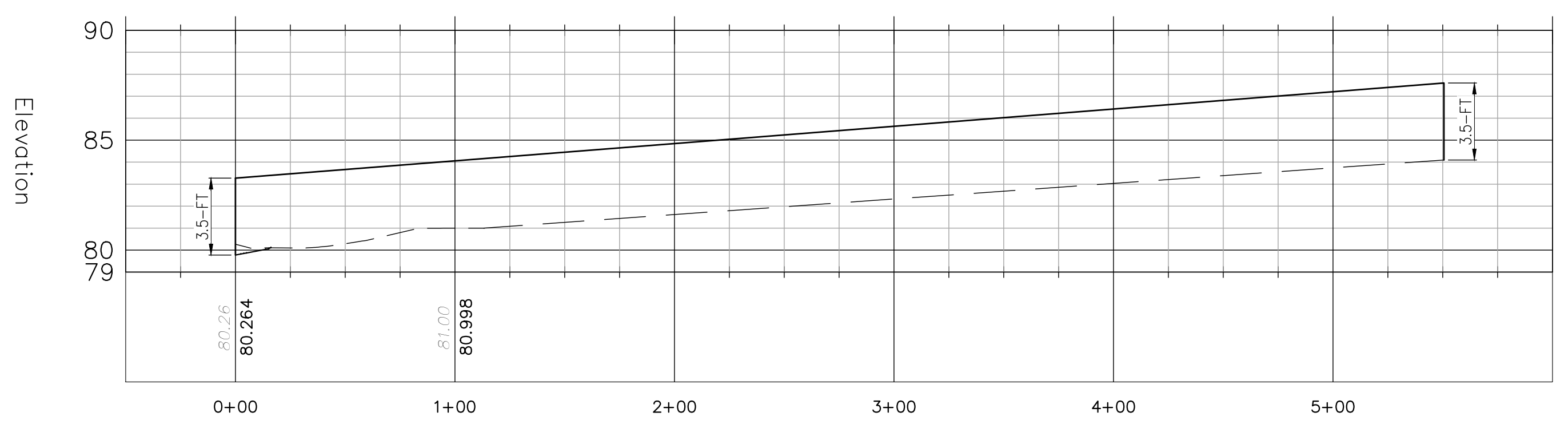
**PASSENGER VEHICLE INTERSECTION SIGHT DISTANCE  
LOOKING RIGHT**



**PASSENGER VEHICLE INTERSECTION SIGHT DISTANCE  
LOOKING LEFT**

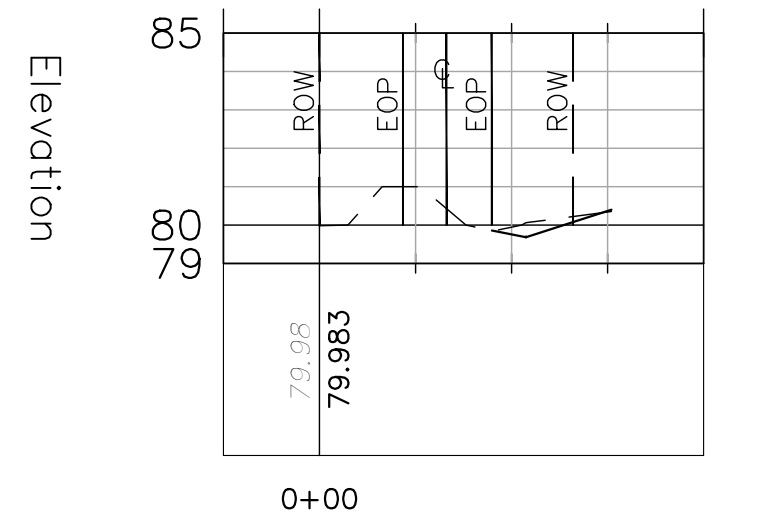
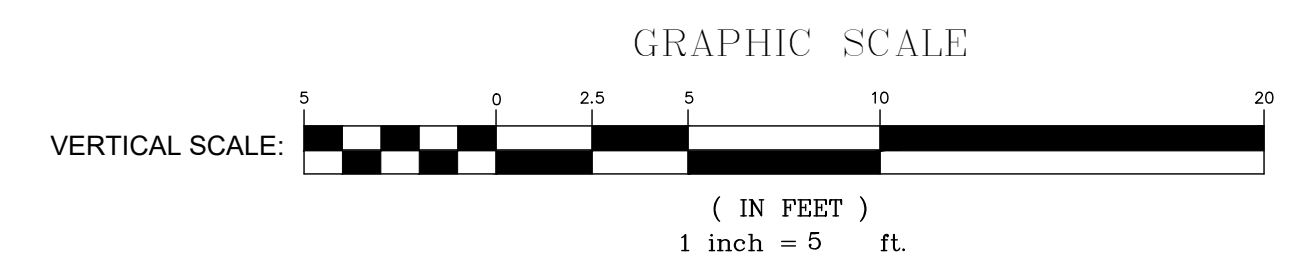
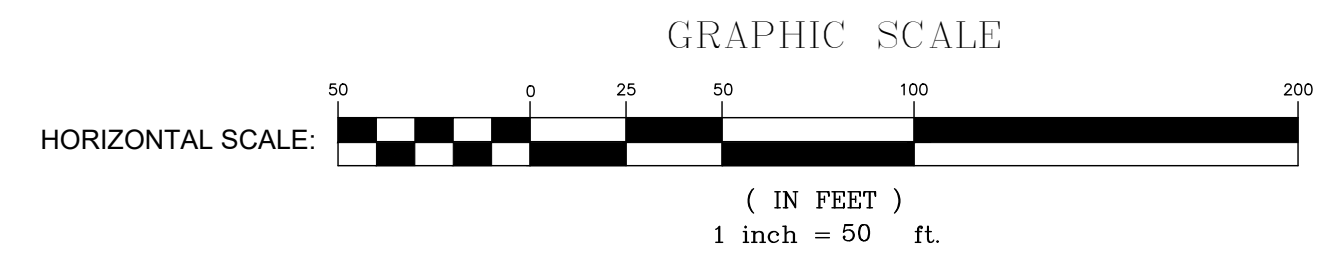


**ISD LOOKING RIGHT**



**ISD LOOKING LEFT**

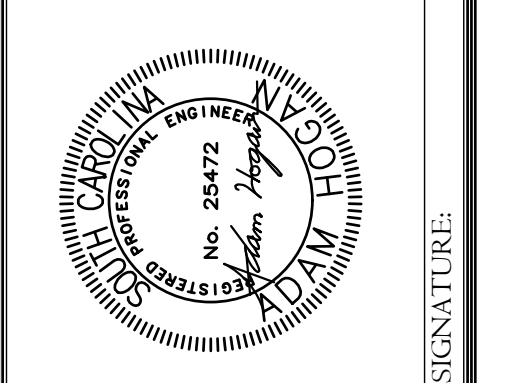
**ROADWAY INFORMATION:**  
 OAKS ROAD (S-664) TWO-LANE TWO-WAY HIGHWAY  
 RIGHT OF WAY: 66 FEET  
 SPEED LIMIT: 45 MPH  
 DESIGN VEHICLE: PASSENGER CAR



**DRIVEWAY PROFILE**

REVISION		DATE	DESCRIPTION
1	12/18/24	ISSUE FOR PERMITTING	
2	01/22/25	SCHEMATIC COMMENTS	

APPROVALS:  
 ENGINEER: ARH  
 DESIGNER: HMW  
 TECHNICIAN: MRT  
 CHECKED BY: ARH  
 APPROVED: ARH



**ALLIANCE CONSULTING ENGINEERS**  
 Alliance Consulting Engineers, Inc.  
 124 Verdie Blvd., Mount Airy, NC 28649  
 Phone: (864) 284-1740 • Fax: (864) 284-1741

PROJECT: 290-GPM OAKS ROAD PUMP STATION  
 SHEET: SC DOT DRIVEWAY DETAIL  
 DATE: AUGUST 2024  
 SCALE: AS SHOWN

FILE NAME: 24110-Plans.dwg  
 REFERENCE FILE: 24110-Base.dwg  
 PROJECT NO.: 24110-0014

SHEET C-8.1  
 OF C-8.1

DWG NO. 01.1695-D29



Santee Lynches Council of Governments (SLCOG) 208 Plan Conformation Approval – Cover Page

## REQUEST FOR 208 CONFORMANCE REVIEW CERTIFICATION

1. Date: January 10, 2025
2. Requestor: Clarendon County
3. Project Name: Oaks Road Pump Station
4. County: Clarendon
5. Location (site address and lat/long): 33 31' 17.08" / 80 23' 58.08"
6. Map (Attach USGS topo or satellite imagery specifically marking project site):
7. Type of Action for Review: Construction Permit / PER / NPDES Permit / ND Permit
8. Type of Project (circle one): Residential / Commercial / Industrial / Agricultural
9. Type of Waste (circle one): Domestic / Commercial / Industrial / Agricultural
10. Volume (GPD): 0 GPD
11. Disposal Method (circle one): Surface Discharge / Aeration / Septic Other  
(specify other: Town of Summerton WWTF)
12. Location of Treatment (circle one): On-Site / Treatment Facility  
(specify facility: Town of Summerton WWTF)
13. ND/NPDES Number (if applicable): SC0020419
14. Consulting Engineer (if applicable):

**Consulting Engineer Contact:**

Name: Alliance Consulting Engineers, Inc.  
 Address: 124 Verdae Boulevard, Suite 505, Greenville, South Carolina 29607  
 Phone: (864) 284-1740  
 Email: ahogan@allianceCE.com

15. Publicly Owned Treatment Works Contact (if applicable):

**Publicly Owned Treatment Works Contact:**

Name: Summerton Public Works  
 Address: 10 Main Street, Summerton, South Carolina 29148  
 Phone: (803) 485-2525  
 Email: m.adger@townofsummerton.com

Please email completed application, including map and photocopy of check to:

Jeff Parkey, jparkey@slcog.org

Please mail check to:

Attn: 208 Conformance Review, Santee-Lynches Council of Governments, 3219 Broad Street, Sumter, SC 29150

----- for Santee-Lynches Office Use -----

Determination: This project (IS / IS NOT) in conformance with the Santee-Lynches 208 Water Quality Management plan.

Comments: In conformance

Jeff Parkey Regional Planning Director  
 Signature of Certifying Officer and Title

01.14.2025  
 Date

**END OF SECTION**

**SECTION 00 41 00**

**BID FORM**

**290-GPM OAKS ROAD PUMP STATION  
ALONG OAKS ROAD  
IN CLARENDON COUNTY  
ALLIANCE CONSULTING ENGINEERS, INC. PROJECT NO. 24110-0014**

**TABLE OF ARTICLES**

ARTICLE 1 - BID RECIPIENT

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

ARTICLE 3 - BIDDER'S REPRESENTATIONS

ARTICLE 4 - BIDDER'S CERTIFICATIONS

ARTICLE 5 - BASIS OF BID

ARTICLE 6 - TIME OF COMPLETION

ARTICLE 7 - ATTACHMENTS TO THIS BID

ARTICLE 8 - DEFINED TERMS

ARTICLE 9 - BID SUBMITTAL

**ARTICLE 1 - BID RECIPIENT**

1.01 This Bid is submitted to:

Jeffrey A. Hyde, Procurement Director  
Clarendon County Procurement Office  
3 South Church Street  
Manning, South Carolina 29102

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS**

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**ARTICLE 3 - BIDDER'S REPRESENTATIONS**

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum Date</u>	<u>Initials</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site- related reports and drawings

identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### **ARTICLE 4 – BIDDERS CERTIFICATIONS**

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
  - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels, and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

**ARTICLE 5 - BASIS OF BID**

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

**Base Bid**

290-GPM OAKS ROAD PUMP STATION					
Item No.	Item Description	Quantity	Unit	Unit Cost	Total
1	Mobilization/Bonds	1	LS	\$	\$
2	Clearing & Grubbing	1	LS	\$	\$
3	Construction Safety / Traffic Control	1	LS	\$	\$
4	Erosion Control Measures (includes Silt Fence, Erosion Control Matting, Sediment Tubes, and Construction Entrances)	1	LS	\$	\$
5	Pump Station Site Grading/Site Work	1	LS	\$	\$
6	8-Inch PVC Gravity Wastewater Line (6-8 Feet Deep)	85	LF	\$	\$
7	4-Foot Diameter Wastewater Manhole (6 Feet Deep)	1	EA	\$	\$
8	6-Inch PVC Force Main (includes Fittings and Appurtenances)	195	LF	\$	\$
9	8-FT Diameter Concrete Wet Well (includes Discharge Piping, Hatches, Fall-Protection Gate, and appurtenances)	1	LS	\$	\$
10	165,000-GPD (290-GPM) Duplex Pumps (includes Control Panel, Floats, and Spare Equipment)	1	LS	\$	\$
11	Wet Well Liner	1	LS	\$	\$
12	6-FT x 8-FT x 7-FT Concrete Valve Vault (includes Valves, Piping, Hatches, Fall-Protection Gate, Pressure Gauge, Bypass Connection, and appurtenances)	1	LS	\$	\$
13	Bore and Jack with 12-Inch Steel Casing to cross Oaks Road (includes 6-Inch PVC Carrier Pipe, Casing, Spiders, and appurtenances)	68	LF	\$	\$
14	Air Release Valve Assembly with Manhole	1	EA	\$	\$
15	Cut-in 6-Inch Tee with Two (2) Gate Valves	2	EA	\$	\$
16	Heavy Duty Asphalt Driveway Radius within SCDOT Right-of-Way	58	SY	\$	\$
17	Gravel Driveway and Pump Station Site	470	SY	\$	\$
18	Pump Station Site Fencing and Gate	1	LS	\$	\$
19	Pump Station Site Electrical (includes all Site Lighting and Concrete Pad and all Electrical Work at Electrical Rack including Wiring, Conduit, Installation of all Panels, Automatic Transfer Switch, and appurtenances)	1	LS	\$	\$

**Base Bid Continued**

Item No.	Item Description	Quantity	Unit	Unit Cost	Total
20	Generator with Generator Pad	1	LS	\$	\$
21	Transformer Pad	1	LS	\$	\$
22	Grassing	1	LS	\$	\$

**Total Base Bid:** \$ \_\_\_\_\_

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

Total Bid Price: \_\_\_\_\_ Dollars  
(Use words)

and \_\_\_\_\_ Cents (\$ \_\_\_\_\_)  
(Use numerals)

Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.

**ARTICLE 6 - TIME OF COMPLETION**

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidate damages

**ARTICLE 7 - ATTACHMENTS TO THIS BID**

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

- A. Required Bid security in the form of a bid bond (EJCDC No. C-430) or certified check in the amount of five percent (5%) of the total bid amount. Bid Bond shall include an executed Power of Attorney;
- B. List of Proposed Subcontractors; (must be submitted within five (5) days of the Bid Opening)
- C. List of Proposed Suppliers; (must be submitted within five (5) days of the Bid Opening)
- D. List of Project References; (must be submitted within five (5) days of the Bid Opening)
- E. Evidence of authority to do business in the State of South Carolina, or written covenant to obtain such license within the time frame for acceptance of Bids;
- F. Contractor License Number or evidence of bidders ability to obtain a State Contractor's License and covenant by Bidder to obtain said license within the time for acceptance of Bids;



- G. Required Bidder Qualification Statement with Supporting Data; (must be submitted within five (5) days of the Bid Opening)

**ARTICLE 8 - DEFINED TERMS**

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, General Conditions and the Supplementary Conditions.

**ARTICLE 9 - BID SUBMITTAL**

9.01 This Bid submitted by: *[Indicate correct name of bidding entity]*

\_\_\_\_\_  
By: *[Signature]* \_\_\_\_\_  
*[Printed name]* \_\_\_\_\_

*(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:  
*[Signature]* \_\_\_\_\_  
*[Printed name]* \_\_\_\_\_

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

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

Address for giving notices:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Contact Name and e-mail address: \_\_\_\_\_  
\_\_\_\_\_

Bidder's License No.: \_\_\_\_\_  
*(where applicable)*

**END OF SECTION**

**SECTION 00 43 00**

**BID BOND**

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

**BIDDER** (Name and Address):

**SURETY** (Name and Address of Principal Place of Business):

**OWNER:**

Clarendon County  
411 Sunset Drive  
Manning, South Carolina 29102

**BID**

Bid Due Date: April 10, 2025, at 2:00 PM  
Description: 290-GPM Oaks Road Pump Station

**BOND**

Bond Number:  
Date (Not earlier than Bid due date):  
Penal sum \_\_\_\_\_

(Words)

\$

\_\_\_\_\_ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

**BIDDER**

**SURETY**

\_\_\_\_\_  
Bidder's Name and Corporate Seal (Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

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

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**SECTION 00 45 13  
BIDDER'S QUALIFICATIONS STATEMENT**

**THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT  
PERMITTED BY LAWS AND REGULATIONS**

**1. SUBMITTED BY:**

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

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

**2. SUBMITTED TO:**

\_\_\_\_\_

**3. SUBMITTED FOR:**

\_\_\_\_\_

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

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

**TYPE OF WORK:**

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

**4. CONTRACTOR'S CONTACT INFORMATION**

Contact Person: \_\_\_\_\_

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

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

**5. AFFILIATED COMPANIES:**

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

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

\_\_\_\_\_

\_\_\_\_\_

**6. TYPE OF ORGANIZATION:**

SOLE PROPRIETORSHIP

Name of Owner: \_\_\_\_\_

Doing Business As: \_\_\_\_\_

Date of Organization: \_\_\_\_\_

PARTNERSHIP

Date of Organization: \_\_\_\_\_

Type of Partnership: \_\_\_\_\_

Name of General Partner(s): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CORPORATION

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

Date of Organization: \_\_\_\_\_

Executive Officers:

- President: \_\_\_\_\_

- Vice President(s): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Treasurer: \_\_\_\_\_

- Secretary: \_\_\_\_\_

LIMITED LIABILITY COMPANY

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

Date of Organization: \_\_\_\_\_

Members: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

JOINT VENTURE

Sate of Organization: \_\_\_\_\_

Date of Organization: \_\_\_\_\_

Form of Organization: \_\_\_\_\_

Joint Venture Managing Partner

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

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

Joint Venture Managing Partner

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

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

Joint Venture Managing Partner

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

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

**7. LICENSING**

Jurisdiction: \_\_\_\_\_

Type of License: \_\_\_\_\_

License Number: \_\_\_\_\_

Jurisdiction: \_\_\_\_\_

Type of License: \_\_\_\_\_

License Number: \_\_\_\_\_



**8. CERTIFICATIONS**

CERTIFIED BY:

Disadvantage Business Enterprise: \_\_\_\_\_  
Minority Business Enterprise: \_\_\_\_\_  
Woman Owned Enterprise: \_\_\_\_\_  
Small Business Enterprise: \_\_\_\_\_  
Other ( \_\_\_\_\_ ): \_\_\_\_\_

**9. BONDING INFORMATION**

Bonding Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
Bonding Agent: \_\_\_\_\_  
Address: \_\_\_\_\_  
Contact Name: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Aggregate Bonding Capacity: \_\_\_\_\_  
Available Bonding Capacity as of date of this submittal: \_\_\_\_\_

**10. FINANCIAL INFORMATION**

Financial Institution: \_\_\_\_\_

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

\_\_\_\_\_

Account Manager: \_\_\_\_\_

Phone: \_\_\_\_\_

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE  
LAST 3 YEARS

**11. CONSTRUCTION EXPERIENCE:**

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

YES  NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

YES  NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

YES  NO

If YES, attach as an Attachment details including Project Owner's contact information.

**BIDDER'S QUALIFICATIONS STATEMENT**

**12. SAFETY PROGRAM:**

Name of Contractor's Safety Officer: \_\_\_\_\_

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section V (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

**13. EQUIPMENT:**

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HEREWITH, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: \_\_\_\_\_

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

TITLE: \_\_\_\_\_

DATED: \_\_\_\_\_

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_

NOTARY PUBLIC - STATE OF \_\_\_\_\_

MY COMMISSION EXPIRES: \_\_\_\_\_

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

## SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

**SCHEDULE B**

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				





**SECTION 00 45 36**

**EEO CONTRACT COMPLIANCE NOTICES**

**UNITED STATES DEPARTMENT OF AGRICULTURE**

**EQUAL EMPLOYMENT OPPORTUNITY (EEO)**

**CONTRACT COMPLIANCE NOTICES**

- (1). The following notices shall be included in all solicitations for offers and bids on all Federal and Federally assisted construction contracts or subcontracts in excess of \$10,000 pursuant to Department of Labor (OFCCP) regulations 41 CFR, Part 604.

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offerors or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables: Goals for female and minority participation is 6.9% and 32% respectively.

These goals are applicable to all the Contractors construction work (whether or it is federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract and in each trade and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulation in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number, estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is Newberry County, South Carolina.

## STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION

### CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
  - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d. "Minority" Includes:
    - i) Black (all persons having origins in the Black African racial groups not of Hispanic origin):
    - ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race):
    - (iii) Asian and Pacific Islander (all persons having origins in any of the, original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor, in the covered area either individually through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provision of any such Home town Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its Obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, or the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices, and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contract shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations responses.
  - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor. This shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
  - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading program and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above
  - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations, by including it in any policy manual and collective bargaining agreement: by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
  - g. Review at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsible for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
  - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing

the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

- i. Direct its recruitment efforts, both oral and written to minority, female and community organizations, to schools with minority and female students and minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
  - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
  - k. Validate all tests and other selection recruitment's where there is an obligation to do so under 41 CFR Part 60-3.
  - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training. etc., such opportunities.
  - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
  - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
  - o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
  - p. Conduct a review at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through P). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant may be asserted is fulfilling any one or more of its obligations under 7a through P of these Specifications provided that the contract, or actively participates in the group. Makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation makes good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority, consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if minority group of women is underutilized.
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specification, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned social security number, race, sex, status (e.g.. mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
14. Nothing herein provided shall be construed as a limitation upon the application other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development , Block Grant Program).

**SECTION 00 51 02**

**NOTICE OF AWARD**

Date

Project: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina	Owner: Clarendon County	Owner's Contract No.:
---	-------------------------	-----------------------

Contract:	Engineer's Project No.: 24110-0014
-----------	---------------------------------------

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested):

You are notified that your Bid dated \_\_\_\_\_ for the above Contract has been considered.

You are the Successful Bidder and are awarded a Contract for the 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina.

The Contract Price of your Contract is \_\_\_\_\_ (\$\_\_\_\_\_)

\_\_\_ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

\_\_\_ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

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

1. Deliver to the Owner four (4) fully-executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01).
3. Other conditions precedent: None

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

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

\_\_\_\_\_  
Owner  
By: \_\_\_\_\_  
Authorized Signature  
\_\_\_\_\_  
Title

**Acceptance of Notice**

Receipt of the above Notice of Award is hereby acknowledged by \_\_\_\_\_  
This the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Contractor  
By: \_\_\_\_\_  
Authorized Signature  
\_\_\_\_\_  
Title

Copy to Engineer

**SECTION 00 52 00**

**CONTRACT**

THIS AGREEMENT is by and between Clarendon County

("Owner") and \_\_\_\_\_

("Contractor") Owner and Contractor hereby agree as follows:

**ARTICLE 1 - WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina - This project consists of providing all required materials to complete the construction of the new 290-GPM Oaks Road Pump Station. Generally, the project includes the construction of a new 290-GPM Pump Station at an existing easement within the Willow Oaks Hunting LLC Property (TMS # 062-00-00-014-00) including site work and grading, precast structures, pumps, piping, electrical, and all associated work. Specific details are included within the Construction Plans and Technical Specifications.

**ARTICLE 2 - THE PROJECT**

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

New 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina

**ARTICLE 3 - ENGINEER**

3.01 The Project has been designed by: Alliance Consulting Engineers, Inc., who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 – CONTRACT TIMES**

4.01 Time of the Essence

A. All time limits for Milestones for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within 180 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 240 days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with



Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

## **ARTICLE 5 - CONTRACT PRICE**

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

- A. All specific cash allowances are included in the above price in accordance with Paragraph 11.02 of the General Conditions.

## **ARTICLE 6 - PAYMENT PROCEDURES**

6.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

- 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

- a. 90% of Work completed (with the balance being Retainage).
- b. 90% of cost of materials and equipment not incorporated in the Work (with the balance being Retainage).

- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100% of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 100% of Engineer's estimate of the value of Work to be completed or corrected as

shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

**ARTICLE 7 – INTEREST**

- 7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 3% percent per annum.

**ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS**

- 8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor’s safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## ARTICLE 9 - CONTRACT DOCUMENTS

### 9.01 Contents

- A. The Contract Documents consist of the following:
  - 1. This Agreement - Section 00 52 00 (pages 1 to 6, inclusive).
  - 2. Performance Bond - Section 00 61 13.13 (pages 1 to 3, inclusive).
  - 3. Payment Bond - Section 00 61 13.16 (pages 1 to 3, inclusive).
  - 4. Other bonds (N/A).
  - 5. General Conditions - Section 00 70 00 (pages 1 to 62, inclusive).
  - 6. Supplemental Conditions - Section 00 73 00 (pages 1 to 8, inclusive).
  - 7. Specifications as listed in the Table of Contents of the Project Manual. The following Sections included within Division 0 are considered part of the "Technical Specifications."
  - 8. Drawings consisting of 19 sheets with each sheet bearing the following general title: **290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina**
  - 9. Addenda (numbers \_\_\_\_ to \_\_\_\_, inclusive).
  - 10. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor's Bid - Section 00 41 00 (pages 1 to 7, inclusive).
  - 11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    - a. Notice to Proceed - Section 00 55 00 (pages 1 to 1, inclusive).
    - b. Work Change Directives.
    - c. Change Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified or supplemented as provided in Paragraph 3.04 of the General Conditions.

## ARTICLE 10 - MISCELLANEOUS

### 10.01 Terms

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

### 10.02 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### 10.03 Successors and Assigns

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

### 10.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

### 10.05 Contractor's Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. One counterpart each has been delivered to Owner, Contractor, Engineer and provided to the Contractor for his Bonding Agency. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on \_\_\_\_\_  
(which is the Effective Date of the Agreement).

OWNER:

Clarendon County \_\_\_\_\_

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

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

Attest: \_\_\_\_\_

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

Address for giving notices:

Clarendon County \_\_\_\_\_

411 Sunset Drive \_\_\_\_\_

Manning, South Carolina 29102 \_\_\_\_\_

\_\_\_\_\_

CONTRACTOR

\_\_\_\_\_

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

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

If Contractor is a corporation, a Partnership, or a joint venture, attach evidence of authority to sign.)

Attest: \_\_\_\_\_

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

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

License No.: \_\_\_\_\_

(Where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Agent for service of process:

\_\_\_\_\_

**SECTION 00 55 00**

**NOTICE TO PROCEED**

Date \_\_\_\_\_

Project: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina	Owner: Clarendon County	Owner's Contract No.:
---	-------------------------	-----------------------

Contract:	Engineer's Project No.: 24110-0014
-----------	------------------------------------

Contractor:

Contractor's Address: (send Certified Mail, Return Receipt Requested):

---



---



---



---

You are notified that the Contract Times under the above contract will commence to run on \_\_\_\_\_ . On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is \_\_\_\_\_ , and the date of readiness for final payment is \_\_\_\_\_ .

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insured and loss payees) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you start any work at the site, you must: notify the Engineer and Owner.

_____	Clarendon County
Contractor	Owner
by:	Given by:
_____	_____
Authorized Signature	Authorized Signature
_____	_____
Title	Title
_____	_____
Date	Date

Copy to Engineer

**SECTION 00 61 13.13**

**PERFORMANCE BOND**

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER: Clarendon County  
411 Sunset Drive  
Manning, South Carolina 29102

**CONSTRUCTION CONTRACT**

Effective Date of the Agreement:

Amount:

Description: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina

**BOND**

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form:  None  See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

\_\_\_\_\_  
Contractor's Name and Corporate Seal

\_\_\_\_\_  
Surety's Name and Corporate Seal

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

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

**Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.**

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner

the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

**PERFORMANCE BOND**

24110-0014

00 61 13.13 - 2

March 2025



11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

FOR INFORMATION ONLY – Name, Address and Telephone Surety Agency or Broker: Owner's Representative (Engineer): <b>Alliance Consulting Engineers, Inc., 124 Verdea Boulevard, Bonaventure II, Suite 505, Greenville, SC 29607-3843, (864) 284-1740</b>
---

**END OF SECTION**

**SECTION 00 61 13.16**

**PAYMENT BOND**

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER: Clarendon County  
411 Sunset Drive  
Manning, South Carolina 29102

**CONSTRUCTION CONTRACT**

Effective Date of the Agreement:

Amount:

Description: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina

**BOND**

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form:  None  See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

\_\_\_\_\_  
Contractor's Name and Corporate Seal *(seal)*

\_\_\_\_\_  
Surety's Name and Corporate Seal *(seal)*

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

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

24110-0014

**PAYMENT BOND**  
00 61 13.16 - 1

March 2025

**Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.**

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
  - 5.1 Claimants who do not have a direct contract with the Contractor,
    - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2 Pay or arrange for payment of any undisputed amounts.
  - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

24110-0014

PAYMENT BOND  
00 61 13.16 - 2

March 2025

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
- 16. Definitions**
- 16.1 **Claim:** A written statement by the Claimant including at a minimum:
1. The name of the Claimant;
  2. The name of the person for whom the labor was done, or materials or equipment furnished;
  3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
  4. A brief description of the labor, materials, or equipment furnished;
  5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
  6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
  7. The total amount of previous payments received by the Claimant; and
  8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:

**Contractor's Application for Payment No.**

Clarendon County	Application Period: <b>SECTION 00 62 76</b>	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project: in Clarendon County, South Carolina	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: 24110-0014

**Application For Payment  
Change Order Summary**

Approved Change Orders			
Number	Additions	Deductions	
			<b>1. ORIGINAL CONTRACT PRICE</b> ..... \$ _____
			<b>2. Net change by Change Orders</b> ..... \$ _____
			<b>3. Current Contract Price (Line 1 ± 2)</b> ..... \$ _____
			<b>4. TOTAL COMPLETED AND STORED TO DATE</b> (Column F on Progress Estimate)..... \$ _____
			<b>5. RETAINAGE:</b>
			a. X _____ Work Completed..... \$ _____
			b. X _____ Stored Material..... \$ _____
			c. Total Retainage (Line 5a + Line 5b)..... \$ _____
			<b>6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)</b> ..... \$ _____
			<b>7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)</b> ..... \$ _____
			<b>8. AMOUNT DUE THIS APPLICATION</b> ..... \$ _____
			<b>9. BALANCE TO FINISH, PLUS RETAINAGE</b> (Column G on Progress Estimate + Line 5 above)..... \$ _____
TOTALS			
NET CHANGE BY CHANGE ORDERS			

<b>Contractor's Certification</b>	
<p>The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.</p>	
By:	Date:

Payment of: \$ \_\_\_\_\_  
(Line 8 or other - attach explanation of the other amount)

is recommended by: \_\_\_\_\_ (Date) \_\_\_\_\_  
(Engineer)

Payment of: \$ \_\_\_\_\_  
(Line 8 or other - attach explanation of the other amount)

is approved by: \_\_\_\_\_ (Date) \_\_\_\_\_  
(Owner)

Approved by: \_\_\_\_\_ (Date) \_\_\_\_\_  
Funding Agency (if applicable)





SECTION 00 62 76

**Stored Material Summary**

**Contractor's Application**

For (contract): Clarendon County						Application Number:			
Application Period:						Application Date:			

A Invoice No.	B Shop Drawing Transmittal No.	C Materials Description	D		E		F		G Materials Remaining in Storage (\$) (D + E - F)
			Stored Previously		Stored this Month		Incorporated in Work		
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
<b>Totals</b>									



SECTION 00 63 36

FIELD ORDER

No. \_\_\_\_\_

Date of Issuance: \_\_\_\_\_ Effective Date: \_\_\_\_\_

Project : 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina	Owner: Clarendon County	Owner's Contract No.:
Contract :	Date of Contract:	
Contractor:	Engineer's Project No.: 24110-0014	

**Attention:**

You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.05A., for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: \_\_\_\_\_ (Specification Section(s)) \_\_\_\_\_ (Drawing(s) / Detail(s))

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

Attachments:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Engineer: Adam Hogan, P.E.

Receipt Acknowledged by (Contractor): \_\_\_\_\_ Date: \_\_\_\_\_

Copy to Owner

**SECTION 00 63 49**

**WORK CHANGE DIRECTIVE**

**No. \_\_\_\_\_**

Date of Issuance: \_\_\_\_\_ Effective Date: \_\_\_\_\_

Project: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina	Owner: Clarendon County	Owner's Contract No.:
Contract: :		Date of Contract:
Contractor:		Engineer's Project No.: 24110-0014

**You are directed to proceed promptly with the following change(s):**

Item No.	Description

**Attachments (list documents supporting change):**

---



---

**Purpose for Work Change Directive:**

- Authorization for Work described herein to proceed on the basis of Cost of the Work due to:
  - Disagreement on pricing of proposed change.
  - Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

**Estimated change in Contract Price and Contract Times:**

Contract Price \$ \_\_\_\_\_ (increase/decrease)      Contract Time \_\_\_\_\_ days (increase/decrease)

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Recommended for Approval by Engineer: Adam Hogan, P.E.	Date
Authorized for Owner by:	Date
Accepted for Contractor by:	Date
Approved by Funding Agency (if applicable):	Date:

SECTION 00 63 63

CHANGE ORDER

No. \_\_\_\_\_

Date of Issuance: \_\_\_\_\_

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

Project: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina

Owner: Clarendon County

Owner's Contract No.:

Contract: :

Date of Contract:

Contractor:

Engineer's Project No.: 24110-0014

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:

CHANGE IN CONTRACT TIMES:

Original Contract Price:

Original Contract Times:  Working days  Calendar days

\$ \_\_\_\_\_

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

[Increase] [Decrease] from previously approved Change Orders No. \_\_\_\_\_ to No. \_\_\_\_\_:

[Increase] [Decrease] from previously approved Change Orders No. \_\_\_\_\_ to No. \_\_\_\_\_:

\$ \_\_\_\_\_

Substantial completion (days): \_\_\_\_\_

Ready for final payment (days): \_\_\_\_\_

Contract Price prior to this Change Order:

Contract Times prior to this Change Order:

\$ \_\_\_\_\_

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

[Increase] [Decrease] of this Change Order:

[Increase] [Decrease] of this Change Order:

\$ \_\_\_\_\_

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

Contract Price incorporating this Change Order:

Contract Times with all approved Change Orders:

\$ \_\_\_\_\_

Substantial completion (days or date): \_\_\_\_\_

Ready for final payment (days or date): \_\_\_\_\_

RECOMMENDED:

ACCEPTED:

ACCEPTED:

By: \_\_\_\_\_  
Engineer: Adam Hogan, P.E.

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

By: \_\_\_\_\_  
Contractor (Authorized Signature)

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

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

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

Approved by Funding Agency (if applicable): \_\_\_\_\_

Date:

24110-0014

CHANGE ORDER  
00 63 63 - 1

March 2025

# Change Order

## Instructions

### A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

### B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

**END OF SECTION**

SECTION 00 65 16

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: 290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina	Owner: Clarendon County	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 24110-0014

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents:
- The following specified portions:

---



---



---

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities
- Not Amended

Owner's Amended Responsibilities:

---



---



---

Contractor's Amended Responsibilities:

---



---



---

The following documents are attached to and made part of this Certificate:

---



---

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer: Adam Hogan, P.E. Date

Accepted by Contractor: Date

Accepted by Owner: Date

SECTION 00 65 19.13

CONTRACTOR'S AFFIDAVIT

The State of \_\_\_\_\_ Date: \_\_\_\_\_

The County of \_\_\_\_\_

The City/Town of \_\_\_\_\_

\_\_\_\_\_ of \_\_\_\_\_  
(Officer's Name) (Officer's Title) (Contractor's Name)

being duly sworn, deposes and says that \_\_\_\_\_  
(Contractor's Name)

has furnished all labor and material entering into the **290-GPM Oaks Road Pump Station along Oaks Road in Clarendon County, South Carolina**

called for in the Contract Documents dated \_\_\_\_\_ with Clarendon County states further that this officer has full knowledge of all obligations for such labor and materials, which have entered into and become part of that certain project known and designated above, and that this officer further deposes and says that all debts and other obligations for such labor and materials have been fully and completely paid for in good and lawful money of the United States of America and that there are no suits for damages against them proceeding, prospective and/or otherwise, in consequence of their operations on the above said project.

The said \_\_\_\_\_ will hold the Owners,  
(Contractor's Name)

**Clarendon County**, blameless of any and all mechanic's liens that may be hereafter entered or filed  
(Owner's Name)

for record, so as to constitute charge against said premises for work or labor done or materials furnished by them.

IN WITNESS HEREOF, this officer has heretofore put his hand and seal:

\_\_\_\_\_  
(Officer's Name) (Seal)

I, \_\_\_\_\_, Notary Public in and for the above named County and State do

hereby certify that \_\_\_\_\_ personally known to me to be the affiant in the  
(Officer's Name)  
foregoing Affidavit, personally appeared before me this day and, having been duly sworn, deposes and says that the facts set forth in the above Affidavit are true and correct.

WITNESS my hand and seal this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
(Seal)

Notary Public for the State of \_\_\_\_\_ My Commission Expires: \_\_\_\_\_

**SECTION 00 70 00**

**STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT**

**TABLE OF CONTENTS**

	<b>Page</b>
Article 1 – Definitions and Terminology .....	5
1.01 Defined Terms .....	5
1.02 Terminology.....	8
Article 2 – Preliminary Matters .....	9
2.01 Delivery of Bonds and Evidence of Insurance .....	9
2.02 Copies of Documents .....	10
2.03 Before Starting Construction .....	10
2.04 Preconstruction Conference; Designation of Authorized Representatives .....	10
2.05 Initial Acceptance of Schedules .....	10
2.06 Electronic Transmittals .....	11
Article 3 – Documents: Intent, Requirements, Reuse .....	11
3.01 Intent.....	11
3.02 Reference Standards .....	11
3.03 Reporting and Resolving Discrepancies .....	12
3.04 Requirements of the Contract Documents .....	12
3.05 Reuse of Documents.....	13
Article 4 – Commencement and Progress of the Work.....	13
4.01 Commencement of Contract Times; Notice to Proceed.....	13
4.02 Starting the Work.....	13
4.03 Reference Points .....	13
4.04 Progress Schedule .....	13
4.05 Delays in Contractor’s Progress.....	14
Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions .....	15
5.01 Availability of Lands.....	15
5.02 Use of Site and Other Areas .....	15
5.03 Subsurface and Physical Conditions.....	16
5.04 Differing Subsurface or Physical Conditions .....	16
5.05 Underground Facilities .....	18
5.06 Hazardous Environmental Conditions at Site.....	19
Article 6 – Bonds and Insurance .....	21
6.01 Performance, Payment, and Other Bonds .....	21
6.02 Insurance—General Provisions .....	21

**GENERAL CONDITIONS**

6.03	Contractor's Insurance .....	22
6.04	Owner's Liability Insurance .....	24
6.05	Property Insurance .....	24
6.06	Waiver of Rights .....	26
6.07	Receipt and Application of Property Insurance Proceeds.....	27
Article 7 – Contractor's Responsibilities .....		27
7.01	Supervision and Superintendence .....	27
7.02	Labor; Working Hours .....	27
7.03	Services, Materials, and Equipment.....	28
7.04	“Or Equals” .....	28
7.05	Substitutes.....	29
7.06	Concerning Subcontractors, Suppliers, and Others.....	30
7.07	Patent Fees and Royalties .....	32
7.08	Permits .....	32
7.09	Taxes.....	32
7.10	Laws and Regulations.....	32
7.11	Record Documents.....	33
7.12	Safety and Protection .....	33
7.13	Safety Representative .....	34
7.14	Hazard Communication Programs .....	34
7.15	Emergencies .....	34
7.16	Shop Drawings, Samples, and Other Submittals.....	34
7.17	Contractor's General Warranty and Guarantee .....	36
7.18	Indemnification .....	37
7.19	Delegation of Professional Design Services .....	37
Article 8 – Other Work at the Site .....		38
8.01	Other Work .....	38
8.02	Coordination .....	38
8.03	Legal Relationships .....	39
Article 9 – Owner's Responsibilities .....		40
9.01	Communications to Contractor.....	40
9.02	Replacement of Engineer.....	40
9.03	Furnish Data.....	40
9.04	Pay When Due .....	40
9.05	Lands and Easements; Reports, Tests, and Drawings.....	40
9.06	Insurance.....	40
9.07	Change Orders.....	40
9.08	Inspections, Tests, and Approvals .....	40

GENERAL CONDITIONS



9.09	Limitations on Owner’s Responsibilities.....	40
9.10	Undisclosed Hazardous Environmental Condition.....	40
9.11	Evidence of Financial Arrangements.....	40
9.12	Safety Programs.....	41
Article 10 – Engineer’s Status During Construction.....		41
10.01	Owner’s Representative.....	41
10.02	Visits to Site.....	41
10.03	Project Representative.....	41
10.04	Rejecting Defective Work.....	41
10.05	Shop Drawings, Change Orders and Payments.....	41
10.06	Determinations for Unit Price Work.....	42
10.07	Decisions on Requirements of Contract Documents and Acceptability of Work.....	42
10.08	Limitations on Engineer’s Authority and Responsibilities.....	42
10.09	Compliance with Safety Program.....	42
Article 11 – Amending the Contract Documents; Changes in the Work.....		42
11.01	Amending and Supplementing Contract Documents.....	42
11.02	Owner-Authorized Changes in the Work.....	43
11.03	Unauthorized Changes in the Work.....	43
11.04	Change of Contract Price.....	43
11.05	Change of Contract Times.....	44
11.06	Change Proposals.....	45
11.07	Execution of Change Orders.....	45
11.08	Notification to Surety.....	46
Article 12 – Claims.....		46
12.01	Claims.....	46
Article 13 – Cost of the Work; Allowances; Unit Price Work.....		47
13.01	Cost of the Work.....	47
13.02	Allowances.....	49
13.03	Unit Price Work.....	50
Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work.....		50
14.01	Access to Work.....	50
14.02	Tests, Inspections, and Approvals.....	50
14.03	Defective Work.....	51
14.04	Acceptance of Defective Work.....	52
14.05	Uncovering Work.....	52
14.06	Owner May Stop the Work.....	52
14.07	Owner May Correct Defective Work.....	52

GENERAL CONDITIONS

Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period .....	53
15.01 Progress Payments .....	53
15.02 Contractor’s Warranty of Title .....	56
15.03 Substantial Completion .....	56
15.04 Partial Use or Occupancy.....	57
15.05 Final Inspection .....	57
15.06 Final Payment .....	57
15.07 Waiver of Claims .....	58
15.08 Correction Period .....	58
Article 16 – Suspension of Work and Termination.....	59
16.01 Owner May Suspend Work .....	59
16.02 Owner May Terminate for Cause .....	59
16.03 Owner May Terminate For Convenience .....	60
16.04 Contractor May Stop Work or Terminate .....	61
Article 17 – Final Resolution of Disputes .....	61
17.01 Methods and Procedures .....	61
Article 18 – Miscellaneous .....	61
18.01 Giving Notice .....	61
18.02 Computation of Times .....	62
18.03 Cumulative Remedies .....	62
18.04 Limitation of Damages.....	62
18.05 No Waiver.....	62
18.06 Survival of Obligations.....	62
18.07 Controlling Law.....	62
18.08 Headings .....	62

GENERAL CONDITIONS

## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 Defined Terms

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. Addenda—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. Agreement—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. Application for Payment—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. Bid—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. Bidder—An individual or entity that submits a Bid to Owner.
  6. Bidding Documents—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. Bidding Requirements—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. Change Order—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. Change Proposal—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. Claim—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.
  11. Constituent of Concern—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other

### GENERAL CONDITIONS

24110-0014

00 70 00 - 5

March 2025

material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. Contract—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. Contract Documents—Those items so designated in the Agreement, and which together comprise the Contract.
14. Contract Price—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. Contract Times—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. Contractor—The individual or entity with which Owner has contracted for performance of the Work.
17. Cost of the Work—See Paragraph 13.01 for definition.
18. Drawings—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. Effective Date of the Contract—The date, indicated in the Agreement, on which the Contract becomes effective.
20. Engineer—The individual or entity named as such in the Agreement.
21. Field Order—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. Hazardous Environmental Condition—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. Laws and Regulations; Laws or Regulations—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
24. Liens—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. Milestone—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. Notice of Award—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
27. Notice to Proceed—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 6

March 2025

28. Owner—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. Progress Schedule—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. Project—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. Project Manual—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. Resident Project Representative—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. Samples—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. Schedule of Values—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. Shop Drawings—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
37. Site—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. Specifications—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. Subcontractor—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. Successful Bidder—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

## GENERAL CONDITIONS

24110-0014

00 70 00 - 7

March 2025

42. Supplementary Conditions—The part of the Contract that amends or supplements these General Conditions.
43. Supplier—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. Technical Data—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. Underground Facilities—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. Unit Price Work—Work to be paid for on the basis of unit prices.
47. Work—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
48. Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. Intent of Certain Terms or Adjectives:
  1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

## GENERAL CONDITIONS

24110-0014

00 70 00 - 8

March 2025

- C. Day:
  - 1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. Defective:
  - 1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. Furnish, Install, Perform, Provide:
  - 1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  - 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2 – PRELIMINARY MATTERS**

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

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

## **GENERAL CONDITIONS**

24110-0014

00 70 00 - 9

March 2025

## 2.02 Copies of Documents

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

## 2.03 Before Starting Construction

- A. Preliminary Schedules: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

## 2.04 Preconstruction Conference; Designation of Authorized Representatives

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

## 2.05 Initial Acceptance of Schedules

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 10

March 2025



3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

#### 2.06 Electronic Transmittals

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

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

#### 3.01 Intent

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

#### 3.02 Reference Standards

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 11

March 2025

or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

### 3.03 Reporting and Resolving Discrepancies

#### A. Reporting Discrepancies:

1. Contractor's Verification of Figures and Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
2. Contractor's Review of Contract Documents: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

#### B. Resolving Discrepancies:

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

### 3.04 Requirements of the Contract Documents

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

## GENERAL CONDITIONS

24110-0014

00 70 00 - 12

March 2025

- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 Reuse of Documents

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

## ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

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

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

### 4.02 Starting the Work

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

### 4.03 Reference Points

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

### 4.04 Progress Schedule

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

## GENERAL CONDITIONS

24110-0014

00 70 00 - 13

March 2025

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.
- 4.05 Delays in Contractor's Progress
- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
  - B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
  - C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
    1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
    2. abnormal weather conditions;
    3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
    4. acts of war or terrorism.
  - D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
  - E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
  - F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
  - G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

GENERAL CONDITIONS

24110-0014

00 70 00 - 14

March 2025

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

### 5.01 Availability of Lands

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

### 5.02 Use of Site and Other Areas

- A. Limitation on Use of Site and Other Areas:
  - 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
  - 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. Removal of Debris During Performance of the Work: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

## GENERAL CONDITIONS

24110-0014

00 70 00 - 15

March 2025

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. Loading of Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

#### 5.03 Subsurface and Physical Conditions

- A. Reports and Drawings: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.

- B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 Differing Subsurface or Physical Conditions

- A. Notice by Contractor: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 16

March 2025

- B. **Engineer's Review:** After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. **Owner's Statement to Contractor Regarding Site Condition:** After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. **Possible Price and Times Adjustments:**
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
    - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
  2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
  3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

GENERAL CONDITIONS

24110-0014

00 70 00 - 17

March 2025

## 5.05 Underground Facilities

- A. Contractor's Responsibilities: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.
- C. Engineer's Review: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. Owner's Statement to Contractor Regarding Underground Facility: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. Possible Price and Times Adjustments:
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

### GENERAL CONDITIONS

24110-0014

00 70 00 - 18

March 2025



- a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
  - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
  - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
  - d. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

#### 5.06 Hazardous Environmental Conditions at Site

- A. Reports and Drawings: The Supplementary Conditions identify:
  1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. Technical Data contained in such reports and drawings.
- B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
  1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 19

March 2025

- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor

GENERAL CONDITIONS

24110-0014

00 70 00 - 20

March 2025

to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 6 – BONDS AND INSURANCE**

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

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

### **6.02 Insurance—General Provisions**

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

## **GENERAL CONDITIONS**

24110-0014

00 70 00 - 21

March 2025

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

### 6.03 Contractor's Insurance

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

## GENERAL CONDITIONS

24110-0014

00 70 00 - 22

March 2025

4. Foreign voluntary worker compensation (if applicable).
- B. Commercial General Liability—Claims Covered: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
  1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  2. claims for damages insured by reasonably available personal injury liability coverage.
  3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. Commercial General Liability—Form and Content: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
  1. Products and completed operations coverage:
    - a. Such insurance shall be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. Automobile liability: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. Contractor's pollution liability insurance: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. Additional insureds: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary

GENERAL CONDITIONS

24110-0014

00 70 00 - 23

March 2025

Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

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

#### 6.04 Owner's Liability Insurance

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

#### 6.05 Property Insurance

- A. Builder's Risk: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts

### GENERAL CONDITIONS

24110-0014

00 70 00 - 24

March 2025

as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
6. extend to cover damage or loss to insured property while in transit.
7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.
9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
10. not include a co-insurance clause.
11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
12. include performance/hot testing and start-up.

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 25

March 2025

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. Deductibles: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. Partial Occupancy or Use by Owner: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. Additional Insurance: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. Insurance of Other Property: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

#### 6.06 Waiver of Rights

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 26

March 2025



insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

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

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

### ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

#### 7.01 Supervision and Superintendence

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

#### 7.02 Labor; Working Hours

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

### GENERAL CONDITIONS

24110-0014

00 70 00 - 27

March 2025

- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 Services, Materials, and Equipment

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      - 3) it has a proven record of performance and availability of responsive service; and
      - 4) it is not objectionable to Owner.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and

GENERAL CONDITIONS

- 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. Contractor's Expense: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
  - C. Engineer's Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
  - D. Effect of Engineer's Determination: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
  - E. Treatment as a Substitution Request: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 Substitutes

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

#### GENERAL CONDITIONS

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

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

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 30

March 2025

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. Nothing in the Contract Documents:
  - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
  - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

GENERAL CONDITIONS

24110-0014

00 70 00 - 31

March 2025

## 7.07 Patent Fees and Royalties

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

## 7.08 Permits

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

## 7.09 Taxes

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

## 7.10 Laws and Regulations

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

### GENERAL CONDITIONS

24110-0014

00 70 00 - 32

March 2025

arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.11 Record Documents

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

#### 7.12 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier,

### GENERAL CONDITIONS

24110-0014

00 70 00 - 33

March 2025

or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.13 Safety Representative

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

#### 7.14 Hazard Communication Programs

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 7.15 Emergencies

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

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

- A. Shop Drawing and Sample Submittal Requirements:
  - 1. Before submitting a Shop Drawing or Sample, Contractor shall have:
    - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
    - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
    - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
    - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
  - 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

### GENERAL CONDITIONS

24110-0014

00 70 00 - 34

March 2025



3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.
- B. Submittal Procedures for Shop Drawings and Samples: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
1. Shop Drawings:
    - a. Contractor shall submit the number of copies required in the Specifications.
    - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.
  2. Samples:
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. Other Submittals: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. Engineer's Review:
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

GENERAL CONDITIONS

24110-0014

00 70 00 - 35

March 2025

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
  6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
  7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
  8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.
- E. Resubmittal Procedures:
1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
  2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
  3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

#### 7.17 Contractor's General Warranty and Guarantee

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 36

March 2025

6. the issuance of a notice of acceptability by Engineer;
  7. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 Indemnification

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

#### 7.19 Delegation of Professional Design Services

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 37

March 2025

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

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

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

### **8.01 Other Work**

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

### **8.02 Coordination**

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

## **GENERAL CONDITIONS**

24110-0014

00 70 00 - 38

March 2025

2. an itemization of the specific matters to be covered by such authority and responsibility; and
  3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

### 8.03 Legal Relationships

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.
- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

## GENERAL CONDITIONS

24110-0014

00 70 00 - 39

March 2025

## ARTICLE 9 – OWNER’S RESPONSIBILITIES

- 9.01 Communications to Contractor
- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.
- 9.02 Replacement of Engineer
- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer’s status under the Contract Documents shall be that of the former Engineer.
- 9.03 Furnish Data
- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.
- 9.04 Pay When Due
- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.
- 9.05 Lands and Easements; Reports, Tests, and Drawings
- A. Owner’s duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner’s duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 Insurance
- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 Change Orders
- A. Owner’s responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 Inspections, Tests, and Approvals
- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 Limitations on Owner’s Responsibilities
- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.
- 9.10 Undisclosed Hazardous Environmental Condition
- A. Owner’s responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 Evidence of Financial Arrangements
- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner’s obligations under the Contract Documents (including obligations under proposed changes in the Work).

### GENERAL CONDITIONS

24110-0014

00 70 00 - 40

March 2025

9.12 Safety Programs

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

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

10.01 Owner's Representative

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

10.02 Visits to Site

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

10.03 Project Representative

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

10.04 Rejecting Defective Work

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

10.05 Shop Drawings, Change Orders and Payments

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

GENERAL CONDITIONS

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 Determinations for Unit Price Work

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

10.07 Decisions on Requirements of Contract Documents and Acceptability of Work

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

10.08 Limitations on Engineer's Authority and Responsibilities

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

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 Compliance with Safety Program

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

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

11.01 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. Change Orders:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be

GENERAL CONDITIONS



set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

- b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
2. Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
  3. Field Orders: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

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

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

#### 11.03 Unauthorized Changes in the Work

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

#### 11.04 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

### GENERAL CONDITIONS

24110-0014

00 70 00 - 43

March 2025

- B. An adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. Contractor's Fee: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 Change of Contract Times

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 44

March 2025

## 11.06 Change Proposals

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

## 11.07 Execution of Change Orders

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 45

March 2025

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

#### 11.08 Notification to Surety

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

### ARTICLE 12 – CLAIMS

#### 12.01 Claims

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 46

March 2025

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

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

### **13.01 Cost of the Work**

- A. Purposes for Determination of Cost of the Work: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  - 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. Costs Included: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
  - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
  - 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns

## **GENERAL CONDITIONS**

24110-0014

00 70 00 - 47

March 2025

from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
  - g. The cost of utilities, fuel, and sanitary facilities at the Site.
  - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
  - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 48

March 2025

- C. Costs Excluded: The term Cost of the Work shall not include any of the following items:
1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
  2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. Contractor's Fee: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.
- E. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

#### 13.02 Allowances

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 49

March 2025

### 13.03 Unit Price Work

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

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

### 14.01 Access to Work

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

### 14.02 Tests, Inspections, and Approvals

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such

## GENERAL CONDITIONS

24110-0014

00 70 00 - 50

March 2025



inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  3. by manufacturers of equipment furnished under the Contract Documents;
  4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 Defective Work

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 51

March 2025

#### 14.04 Acceptance of Defective Work

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

#### 14.05 Uncovering Work

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

#### 14.06 Owner May Stop the Work

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

#### 14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if

### GENERAL CONDITIONS

24110-0014

00 70 00 - 52

March 2025

Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

### **15.01 Progress Payments**

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

### **GENERAL CONDITIONS**

24110-0014

00 70 00 - 53

March 2025

Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 54

March 2025

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

GENERAL CONDITIONS

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

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

#### 15.02 Contractor's Warranty of Title

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

#### 15.03 Substantial Completion

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 56

March 2025

#### 15.04 Partial Use or Occupancy

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

#### 15.05 Final Inspection

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

#### 15.06 Final Payment

- A. Application for Payment:
1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.
  2. The final Application for Payment shall be accompanied (except as previously delivered) by:
    - a. all documentation called for in the Contract Documents;
    - b. consent of the surety, if any, to final payment;
    - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
    - d. a list of all disputes that Contractor believes are unsettled; and

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 57

March 2025

- e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. Engineer's Review of Application and Acceptance:
1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. Completion of Work: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. Payment Becomes Due: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### 15.07 Waiver of Claims

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

#### 15.08 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used

### GENERAL CONDITIONS

24110-0014

00 70 00 - 58

March 2025



by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
  2. correct such defective Work;
  3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## **ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION**

### **16.01 Owner May Suspend Work**

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

### **16.02 Owner May Terminate for Cause**

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
  2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

## **GENERAL CONDITIONS**

24110-0014

00 70 00 - 59

March 2025

4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
    1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
    2. enforce the rights available to Owner under any applicable performance bond.
  - C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
  - D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
  - E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
  - F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
  - G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 Owner May Terminate For Convenience

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
  1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
  3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

### GENERAL CONDITIONS

24110-0014

00 70 00 - 60

March 2025

- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

#### 16.04 Contractor May Stop Work or Terminate

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

### ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

#### 17.01 Methods and Procedures

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

### ARTICLE 18 – MISCELLANEOUS

#### 18.01 Giving Notice

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

#### GENERAL CONDITIONS

24110-0014

00 70 00 - 61

March 2025

#### 18.02 Computation of Times

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

#### 18.03 Cumulative Remedies

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

#### 18.04 Limitation of Damages

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

#### 18.05 No Waiver

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

#### 18.06 Survival of Obligations

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

#### 18.07 Controlling Law

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

#### 18.08 Headings

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

### GENERAL CONDITIONS

24110-0014

00 70 00 - 62

March 2025

## SECTION 00 73 00

### SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. C-700, 2007 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

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

#### TABLE OF CONTENTS

	Page
SC-1.01.A.3	Application for Payment 2
SC-1.01.A.9	Change Order 2
SC-1.01.A.19	Engineer's Consultants 2
SC-1.01.A.52	Defined Terms 2
SC-2.02	Copies of Documents 2
SC-2.04	Starting of Work 2
SC-3.01	Intent 3
SC-3.03	Reporting and Resolving Discrepancies 3
SC-3.05	Reuse of Documents 4
SC-4.02	Subsurface and Physical Conditions 4
SC-4.06	Hazardous Environmental Condition at Site 4
SC-5.03	Certificate of Insurance 4
SC-5.04	Contractor's Liability Insurance 5
SC-6.03	Services, Materials, and Equipment 6
SC-6.05	Substitutes and "Or-Equals" 6
SC-6.06	Concerning Subcontractors, Suppliers, and Others 6
SC-6.10	Taxes 7
SC-6.17	Shop Drawing and Samples 7
SC-6.20	Indemnification 7
SC-7.01	Related Work at Site 8
SC-7.02.A	Coordination 8
SC-9.03.A	Project Representative 8
SC-14.02	Progress Payments 8

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

Owner must approve all Applications for Payment before payment is made.

SC-1.01.A.9 Add the following language to the end of Paragraph 1.01.A.9:

The Change Order form to be used on this Project is EJCDC No. C-941. Owner approval is required before Change Orders are effective.

SC-1.01.A.19. Add the following language to the end of Paragraph 1.01.A.19:

The Engineer's Consultants on this project are:

Land Surveyor: William E. Hayes, PLS

SC-1.01.A.48 Add the following new paragraph(s) immediately after Paragraph 1.01.A.48:

49. Abbreviations used in these Specifications refer to the following:

OWNER: Clarendon County

ENGINEER: Alliance Consulting Engineers, Inc. or their duly authorized representative

50. Definitions: Wherever in the specifications or upon the drawings the words "directed", "required", "permitted", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the OWNER is intended; and similarly, the words "approved", "acceptable", "satisfactory", or words of like import shall mean approved by, or acceptable to, or satisfactory to the OWNER, unless otherwise expressly stated.

SC-2.02 Copies of Documents

Delete Paragraph 2.02.A in its entirety and insert the following in its place:

Owner shall furnish to Contractor up to two (2) printed or hard copies of the Drawings and Specifications and one set in electronic format upon request. Owner shall furnish to Contractor one (1) printed or hard copy of the Contract (including the fully executed Agreement) and one copy in electronic portable document format (PDF). Additional copies will be furnished upon request at the cost of reproduction.

SC-2.04 Starting of Work

Add the following new paragraph(s) immediately after Paragraph 2.04.A:

B. All papers required to be delivered to the OWNER shall, unless otherwise specified in writing to the CONTRACTOR, be delivered to the OWNER'S representative as indicated below, and any notice to or demand upon the OWNER shall be sufficiently given if delivered to the office of said representative, or if deposited in the United States Mail, in a sealed postage prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to the OWNER'S representative as indicated below, or to such other representative of the OWNER, or to such other address as the OWNER may subsequently specify in writing to the CONTRACTOR for such purposes. The OWNER'S representative is as follows:

Alliance Consulting Engineers, Inc.  
124 Verdea Boulevard  
Bonaventure II, Suite 505  
Greenville, SC 29607-3843

SC-3.01 Intent

SC-3.01 Add the following new paragraph(s) immediately after Paragraph 3.01.C:

D. Enumeration of the Plans, Specifications and Addenda

1. The plans, specifications and addenda which form a part of this contract as set forth in Paragraph 1.01.A of the General Conditions, Contract and Contract Documents are enumerated in Section 00 01 10 - Table of Contents and Section 00 01 15 - Drawings Index.

SC-3.03 Reporting and Resolving Discrepancies

Add the following new paragraph(s) immediately after Paragraph 3.03.B:

C. The contract, plans and specifications are to be interpreted as mutually explanatory or supplementary, and therefore any features shown in one and not in the other shall have the same force and effect as if shown by both, and shall be fully executed. Prior to execution of the WORK, the CONTRACTOR shall check all drawings and specifications, and shall immediately report to the ENGINEER all errors, discrepancies, conflicts and omissions discovered therein. All such errors, discrepancies, conflicts and omissions will be adjusted by the ENGINEER, and adjustment by the CONTRACTOR without prior approval shall be at his own risk. The settlement of any complications arising from such adjustments shall be made by the CONTRACTOR at his own expense and to the satisfaction of the OWNER.

SC-3.05 Reuse of Documents

Add the following new paragraph(s) immediately after Paragraph 3.05.B:

C. All drawings, specifications and memoranda relating to the WORK are the property of the OWNER and are to be carefully used and returned to the OWNER upon completion or cessation of the WORK from any cause.

D. Plans and specifications to be furnished: Two (2) sets of plans and one (1) set of specifications will be furnished to the CONTRACTOR without charge. Additional sets can be secured from the ENGINEER upon request at cost of reproduction. The CONTRACTOR shall have available on the project site at all times one (1) copy of each of said plans and specifications.

SC-5.03 Add the following new paragraphs immediately after Paragraph 4.02.B:

A. No reports or drawings related to Geotechnical Subsurface Exploration are known to the Owner or Engineer.

B. Not used.

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

A. No reports on drawings related to Hazardous Environmental Conditions are known to Owner or Engineer.

B. Not Used.

SC-6.03 Certificates of Insurance

Replace paragraphs 6.03.C and 6.03.D with the following:

C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

SC-6.04 Add the following new paragraphs immediately after Paragraph 6.04.B:

C. The limits of liability for the insurance required by Paragraph 6.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverage's under Paragraphs 6.04.A.1 and A.2 of the General Conditions:

1.

- a. a. State: Statutory
- b. b. Applicable Federal (e.g.,  
Longshoreman's): Statutory
- c. c. Employer's Liability:  
\$500,000
- d.

2. Contractor's General Liability under Paragraphs 6.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

2.

- a. a. General Aggregate  
\$2,000,000
- b. b. Products – Completed  
Operations Aggregate \$1,000,000
- c. c. Personal and Advertising  
Injury \$1,000,000
- d. d. Each Occurrence (Bodily  
Injury and Property Damage) \$1,000,000
- e. e. Property Damage liability  
insurance will provide Explosion, Collapse and Under-ground  
coverages where applicable.
- f. f. Excess or Umbrella  
Liability:



- g.** 1) General Aggregate  
\$5,000,000
- h.** 2) Each Occurrence  
\$5,000,000
- 

3. Automobile Liability under Paragraph 6.04.A.6 of the General Conditions:  
3.

- a.** a. Bodily Injury:
  - Each person \$1,000,000
  - Each Accident \$1,000,000
- b.** b. Property Damage:
  - Each Accident \$1,000,000
- c.** c. Combined Single Limit of  
\$1,000,000
- d.**

4. The Contractual Liability coverage required by Paragraph 6.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

- e.** a. Bodily Injury:
  - Each person \$2,000,000
  - Each Accident \$2,000,000
- f.** b. Property Damage:
  - Each Accident \$2,000,000
  - Annual Aggregate \$2,000,000

SC-7.03 Services, Materials, and Equipment

SC-7.03 Add the following new paragraphs immediately after Paragraph 7.03.C:

D. All materials supplied and articles furnished shall, wherever specified and otherwise wherever practicable, be the standard products of recognized, reputable manufacturers. The standard products of manufacturers other than those specified will be accepted when it is proven to the satisfaction of the ENGINEER, in accordance with the Contract, that they are equal in strength, durability, usefulness and convenience for the purpose intended. Any changes required in the details and dimensions indicated on the drawings, or the substitution of standard products other than those provided for, shall be properly made as approved by the ENGINEER and at the expense of the CONTRACTOR.

SC-7.05 Substitutes and "Or-Equals"

SC-6.05.C Amend the paragraph by making two subparagraphs under the title C. Engineer's Evaluation. The paragraph text is re-titled, 7.05.C.2 After Effective Date of Agreement. A new paragraph is added before this paragraph to read as follows:

1. During Bidding: The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 7.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of Paragraph 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final, and set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

SC-7.06 Add the following new paragraphs immediately after Paragraph 7.06.G:

H. The CONTRACTOR shall give his personal superintendence to the WORK, or shall have a competent superintendent with authority to act for him, to the satisfaction of the ENGINEER, on the job at all times during the progress of the WORK.

I. The CONTRACTOR shall employ an ample force of properly experienced persons and provide construction plant properly adapted to the WORK and of sufficient capacity and efficiency to accomplish the WORK in a safe and workmanlike manner at a rate of progress satisfactory to the OWNER. All plants shall be maintained in good working order and provision shall be made for immediate emergency repairs. No reduction in the capacity of the plant employed on the WORK shall be made except by written permission of the OWNER. The measure of the capacity of the plant shall be its actual performance on the WORK to which these specifications apply. Award of this contract shall not be construed as a guaranty by the OWNER that plant listed by the CONTRACTOR for use on this contract is adequate for the performance of the WORK.

J. Should the CONTRACTOR fail to maintain a rate of progress which, in the opinion of the OWNER, will complete WORK within the time limit specified, the OWNER may require that additional persons working, if necessary, during additional periods or shifts, or additional plant, or both, be placed on the WORK; or a reorganization of plant layout be effected in order that the progress of the WORK be brought up to schedule and so maintained. Should the CONTRACTOR refuse or neglect so to increase the number of employees, working period, or plant, or to reorganize the plant layout in the manner satisfactory to the OWNER, the latter may proceed under the provisions of the Contract to rectify the conditions.

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

L. Owner may furnish to any subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

SC-7.17 Shop Drawings and Samples

SC-7.17 Add the following new paragraphs immediately after Paragraph 7.17.E:

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor.

SC-7.18 Indemnification

SC-7.18 Add the following new paragraphs immediately after Paragraph 7.18.C:

D. CONTRACTOR will indemnify and hold harmless the OWNER, the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act of omission of the CONTRACTOR and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

E. In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by an employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

F. The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, its agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, design or specifications.

SC-8.01 Other Work

SC-8.01 Add the following new paragraphs immediately after Paragraph 8.01.D:

E. The WORK shall be periodically reviewed by the ENGINEER's representatives, but the presence of the ENGINEER's representatives shall not relieve the CONTRACTOR or his responsible agent of responsibility for the proper execution of the WORK.

F. The CONTRACTOR will be required to furnish at his expense such labor, organization and materials which form a part of the ordinary and usual equipment and crew of the CONTRACTOR as may be reasonably necessary in inspecting and supervising the WORK. Should the CONTRACTOR refuse, neglect or delay compliance with this requirement, the specified facilities may be furnished and maintained by the OWNER and the cost thereof will be deducted from any amounts due, or to become due, the CONTRACTOR.

G. Except as specified in this paragraph, or otherwise provided for in these specifications, all expense of inspection will be borne by the CONTRACTOR.

H. It is understood that any instruction or decision given by the ENGINEER is to be considered the instruction or decision of the OWNER, in all cases where, under the terms of this contract, decision rests with the ENGINEER.

I. The ENGINEER or his authorized representative shall have access to the WORK at all times.

SC-8.02.A Delete paragraphs 8.02.A.1-3 in their entirety and insert the following:

1. Division III and other general contractor(s) shall coordinate all activities among their separate Scopes of Work with one another and any additional subcontractors on the Site to ensure a safe, efficient working environment. These coordination efforts shall cover scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing and all other aspects of the Work that do not impact the design or function of the Work. In the event that disputes arise regarding scheduling or other efforts on the Site that cannot be resolved between the Division III and other contractor(s), then the Engineer will mediate the dispute on behalf of the Owner.

SC-10.03.A Add the following language at the end of paragraph 10.03.A:

The Engineer will provide Resident Project Representative Services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-500, 2008 Edition, as amended and executed for this specific Project.

SC-15.01 Add the following language at the end of paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-15.01 Delete Paragraph 15.01.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner for consideration. If the Owner finds the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.B will become due ten days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

END OF SECTION

## SECTION 01 06 00

### REGULATORY REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The following requirements of Regulatory Agencies having jurisdiction within this project area are considered a part of these Contract Documents.
- B. The project construction, including the letting of contracts, shall conform to any applicable requirements of the State, territorial and local laws and/or ordinances provided that these requirements do not conflict with any Federal laws and this sub-chapter.
- C. South Carolina Sales Tax: All applicable South Carolina sales tax shall be paid by the Contractor.
  - a. Use of chemicals: All chemicals used during the project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions.
- D. Safety and Health Regulations: 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).

##### 1.02 INSPECTION BY AGENCIES:

- A. The representatives of the South Carolina Department of Environmental Services, Clarendon County, the Town of Summerton, the South Carolina Department of Transportation, Environmental Protection Agency, and if required, the U.S. Army Corps of Engineers shall have access to the work wherever it is, in preparation or in progress, and the Contractor shall provide proper facilities for such access and inspection.

#### PART 2 PRODUCTS - NOT USED

#### PART 3 EXECUTION - NOT USED

**END OF SECTION**

## SECTION 01 23 00

### BID ALTERNATES AND SUBSTITUTES

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 DEFINITIONS

- A. Bid Alternate: A scope of work proposed by the Bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept corresponding changes either in the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in the Contract Documents. The selection of the successful bidder will be based on the Base Bid amount which does not include Alternate Bid Items.
  - 1. The cost or credit for each alternate is the net addition or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum related to this Definition.
- B. Base Bid: The amount for which the Bidder proposes to perform Work, not including that work for which Alternative Bid items and Substitutes are also submitted.

##### 1.03 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate or substitute into the Project.
  - 1. Include as part of each Alternate or Substitute, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not indicated as part of the alternate.
- B. Notification: Following award of the Contract, Engineer shall notify each party involved, in writing, of the status of each alternate or Substitute equipment. Engineer shall indicate if alternates and substitutes have been accepted, rejected, or deferred for later consideration. Where applicable, Contractor shall include a complete description of negotiated modifications to alternates or Substitutes offered.
- C. Execute accepted alternates under the same conditions as other work of the Contract.

#### PART 2 PRODUCTS - NOT USED

#### PART 3 EXECUTION

##### 3.01 SCHEDULE OF ALTERNATIVES

- A. A complete Schedule of Bid Alternates is detailed within the Bid Form Section 00 41 00 and other Division 0 Sections.

**END OF SECTION**

## SECTION 01 30 00

### ADMINISTRATIVE REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

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

##### 1.02 RELATED SECTIONS

- A. Document 00 70 00 - General Conditions: Dates for applications for payment
- B. Document 00 70 00 - General Conditions: Duties of the Construction Manager
- C. Section 01 32 16 - Construction Progress Schedule: Form, content and administration of schedules
- D. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements
- E. Section 01 78 00 - Closeout Submittals: Project record documents
- F. Sections throughout these specifications may include other submittals that may be required for construction

##### 1.03 PROJECT COORDINATION

- A. Project Manager: Alliance Consulting Engineers, Inc. designee.
- B. Coordinate with the Project Manager on the site for allocation of mobilization areas; for field offices and sheds, for access, traffic and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Manager.
- D. Comply with Project Manager's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Make the following types of submittals to the Project Manager:
  - 1. Requests for interpretation.
  - 2. Requests for substitution.

3. Shop drawings, operation and maintenance manuals, product data, and samples.
4. Manufacturer's instructions and field reports.
5. Applications for payment and change order requests.
6. Progress schedules.
7. Coordination drawings.
8. Closeout submittals.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PRECONSTRUCTION MEETING**

- A. Engineer will schedule a meeting within thirty (30) days after the Owner has determined the low bidder and may be held prior to issuance of the Notice to Proceed when required by regulatory agencies having jurisdiction. In any event, the Meeting will be held prior to actual start of construction.
- B. For the individuals designated by the Contractor, his subcontractors and suppliers attending the Preconstruction Meeting, provide required authority to commit the entities they represent to solutions agreed upon in the meeting.
- C. Advise the Engineer at least twenty-hours (24) in advance of the meeting to add items to the agenda.
- D. Attendance Required:
  1. Owner.
  2. Engineer.
  3. Contractor.
  4. Subcontractors, as needed.
  5. Utility Providers
  6. Permit Agents
- E. Agenda:
  1. Execution of Owner-Contractor Contract Agreement.
  2. Distribution of Contract Documents.
  3. Arrangement of Contractor's forces and personnel and those of subcontractors, material suppliers and the Engineer.
  4. Channels and procedures for communication.
  5. Designation of personnel representing the parties to Contract, Contractor, Owner



and Engineer.

6. Procedures and processing of field decisions, submittals and substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
  7. Scheduling.
  8. Scheduling activities of a Geotechnical Engineer
  9. Rules and regulations governing performance of the Work for security, quality control, housekeeping and related matters.
- F. Preconstruction Meeting minutes will be recorded and distributed within ten (10) days after meeting to participants, with three (3) copies to the Contractor and the required number of copies to the Owner, and those affected by decisions being made.

### **3.02 PROGRESS MEETINGS**

- A. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings. Contractor must advise the Engineer within forty-eight (48) hours of advance notice of the meeting to add items to the agenda.
- B. The Contractor's relations with his subcontractors and material suppliers, and discussions with regards to these items are the Contractor's responsibility and normally not part of the project meeting agenda.
- C. For the individuals designated by the Contractor to attend and participate in the project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.
- D. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
- E. Meeting Schedule:
  1. Project Meetings will be held monthly or as determined by the Engineer and Owner during construction.
  2. Coordinate as necessary to establish mutually acceptable schedule for meetings.
- F. Meeting Location: The Engineer will establish the meeting location, and where possible the meetings will be held at the project site or a location near the project site.
- G. Agenda:
  1. Review minutes of previous meetings.
  2. Review of Work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.

6. Maintenance of progress schedule.
  7. Corrective measures to regain projected schedules
  8. Planned progress during succeeding work period.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.
  11. Other business relating to Work.
- H. Project Meeting minutes will be recorded and distributed within ten (10) days after meeting to participants, with three (3) copies to the Contractor and the required number of copies to the Owner, and those affected by decisions made.
- I. Revisions to Meeting Minutes:
1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, the minutes will be accepted as properly stating the activities and decisions of the meeting.
  2. Individuals challenging published minutes shall reproduce and distribute copies of the challenge for review by all parties affected.
  3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

### **3.03 CONSTRUCTION PROGRESS SCHEDULE**

- A. Comply with Section 01 31 00 - Construction Schedules.
- B. Submit updated schedule with each Application for Payment.

### **3.04 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.
- C. Samples
  1. Provide sample or samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.
  2. Number of samples required:

- a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
  - b. By pre-arrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the work at a location agreed upon by the Engineer.
- D. Colors and Patterns
- 1. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Engineer for selection and confirmation with the Owner.
- E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

### **3.05 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
- 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions and literature.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.
- B. Submit for Engineer's knowledge as contract administrator or for Owner

### **3.06 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. When the following are specified in individual sections, submit them at project closeout:
- 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties and Bonds.
  - 4. Keys and Keying Schedule.
  - 5. Spare parts and manuals.
  - 6. Evidence of payment and release of liens per the General Conditions.
  - 7. Section 00 65 19.13 - Contractor's Affidavit.
  - 8. Other types as indicated.

- B. Submit for Owner's benefit during and after project completion.

### **3.07 NUMBER OF COPIES OF SUBMITTALS**

- A. Documents for Review:

- 1. Shop Drawings

- a. Scale and Measurement: Make shop drawings accurately to a scale of sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
- b. Large Prints (11" X 17" or larger):
  - i. Submit shop drawings in the form of white copies.
  - ii. Blueprints will not be acceptable.
- c. Manufacturer's Literature:
  - i. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.
  - ii. Submit the number of copies which are required to be returned, plus three (3) copies which will be retained by the Engineer.
- d. Do not begin fabrication of equipment or materials prior to Engineer's approval of shop drawings.

- B. Documents for Information: Submit three (3).

- C. Documents for Project Closeout: Make one (1) reproduction of submittal originally reviewed. Submit one (1) extra of submittals for information.

- D. Samples: Submit the number specified in individual specification sections; one (1) of which will be retained by Engineer.

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

### **3.08 SUBMITTAL PROCEDURES**

- A. Transmit each submittal with a Cover Letter that stipulates that the items submitted comply or do not comply with the full extent of the specifications. The Cover Letter must also include an explanation of why the items submitted are considered equal to the items specified. Failure to submit a Cover Letter will result in a rejection of the submittal.

- B. Timing of Submittals:

- 1. Within fifteen (15) calendar days after the Contractor has received the Owner's notice to proceed, submit:
  - a. Schedule for submittals including specification section, type of submittal

- and submittal date.
  - b. Construction schedule.
  - c. Schedule of partial payment requests.
  - 2. Make submittals of shop drawings, samples, substitution requests and other items in accordance with the provisions of this Section.
- C. Quality Assurance:
- 1. Coordination of submittals:
    - a. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
    - b. Verify that each item and the submittal for it conform in all respects with the specified requirements.
    - c. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.
  - 2. The following products do not require further approval except for interface within the Work and where otherwise indicated.
    - a. Products specified by reference to standard specifications such as ASTM, AWWA, and similar standards.
    - b. Products specified by manufacturer's name and catalog model number.
  - 3. Or equal:
    - a. Where the phrase "or equal" occurs in the Contract Documents, do not assume that the materials, equipment or methods will be considered as equal unless the item has been specifically so approved for this Work by the Engineer.
    - b. The decision of the Engineer shall be final.
  - 4. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless the Contractor advises the Engineer otherwise in writing.
- D. Sequentially number submittal in the Cover Letter. Revise submittals with original number and a sequential alphabetic suffix.
- E. Before submitting a shop drawing or any related material, Contractor shall:
- 1. Review each such submission for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of Contractor.
  - 2. Approve each such submission before submitting it.
  - 3. Stamp each such submission before submitting it.

- F. Shop drawings and related materials shall be returned with comments provided that each submission has been specified and is stamped by the Contractor.
- G. Shop drawings or material not specified or which have not been approved by the Contractor shall be returned without comment.
- H. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work and coordination of information is in accordance with the requirements of the Work and Contract Documents. The following stamp shall be used on all shop drawings: "This Shop Drawing has been reviewed by [Name of Contractor] and approved in accordance with the ways, means, methods, techniques, sequences and procedures associated with the project construction. [Name of Contractor] has approved these Shop Drawings in accordance with safety precautions and programs incidental thereto, and warrants that these Shop Drawings comply with the Contract Documents and includes no variations from the specifications."

Signature  
Name and Title (Please Print)  
Date

I. Identification of Submittals

- 1. Consecutively number all submittals.
  - a. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
  - b. On resubmittals, cite the original submittal number for reference.
- 2. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
- 3. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- 4. Maintain an accurate submittal log for the duration of the work, showing current status of all submittals at all times. Make the submittal log available to the Engineer for his review upon request.

J. Unrequired submittals will not be reviewed by the Engineer.

K. Submittals required by the Contractor of his subcontractors, such as drawings, setting diagrams or similar information needed to coordinate the construction, shall remain between the Contractor and his subcontractors and these submittals will not be reviewed by the Engineer.

L. Grouping of Submittals

- 1. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
  - a. Partial submittals may be rejected as not complying with the provisions of the Contract.
  - b. The Contractor may be held liable for delays so occasioned.

- M. Timing of Submittals
1. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- N. Resubmittal Schedule
1. For submittals marked "Furnish as Corrected" by the Engineer, resubmittal shall be within fifteen (15) days of the review date shown on the Engineer's shop drawing review stamp.
  2. For submittals marked "Revise and Resubmit", "Submit Specified Item", or "Rejected", resubmittal shall be within fifteen (15) days of the review date shown on the Engineer's shop drawing review stamp.
- O. Engineer's Review
1. Review by the Engineer does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
  2. Revisions:
    - a. Make revisions required by the Engineer.
      - i. If the Contractor considers any required revision to be a change, he shall so notify the Engineer as provided for in the General Conditions.
      - ii. Make only those revisions directed or approved by the Engineer.
      - iii. Submittals which have been reviewed and returned to the Contractor marked "Revise and Resubmit" or "Rejected" and which are resubmitted and not in an approved state, will not be reviewed a third time unless payment for the third and any subsequent review is by the Contractor. The engineering costs for review shall be equal to the Engineer's charges to the Owner under the terms of the Engineering Agreement with the Owner.
- P. Deliver submittals to Engineer at business address.
- Q. Schedule submittals to expedite the Project, and coordinate submission of related items.
- R. For each submittal for review, allow twenty-five (25) working days excluding delivery time to and from the Contractor.
- S. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- T. Provide space for Contractor and Engineer review stamps.
- U. When revised for resubmission, identify all changes made since previous submission.
- V. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

W. Submittals not requested will not be recognized or processed.

**END OF SECTION**



## SECTION 01 31 00

### CONSTRUCTION SCHEDULES

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Construction Schedules are to be prepared to provide assurance of project planning and the execution of the work so that the construction is completed within the construction period as stated in the Contract Documents, and to provide Alliance Consulting Engineers, Inc. a means to evaluate the progress of the work.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 01 of these Specifications.
  - 2. General Conditions and the requirements associated with the progress schedule.
  - 3. Construction period: As related to the executed contract.
- C. Definitions: "Day", means calendar day.

##### 1.02 QUALITY ASSURANCE

- A. The Contractor is to provide a scheduler that is thoroughly trained and experienced in preparing construction schedule data, and in preparing and issuing periodic schedule reports as stated below.
- B. Perform data preparation that includes analysis, charting and updating as required.
- C. Reliance upon the approved schedule:
  - 1. Once approved by Alliance Consulting Engineers, Inc., the construction schedule will be an integral part of the Contract and will establish interim completion dates for the various construction tasks specified in the Contract.
  - 2. The Contractor agrees and understands that the failure of the Owner to exercise this option either to order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered a precedent for any other scheduled activities.

##### 1.03 SUBMITTALS

- A. Comply with provisions of Section 01 30 00 Administrative Requirements.
- B. Once the preliminary schedule has been reviewed and approved by Alliance Consulting Engineers, Inc., within ten (10) calendar days, the Contractor must submit one (1) reproducible copy and four (4) prints of a preliminary construction schedule prepared in accordance with Part 3 of this Section.
- C. Once the Contractor receives final review and approval of the preliminary construction schedule, the Contractor must submit within ten (10) calendar days one (1) reproducible copy and four (4) prints of a construction schedule prepared in accordance with Part 3 of

this Section.

- D. The Contractor must also provide on the first working day of each month, four (4) prints of the construction schedule that has been updated in accordance with Part 3 of this Section.

## **PART 2 PRODUCTS**

### **2.01 CONSTRUCTION ANALYSIS**

- A. The construction schedule must illustrate graphically by bar chart the order and interdependence of all construction activities required to complete the work, and the sequence in which the construction activities are to be completed. All construction activities must be planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram and any other work being completed on the project site by other contractors that requires coordination.
  - 1. The graphical chart must be a two (2) line bar chart; with one (1) bar for planned activities, and one (1) bar for actual activity completion.
- B. Include, but do not necessarily limit indicated activities to:
  - 1. Project mobilization.
  - 2. Submittal and approval of shop drawings and sample data.
  - 3. Procurement of equipment and critical materials.
  - 4. Fabrication of special material and equipment, and its installation and testing.
  - 5. Each construction activity that is critical to the work being performed.
  - 6. All activities by Alliance Consulting Engineers, Inc. that affect progress, required dates for completion, or both, for all and each part of the Work.
  - 7. All activities by other contractors that have to be coordinated with the work being completed under this Contract.
  - 8. Final cleanup.
  - 9. Final inspecting and testing.

## **PART 3 EXECUTION**

### **3.01 PRELIMINARY ANALYSIS**

- A. Contents:
  - 1. Outline the activities of the Contractor for the period between receipt of Notice to Proceed and submittal of construction schedule.
  - 2. Outline the Contractor's approach to the remaining work to be completed.
  - 3. Outline the costs of all activities scheduled before submittal and approval of the construction schedule.

### **3.02 CONSTRUCTION SCHEDULE**

- A. Provide a construction schedule that incorporates all of the revisions from review of the preliminary analysis.

### **3.03 PERIODIC REPORTS**

- A. Provide monthly updates of the approved construction schedule.
  - 1. Indicate "actual" progress for each activity on the bar chart.
  - 2. Provide written narrative summary of revisions causing delay in the construction, and an explanation of corrective actions being taken or proposed.

### **3.04 REVISIONS**

- A. Provide a revised construction schedule periodically that includes delays, early completion, etc.
- B. Any revisions to the construction schedule must be approved by Alliance Consulting Engineers, Inc. before acceptance.

**END OF SECTION**

## SECTION 01 32 00

### PROJECT CONSTRUCTION SEQUENCE AND PROVISIONS

#### PART 1 GENERAL

##### 1.01 CONSTRUCTION AREAS

- A. The Contractor shall limit his use of the construction areas for work and for storage to allow for:
  - 1. Work by other Contractors.
  - 2. Owner use.
  - 3. Public use.
- B. Coordinate use of work site under direction of Engineer.
- C. Assume full responsibility for the protection and safekeeping of materials and products under this Contract, stored on the site.
- D. Move any stored products, under Contractor's control, which interfere with operations of the OWNER or separate Contractor.
- E. Obtain and pay for the use of additional storage of work areas needed for operations.

##### 1.02 SPECIFICATIONS

- A. Specifications

The Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements of the work and shall always govern whenever there appears to be a conflict.

- B. Intent

All work called for in the Specifications applicable to this Contract, but not shown on the plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the plans or the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these specifications shall be made upon that basis. The inclusion of the General Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

##### 1.03 WORK IN PROGRESS

The Contractor shall furnish personnel and equipment which will be efficient, appropriate, and adequately sized to secure a satisfactory quality of work and a rate of progress which will insure the

completion of the work within the time stipulated in the Proposal. If at any time such personnel appears to the Engineer to be inefficient, inappropriate, or insufficient for securing the quality of work required for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character, or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

#### **1.04 UTILITY SYSTEMS AND FACILITIES**

- A. The Contractor shall interrupt water, telephone, power, cable TV, sewer, gas or other related utility services and disturb the normal functioning of the system as little as possible. He shall notify the Engineer and the appropriate agency well in advance of any requirements for dewatering, isolating, or relocating a section of a utility, so that necessary arrangements may be made with the appropriate agency.
- B. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, storm drains and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him/her at his/her expense.
- C. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.
- D. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and no separate payment will be made for this work.
- E. If, in the opinion of the Engineer, permanent relocation of a utility owned by the Owner is required, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for at the contract unit prices, if applicable, or as extra work. If relocation of a privately owned utility is required, the Owner will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and utility and shall have no claim for delay due to such relocation. The Contractor shall notify all utility companies in writing at least 48 hours (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities.
- F. The Contractor shall be responsible to maintain water, telephone, power, cable TV, sewer, gas and other related utilities throughout construction at no additional cost to the Owner.
- G. The Contractor shall fully cooperate with all private and public utilities during the installation of new facilities, or relocation of existing facilities. The Contractor shall coordinate his work accordingly and shall have no claim except for time extension for delays associated with the proposed utility improvements.

#### **1.05 TEST PITS**

- A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction of the Engineer. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer. No separate payment will be made.

## **1.06 CARE AND PROTECTION OF PROPERTY**

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Engineer.
- B. All sidewalks and driveways which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials.
- C. Along the location of this work all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and seeded.
- D. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the tree warden. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.
- E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under other items in the Proposal.

## **1.07 CLEAN-UP**

- A. During the course of the work, the Contractor shall keep the site of his operations in as clean and neat of a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, brick, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.
- B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his/her subcontractors shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.
- C. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be responsible to pay all fines, remove the fill, and restore the area impacted.

## **1.08 PROTECTION OF CONSTRUCTION AND EQUIPMENT**

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be

reconstructed by the Contractor at his own expense.

- B. All structures shall be protected in a manner approved by the Engineer. Should any of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense, and to the satisfaction of the Engineer. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.
- C. Further, the Contractor shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

#### **1.09 PROJECT SEQUENCING**

Construct work in stages to accommodate operation of existing facilities during construction period. Coordinate construction schedule and operations with the Owner and the Engineer. Owner reserves the right to place facilities, taken out of service by Contractor, back into service on emergency basis upon notification to Contractor.

**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION – NOT USED**

**END OF SECTION**

## SECTION 01 40 00

### QUALITY REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. References and standards.
- B. Quality assurance submittals
- C. Control of installation.
- D. Inspection services.
- E. Cooperate with the Owner's selected testing agency and all others responsible for testing and inspecting the work.
- F. Provide such other testing and inspecting as are specified to be furnished by the Contractor in this Section and/or elsewhere in the Contract Documents.

##### 1.02 RELATED REQUIREMENTS

- A. Document 00 72 13 – Standard General Conditions of the Construction Contract: Inspections and approvals required by public authorities.
- B. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.
- D. Requirements for testing may be described in various Sections of these specifications.
- E. Where no testing requirements are described, but the Owner decides that testing is required, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.

##### 1.03 ADDITIONAL WORK INCLUDED:

- A. Selection of testing laboratory: The contractor shall provide all necessary testing by a prequalified independent testing laboratory. This information shall be provided to the Engineer for approval during the shop drawing review process.
- B. Payment for initial testing: The selected contractor's contract shall provide all necessary services of the testing laboratory within the contract prices to the owner as further described in Article 2.1 of this Section.
- C. Tests at point of manufacture as specified in other Sections of these documents are to be made with all costs borne by the Contractor.

##### 1.04 REFERENCE STANDARDS

- A. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2009.



- B. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2008.
- C. ASTM E 329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2009.

#### **1.05 SUBMITTALS**

- A. Testing Agency Qualifications:
  - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Test Reports: After each test/inspection, promptly submit three (3) copies of report to Alliance Consulting Engineers, Inc. and to Owner.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number
    - c. Name of inspector
    - d. Date and time of sampling or inspection
    - e. Identification of product and specifications section
    - f. Location in the Project
    - g. Type of test/inspection
    - h. Date of test/inspection
    - i. Results of test/inspection
    - j. Conformance with Contract Documents
    - k. When requested by Alliance Consulting Engineers, Inc., provide interpretation of results.
  - 2. Test report submittals are for Alliance Consulting Engineers Inc.'s knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner information
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Alliance Consulting Engineers, Inc., in quantities specified for Product Data.
  - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  - 2. Certificates may be recent or previous test results on material or product, but

must be acceptable to Alliance Consulting Engineers, Inc.

- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

## **1.06 REFERENCES AND STANDARDS**

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Alliance Consulting Engineers, Inc. before proceeding.
- F. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of Alliance Consulting Engineers, Inc. shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

## **1.07 QUALITY ASSURANCE**

- A. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E 329.
- B. Testing, when required, will be in accordance with all pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials.

## **1.08 PRODUCT HANDLING**

- A. Comply with pertinent provisions of Section 01 60 00 Product Requirements.
- B. Promptly process and distribute required copies of test reports and related instructions to assure necessary retesting and replacement of materials with the least possible delay in progress of the work.

## **PART 2 PRODUCTS**

### **2.01 PAYMENT FOR TESTING**

- A. Testing Services:
  - 1. The Contractor will pay for all testing services required by the contract documents and manufacturer's recommendations except for concrete, aggregate and compaction testing.

2. When initial tests indicate non-compliance with the Contract Documents, any all retesting and consulting required to provide compliance with the Contract Documents will the responsibility of the contractor at no additional costs to the Owner.
3. Retesting: When initial tests indicate non-compliance with the Contract Documents, subsequent re-testing occasioned by the non-compliance shall be performed by the same testing agency.

## **2.02 CODE COMPLIANCE TESTING**

- A. Inspections and tests required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

## **2.03 CONTRACTOR'S CONVENIENCE TESTING**

- A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

## **PART 3 EXECUTION**

### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Alliance Consulting Engineers, Inc. before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### **3.02 CONTRACTOR TESTING COORDINATION:**

- A. Cooperation with Testing Laboratory:
  1. Representatives of the testing laboratory shall have access to the work at all times and at all locations where the work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.
- B. Taking Specimens:

1. All specimens and samples for testing, and deliveries to laboratory, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

### **3.03 SCHEDULES FOR TESTING**

- A. Establishing schedule:
  1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.
  2. Provide all required time within the construction schedule.
- B. Revising schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.
- C. Adherence to schedule: When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the work, all extra charges for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

### **3.04 TESTING AND INSPECTION**

- A. Testing Agency Duties:
  1. Provide qualified personnel at site. Cooperate with Alliance Consulting Engineers, Inc. and Contractor in performance of services.
  2. Perform specified sampling and testing of products in accordance with specified standards.
  3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  4. Promptly notify Alliance Consulting Engineers, Inc. and Contractor of observed irregularities or non-conformance of Work or products.
  5. Perform additional tests and inspections required by Alliance Consulting Engineers, Inc.
  6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
  1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the Work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the Work.

- C. Contractor Responsibilities:
  - 1. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected
    - b. To facilitate tests/inspections
  - 2. Notify Alliance Consulting Engineers, Inc. and laboratory twenty-four (24) hours prior to expected time for operations requiring testing/inspection services.
  - 3. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 4. Arrange with the Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Alliance Consulting Engineers, Inc.
- E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.
- F. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Alliance Consulting Engineers, Inc. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

### **3.05 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Alliance Consulting Engineers, Inc., it is not practical to remove and replace the Work, Alliance Consulting Engineers, Inc. will direct an appropriate remedy or adjust payment.

**END OF SECTION**

## SECTION 01 41 26

### PERMITS AND RIGHTS-OF-WAY

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: This section outlines the requirements of the Contractor for the payment for any fees and the acquisition of any required licenses, building permits, rights-of-ways, easements, etc., that may be required for the construction of the project.
- B. Work not included: The Owner will obtain and provide to the Contractor, copies of the following, if required:
  - 1. The South Carolina Department of Environmental Services (SCDES) Non-Coastal Stormwater Less Than One-Acre (LTOA) Notification Receipt issued on December 20, 2024.
  - 2. The South Carolina Department of Transportation (SCDOT) Utility Encroachment Permit (Permit No. 287743) issued on January 2, 2025.
  - 3. The South Carolina Department of Transportation (SCDOT) Driveway Encroachment Permit (Permit No. 290026) issued on February 25, 2025.
  - 4. The South Carolina Department of Environmental Services (SCDES) Wastewater Construction Permit Bureau of Water (Permit No. WW046421) issued on January 24, 2025.
  - 5. Santee Lynches Council of Governments (SLCOG) 208 Plan Conformation Approval Issued on January 14, 2025.
- C. Related work: Documents affecting work of this section include, but are not necessarily limited to, General Conditions and Sections in Division 01 of these specifications.

##### 1.02 SUBMITTALS

- A. Submit to the Engineer and post at the site, satisfactory evidence that all required licenses, building permits, etc., have been obtained prior to start of construction.

#### PART 2 PRODUCTS - NOT USED

#### PART 3 EXECUTION

##### 3.01 BUSINESS LICENSE

- A. Verify licenses that are required to perform the work within the project area, and obtain at no additional cost to the Owner.

##### 3.02 RIGHTS-OF-WAY, UTILITY LINES

- A. The Contractor shall confine his activities to the project limits as illustrated in the Contract Documents.
- B. The Owner will provide no right-of-way over other property.

##### 3.03 LAND

- A. The necessary land for construction of the proposed improvements will be provided by the Owner.

**END OF SECTION**

## SECTION 01 42 19

### REFERENCE STANDARDS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Throughout these Contract Documents, references are made to specifications and standards that have been issued by nationally recognized professional and/or trade organizations. These referenced standards are generally identified by abbreviating the name of the organization following with the specification/standard number, and unless specifically indicated otherwise, all references to standards refer to the latest edition available at the time of the bidding.

##### 1.02 ABBREVIATIONS

- A. Wherever the following abbreviations are used in these Contract Documents, these abbreviations are to be considered as the same as the respective expressions represented below:

1.	AASHO	American Association of State Highway Officials
2.	ACI	American Concrete Institute
3.	AISC	American Institute of Steel Construction
4.	ALS	American Lumber Standards
5.	ANSI	American National Standards Institute, Inc.
6.	ASTM	American Society for Testing and Materials
7.	AWWA	American Water Works Association
8.	AWPA	American Wood Preservers Association
9.	AWS	American Welding Society
10.	FSS	Federal Specifications and Standards, General Services Administration
11.	SPIB	Southern Pine Inspection Bureau
12.	SSPC	Steel Structures Painting Council

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## SECTION 01 45 29

### TESTING LABORATORY SERVICES

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. This Section includes testing which the Owner may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.
- B. This work also includes all testing required by the Owner to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength and slump testing, soil compaction, etc.
- C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer, e.g., testing of pipe.

##### 1.02 SECTION INCLUDES

- A. Selection of Testing Laboratory.
- B. Laboratory Duties.
- C. Payment for Testing Services.
- D. Contractor Responsibilities.
- E. Schedules for Testing.
- F. Transporting Samples.

##### 1.03 SELECTION OF TESTING LABORATORY

The testing laboratory or laboratories will be selected by the Contractor, subject to the approval of the Owner.

##### 1.04 LABORATORY DUTIES

- A. Cooperate with the Owner, Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials.
  - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
  - 2. Ascertain compliance with requirements of the Contract Documents.
- D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.
- E. Promptly submit three copies (two copies to the Engineer and one copy to the Contractor) of report of inspections and tests in addition to those additional copies required by the Contractor with the following information included:



1. Date issued
  2. Project title and number
  3. Testing laboratory name and address
  4. Name and signature of inspector
  5. Date of inspection or sampling
  6. Record of temperature and weather
  7. Date of test
  8. Identification of product and Specification section
  9. Location of Project
  10. Type of inspection or test
  11. Results of test
  12. Observations regarding compliance with the Contract Documents
- F. Perform additional services as required.
- G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

#### **1.05 PAYMENT FOR TESTING SERVICES**

- A. The cost of testing services required by the Contract shall be paid for by the Contractor and shall be included in the cost of the work to which it pertains. This excludes concrete, soil and asphalt testing, which will be paid for by the Owner.
- B. The cost of additional testing services not specifically required in the Specifications, but requested by the Owner or Engineer, shall be paid for by the Owner.
- C. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the Owner.
- D. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor.

#### **1.06 CONTRACTOR RESPONSIBILITIES**

- A. Contractor will be furnished contact information for the selected laboratory. Contractor will be required to schedule ALL testing.
- B. Cooperate with laboratory personnel, provide access to Work and/or manufacturer's requirements.
- C. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.
- D. Furnish copies of mill test reports.

- E. Furnish required labor and facilities to:
  - 1. Provide access to Work to be tested;
  - 2. Obtain and handle samples at the site (if certified to do so);
  - 3. Facilitate inspections and tests;
  - 4. Build or furnish a holding box for concrete cylinders or other samples as required by the laboratory.
- F. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.
- G. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.
- H. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.
- I. If the Contractor disagrees with the approved Engineer's testing agency's methods or results during an onsite test, the Contractor may have another testing agency conduct an independent evaluation at the Contractor's expense. After an independent evaluation is performed, the Contractor will submit their results to the Engineer for review.

#### **1.07 SCHEDULES FOR TESTING**

- A. Establishing Schedule
  - 1. The Contractor shall, by advance discussion with the testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.
  - 2. Provide all required time within the construction schedule.
- B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.
- C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the Owner.

#### **1.08 TRANSPORTING SAMPLES**

The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## SECTION 01 50 00

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Vehicular access and parking.
- B. Project identification sign.
- C. Field offices

##### 1.02 RELATED SECTIONS

- A. Section 01 55 10 - Vehicular Access and Parking

##### 1.03 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

##### 1.04 FENCING

- A. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.
- B. Proposed fence and gates may be constructed to meet this requirement. Contractor shall make any necessary repairs to fence and gates prior to substantial completion.

##### 1.05 VEHICULAR ACCESS AND PARKING - See Section 01 55 10

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

##### 1.06 PROJECT IDENTIFICATION

- A. Provide Project identification sign of design and construction indicated in the Contract Documents – Section 00 73 00
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

D. Coordinate with Engineer and Owner prior to installation.

**1.07 FIELD OFFICES – INTENTIONALLY OMITTED**

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## SECTION 01 55 10

### VEHICULAR ACCESS AND PARKING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Access roads.
- B. Parking.
- C. Maintenance

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. Temporary Construction: Per Detail on Plans

#### PART 3 EXECUTION

##### 3.01 PREPARATION

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas

##### 3.02 ACCESS ROADS

- A. All material shall be delivered to the site by use of the existing driveways and the publicly-owned stated highways that connect to the site.

##### 3.03 PARKING

- A. Locate as approved by Engineer

##### 3.04 MAINTENANCE

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction. Promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

##### 3.05 REMOVAL, REPAIR

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

##### 3.06 MUD FROM SITE VEHICLES

- A. Provide means of removing mud from vehicle wheels before entering streets.

**END OF SECTION**

**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations and procedures.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.
- G. Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 40 00 - Quality Requirements: Product quality monitoring.
- C. Documents affecting work of this Section include, but are not necessarily limited to, Standard General Conditions of the Construction Contract and Sections in Division 01 of these specifications.
- D. Additional procedures also may be prescribed in other Sections of these specifications.

**1.03 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within fifteen (15) days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

#### **1.04 QUALITY ASSURANCE**

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

#### **1.05 MANUFACTURER'S RECOMMENDATIONS**

- A. Except as otherwise approved by the Engineer, determine and comply with manufacturer's recommendations on product handling, storage and protection.

### **PART 2 PRODUCTS**

#### **2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify the Owner promptly upon discovery; protect, remove, handle, and store as directed by the Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

#### **2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.

#### **2.03 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

#### **2.04 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

- B. Deliver to Project site; obtain receipt prior to final payment.

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Alliance Consulting Engineers, Inc. will consider requests for substitutions only within fifteen (15) days after date of Agreement.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Document
- D. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 5. Will reimburse the Owner and Alliance Consulting Engineers, Inc. for review or redesign services associated with re-approval by authorities.
- E. Substitution Submittal Procedure:
  - 1. Submit three (3) copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. Alliance Consulting Engineers, Inc. will notify Contractor in writing of decision to accept or reject request.

### **3.02 PACKAGING**

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
  - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
  - 2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.



- B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality and other pertinent information.

### **3.03 TRANSPORTATION AND HANDLING**

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.04 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Prevent contact with material that may cause corrosion, discoloration, or staining.
- I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- K. Partial payments under the Contract will not relieve the Contractor from responsibility.
  - 1. When materials and work at the site that have been partially paid for are not adequately protected by the Contractor, such materials will be protected by the

Owner at the expense of the Contractor and no further partial payment thereon will be made.

- L. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.
- M. Electrical and control equipment:
  - 1. Store in a dry area protected from dust and humidity.
  - 2. Equipment can be protected by a weatherproof cover if shipped to the site no more than two (2) weeks prior to installation and energization.

### **3.05 REPAIRS AND REPLACEMENTS**

- A. In the event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the contract time of completion.

**END OF SECTION**

## SECTION 01 61 00

### GENERAL EQUIPMENT REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Requirements relating to providing of equipment and services specified in other Sections of these specifications.

##### 1.02 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections of Division 01 of these Specifications.
- B. Additional provisions concerning this work may be stated in other sections associated with these specifications.
- C. Where new equipment is to be installed into existing structures or systems, verify the plan dimensions with existing dimensions and provide all discrepancies as part of the shop drawings.
- D. Equipment provided as part of this Section shall be installed in the location provided and within the space as indicated on the Construction Plans.
- E. Any structural, piping, wiring, drawings, or other modifications required to accommodate equipment offered other than that shown on the Drawings, or specified, shall be provided at no additional cost to the Owner.

##### 1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Certificates: Certify that products of this section meet or exceed specified requirements.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in the Owner's name and registered with manufacturer.

##### 1.04 QUALITY ASSURANCE

- A. Equipment manufacturers shall, upon request of the Engineer, provide a detailed list of installations of comparable function.
- B. Equipment in each Section shall be by a single manufacturer regularly engaged in the development of equipment designed for the intended function.
- C. Provide each component with a serial number and the manufacturer shall maintain records of same.
- D. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, will provide a list that includes years of experience, projects similar in type, size, and cost, as well as a list of references for each similar project.

- E. Perform design, if required, of Tank, Structural, Foundation, and Electrical under direct supervision of a Professional Engineer experienced in design of this Work and licensed in South Carolina.
- F. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

#### **1.05 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

#### **1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one (1) year period after Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL**

- A. Supply all materials, tools, equipment, labor and supervision to properly complete installation of equipment, piping, controls, etc., in compliance with the contract documents.

#### **2.02 IDENTIFICATION**

- A. Provide stamped identification labels on motors and equipment with pertinent information including serial numbers, model numbers, capacities, voltage, amps, etc.
- B. Label to be aluminum or stainless steel.
- C. Attach with stainless steel or aluminum hardware.

#### **2.03 LUBRICANTS AND LUBRICATING EQUIPMENT**

- A. Provide and install all necessary oils, greases, etc., for initial operation of equipment.
- B. Where manufacturer's recommendations include changing of initial lubricants after 1,000-hours or less of operation, provide sufficient lubricants to make the change.
- C. Provide one of every type lubricating gun required to properly maintain the equipment.

#### **2.04 OPERATION, MAINTENANCE AND SERVICE MANUALS**

- A. Prepare and submit for the Owner's use six (6) copies of O&M Manual for each piece of equipment.
  - 1. Submit Manuals sixty (60) days prior to delivery of equipment.
- B. Manuals shall be specific to the equipment supplied.
  - 1. Manuals applicable to many different configurations and which require the operator to selectively read portions of the instructions will not be accepted.
  - 2. The equipment model that the Manual applies to shall be indicated by an arrow.

- C. Provide a Table of Contents specific to each Manual.
- D. At the beginning of each Manual, provide a description of the equipment to include model numbers, purchase order numbers, serial numbers, motor information and performance and design criteria.
- E. Correlate Manuals with the approved shop drawings and include the following minimum information:
  - 1. Parts list, including recommended spare parts list.
  - 2. Recommended maintenance instructions.
  - 3. Recommended lubricants and lubrication instructions.
  - 4. Address and telephone number of the source for repairs, spare parts and service.
  - 5. Detailed description of operating procedure for the item of equipment specifically written for this installation, including start-up and shutdown procedures.
  - 6. Equipment performance specifications, including pump curves.
  - 7. Results of start-up and any further recommendations resulting from start-up.
  - 8. Current cost for each recommended spare part and agreement to provide updated costs at Owner's request.
- F. Provide a maintenance and lubrication schedule to be a summary of all preventative maintenance and lubrication, including the following information:
  - 1. Title.
  - 2. Type of activity (inspection, adjustment, oil change, etc.).
  - 3. Brief description of activity.
  - 4. Type of lubricant.
  - 5. Frequency (daily, weekly, etc.).
- G. The manufacturer shall provide the Owner with a log chart to record all servicing and maintenance required during the equipment warranty period.
- H. For process oriented equipment, treatment plants, etc., provide a detailed description of the process operation and trouble-shooting of problems.
- I. Provide clear and legible copies. Type parts lists, etc.
- J. Layout and detail drawings shall be reduced to a maximum size of 11" x 17", unless written approval is received from the Engineer prior to submittal of Manuals.
- K. Provide a clearly labeled three-ring binder for Manuals having a thickness greater than 1/4-inch. Provide sheet lifters if binder is more than 2/3 full.
  - 1. Provide multiple binders for Manuals having a thickness greater than 2-inches.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Provide information that may be requested without undue delay.
- B. Deliver O&M Manuals, when required, to the Engineer for review and approval and transmittal to the Owner.
  - 1. Do not start equipment unless the Owner has approved O&M Manuals.
- C. Properly lubricate all equipment prior to start-up.
- D. Work under sections requiring submittal of O&M Manual will not be considered complete and final payment will not be made until all Manuals have been submitted and approved.
- E. Provide revisions to O&M Manuals to reflect any changes made during installation and start-up of equipment.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01 40 00 Quality Requirements.

### **3.04 STARTING EQUIPMENT AND SYSTEMS**

- A. Provide manufacturer's field representative to prepare and start equipment.
- B. Adjust for proper operation within manufacturer's published tolerances.
- C. Demonstrate proper operation of equipment to Owner's designated representative.

### **3.05 WARRANTY PERIOD**

- A. Equipment warranties shall be a one (1)-year period after the Date of Substantial Completion unless otherwise specified.

**END OF SECTION**

**SECTION 01 70 00**  
**EXECUTION REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of the Owner's personnel.
- I. Project Record Documents.
- J. Contract Closeout procedures, except payment procedures.

**1.02 RELATED REQUIREMENTS**

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 01 of these Specifications.
- B. Other requirements for technical services are stated in other sections of these Specifications.
- C. Section 00 65 19.13 - Contractor's Affidavit.
- D. Section 01 30 00 - Administrative Requirements: Submittals procedures.
- E. Section 01 40 00 - Quality Requirements: Testing and observation procedures.
- F. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, with elevations and locations of the work in conformance with Contract Documents.

3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
  2. Integrity of weather exposed or moisture resistant element.
  3. Efficiency, maintenance, or safety of any operational element.
  4. Visual qualities of sight exposed elements.
  5. Work of the Owner or separate Contractor.

#### **1.04 QUALIFICATIONS**

- A. For survey work, employ a land surveyor registered in South Carolina. Submit an evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

#### **1.05 PROJECT CONDITIONS**

- A. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations.
- D. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
1. Minimize amount of bare soil exposed at one time.
  2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
  4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.



## **1.06 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After the Owner's occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of the Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work.
- B. Start of work means acceptance of existing conditions.
- C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- D. Examine and verify specific conditions described in individual specification sections.
- E. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

- F. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

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

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Alliance Consulting Engineers, Inc. four (4) days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two (2) days after meeting to participants, with two (2) copies to Alliance Consulting Engineers, Inc., Owners, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Alliance Consulting Engineers, Inc. of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Alliance Consulting Engineers, Inc. the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Alliance Consulting Engineers, Inc.
- F. Utilize recognized engineering survey practices.
- G. Establish a minimum of two (2) permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
- I. Periodically verify layouts by same means.
- J. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.06 ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Alliance Consulting Engineers, Inc. before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings or described in the Technical Specifications.
  - 2. Relocate items indicated on drawings or described in the Technical Specifications.

- C. Services (Including but not limited to Fire Protection, Electrical and Telecommunications): Remove, relocate and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.
- D. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.
- E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
  - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Alliance Consulting Engineers, Inc.
- F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- G. Clean existing systems and equipment.
- H. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- I. Do not begin new construction in alterations areas before demolition is complete.
- J. Comply with all other applicable requirements of this section.

### **3.07 CUTTING AND PATCHING**

#### **EXECUTION REQUIREMENTS**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- C. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

- J. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- K. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
- L. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

### **3.08 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.09 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.10 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.11 DEMONSTRATION AND INSTRUCTION**

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

### **3.12 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.13 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
- B. Use cleaning materials that are nonhazardous.
- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.14 PROJECT RECORD DOCUMENTS**

- A. Work includes:
  - 1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below.
  - 2. Upon completion of the Work, deliver the recorded changes to the Engineer.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 01 of these specifications.
  - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these specifications.
- C. Quality assurance:
  - 1. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.
  - 2. Accuracy of records shall be such that future search for items shown on the Project Record Documents may rely reasonably on the information provided under this Section of the Work.
- D. Submittals:
  - 1. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.
  - 2. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.

3. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer and secure his approval.
- E. Product handling:
1. Maintain Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer to the Engineer.
  2. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.
    - a. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.
    - b. In such case, provide replacements to the standards originally required by the Contract Documents.
- F. Job Set Documents:
1. Promptly following receipt of the Owner's Notice to Proceed, secure from the Engineer, at no charge to the Contractor, one complete set of all Documents comprising the Contract.
- G. Maintenance of Job Set:
1. Immediately upon receipt of the job set described in above paragraph titled "JOB SET DOCUMENTS", identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".
  2. Preservation:
    - a. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.
    - b. Do not use the job set for any purpose except entry of new data and for review by the Engineer.
    - c. Maintain the job set at the site of Work as that site is designated by the Engineer.
  3. Making entries on Job Set Drawings:
    - a. Use erasable colored pencil, preferably red (not ink or indelible pencil) to delineate changes.
    - b. Show by station number location of all fittings, manholes, valves, wye locations, etc.
    - c. Reference all fittings and valves to two aboveground items reasonably safe from being relocated and indicate such references on the drawings.
    - d. Show location of electrical conduit, pull boxes, etc.



4. Submittal:
  - a. Submit "marked-up" set of drawings to the Engineer.
    - i. Make any necessary additions as required by the Engineer.

### **3.15 CLOSEOUT PROCEDURES**

- A. Work included shall be providing compliance with the requirements of the General Conditions of these Specifications for administrative procedures in closing out the project work.
- B. Make submittals that are required by governing or other authorities.
  1. Provide copies to Alliance Consulting Engineers, Inc.
  2. When the Engineer finds the Contractor's work acceptable, the Contractor shall be given such notice and should proceed with closeout submittals.
  3. Closeout submittals shall contain at least the following:
    - a. Project record documents.
    - b. Equipment operation and maintenance manuals and copies of start-up reports.
    - c. Warranties and bonds.
    - d. Spare parts and manuals.
    - e. Evidence of payment and release to liens per General Conditions.
    - f. Section 00 65 19.13 - Contractor's Affidavit.
- C. Notify Alliance Consulting Engineers, Inc. when work is considered ready for Substantial Completion.
  1. The Contractor shall notify the Engineer that, in his opinion, the project is substantially complete. A written statement listing items complete shall be submitted.
  2. Upon receipt of the Contractor's notice, the Engineer shall make an observation to determine if substantial completion is provided.
  3. If, in the Engineer's opinion, the project is not substantially complete, a written notice to the Contractor shall follow outlining reasons and deficiencies in work that comprised the Engineer's decision. The Engineer's decision shall be final.
- D. Request and obtain permit acceptance on all open construction permits.
- E. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Alliance Consulting Engineers, Inc.'s review.
- F. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owners-occupied areas.

- G. Accompany Engineer & Owner on preliminary final observation.
1. The Engineer will make a final observation for the Contractor after all items noted in the substantial completion observation have been corrected. The Contractor shall notify the Engineer in writing when a final observation is needed. Incomplete and/or defective work shall be given to the Contractor by written notice.
- H. Notify Alliance Consulting Engineers, Inc. when work is considered finally complete.
- I. Complete items of work determined by Alliance Consulting Engineers, Inc.'s final observation.
- J. Re-observation:
1. Re-observation required due to failure by the Contractor to make previously noted corrections will be performed by the Engineer.
  2. Cost for such observations will be due to and payable by the Contractor at a rate equal to charges to the Owner for similar work.
  3. Re-observations will continue until the work is acceptable to the Engineer.
- K. Final Payment:
1. Final payment to the Contractor will be made upon completion of the previous items and others required by these specifications. A final statement shall be forwarded to the Engineer. The statement shall address:
    - a. Previous change orders.
    - b. Unit prices.
    - c. Deductions for un-corrected work.
    - d. Deductions for liquidated damages.
    - e. Deductions for re-testing work.
    - f. Deductions for re-observation.
    - g. Deductions for shop drawing review.
    - h. Adjusted contract sum.
    - i. Previous payments.
    - j. Amount due.
  2. When required, the Engineer will prepare a contract change order for adjustments not previously made.

**END OF SECTION**

## **SECTION 01 71 23**

### **FIELD ENGINEERING**

#### **PART 1 GENERAL**

##### **1.01 DESCRIPTION**

- A. Work included: Provide such field engineering services as are required for proper completion of the Work.

##### **1.02 Related work:**

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 01 of these Specifications.

##### **1.03 QUALITY ASSURANCE**

- A. Provide competent labor, supervision, inspection services, testing services, materials and equipment for a complete and quality rehabilitation and coating project.
- B. Exercise proper precautions to verify the information described in the Technical Specifications and Contract Documents prior to laying out or performing any part of the Work.
  - 1. The Contractor will be held responsible for any errors therein that otherwise might have been avoided.
  - 2. Promptly inform the Engineer of any errors or discrepancies discovered in the Technical Specifications in order that proper corrections may be made.

##### **1.04 PROCEDURES**

- A. Verify lead content of existing coating system before starting work on the site.
- B. Secure all required permits and make all required and necessary notifications before starting work on the site.
- C. Perform preparation, coating and repair task during progress of the Work consistent with the spirit of the Technical Specifications.
- D. Do not deviate from or change items of the Work without specific approval from the Engineer.
- E. Promptly advise the Engineer when a change becomes necessary because of other changes in the Work.

#### **PART 2 PRODUCTS – NOT USED**

#### **PART 3 EXECUTION – NOT USED**

**END OF SECTION**

## SECTION 01 75 16

### START-UP REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Provide personnel to place all equipment in operation and instruct Owner's personnel in operation and maintenance procedures.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 01 of these specifications.
  - 2. Other provisions concerning Start-up Services may also be stated in other Sections of these specifications.

##### 1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled personnel who are thoroughly trained and experienced in the necessary procedures and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Provide manufacturers technical services as specified or needed for start-up.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION

##### 3.01 GENERAL

- A. Contractor shall be responsible for obtaining a certificate of substantial completion for all components which will include but is not limited to all required testing, approved record drawings, Engineer's Certificate of Completion, Owner's Certificate of Completion and a Permit to Operate from SCDES.

##### 3.02 SCHEDULING

- A. Determine date of start-up jointly with Engineer and Owner.
- B. Schedule services of manufacturer's technical personnel jointly with Engineer prior to date of start-up.

##### 3.03 FIELD MEASUREMENTS

- A. Measure and record that all installed metering and telemetry is functioning per manufacturer's requirements.
- B. Include all records in the start-up report.

##### 3.04 COMPLETION

- A. Start-up services will not be considered completed until all equipment is operating properly and equipment is functioning as designed.

END OF SECTION

## SECTION 01 78 00

### CLOSEOUT SUBMITTALS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and Bonds.

##### 1.02 RELATED REQUIREMENTS

- A. Section 00 70 00 – Standard General Conditions of the Construction Contract: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

##### 1.03 SUBMITTALS

- A. Project Record Documents: Contractor to keep Record Documents on site at all times for review by Engineer or Owner. Submit documents to Alliance Consulting Engineers, Inc. with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Alliance Consulting Engineers, Inc. will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by the Owners, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Alliance Consulting Engineers, Inc. comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.

- C. Warranties and Bonds:
1. For equipment or component parts of equipment put into service during construction with the Owners permission, submit documents within 10 days after acceptance.
  2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
  2. Addenda.
  3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by the Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
1. Field changes of dimension and detail.
  2. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE MANUALS**

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.

### **3.04 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with The Owners permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION**

**SECTION 03 40 00**  
**PRECAST CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Lintels and bond beams.
- B. Wetwells
- C. Utility Vaults
- D. Manholes
- E. Headwalls

**1.02 RELATED SECTIONS**

- A. 03 30 00 - Cast-In Place Concrete

**1.03 REFERENCES**

- A. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International; 2014.
- B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1997a.
- C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1998.
- D. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1997.
- E. ASTM A 416/A 416M - Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete; 1998.
- F. ASTM A 497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement; 1997
- G. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.
- H. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1999.
- I. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 1997.
- J. ASTM C 150 - Standard Specification for Portland Cement; 1999a.
- K. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2000.
- L. AWS D1.4 - Structural Welding Code - Reinforcing Steel; American Welding Society; 1998.
- M. PCI MNL-116S - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products; Precast/Prestressed Concrete Institute; 2013, Tenth Edition.



- N. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; 1999.
- O. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; 1988, Second Edition.

#### **1.04 DESIGN REQUIREMENTS**

- A. Size components to withstand design loads in a restrained condition as follows:
  - 1. Horizontal Assembly: 150 psf live and dead loads.
  - 2. Vertical Assembly: 20 psf wind load.
  - 3. As shown on the drawings.
- B. Maximum Allowable Deflection: 1/180 span.
- C. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.
- D. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.
- E. Shall be manufactured in accordance with Prestressed Concrete Institute's Manual 116 Manual for quality control for plans and production of Precast, prestressed concrete products and SC D.O.T. Standard Specifications.

#### **1.05 SUBMITTALS**

- A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate standard component configurations, design loads, deflections, cambers, and bearing requirements.
- C. Shop Drawings: Indicate layout, unit locations, fabrication details, unit identification marks, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.
- D. Samples: Submit two panels, 24 x 24 inches (610 x 610 mm) in size, illustrating surface finish treatment.
- E. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.

#### **1.06 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with requirements of PCI MNL-116S, PCI MNL-120, and PCI MNL-123.
- B. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Erector Qualifications: Company specializing in erecting products of this section with minimum five (5) years of documented experience.

- D. Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State of South Carolina.
- E. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.

#### **1.07 REGULATORY REQUIREMENTS**

Conform to ACI 318 for design load and construction requirements applicable to work of this section.

#### **1.08 PRE-INSTALLATION MEETING**

- A. Convene a pre-installation conference one week prior to commencing work of this section.
- B. Instruct others when field cutting of required openings are 10 inches (254 mm) and smaller.

#### **1.09 DELIVERY, STORAGE AND HANDLING**

- A. Handle precast members in position consistent with their shape and design. Lift and support only from support points.
- B. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.
- C. Protect members to prevent staining, chipping, or spalling of concrete.
- D. Mark each member with date of production and final position in structure.

#### **1.10 PROJECT/SITE CONDITIONS**

Coordinate the work of framing components not pre-tensioned but associated with the work of this section.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Precast Concrete:
  - 1. Sherman Precast.
  - 2. Tindall Concrete Products.
  - 3. Hanson
  - 4. Approved Equal.

#### **2.02 MATERIALS**

- A. Cement: White Portland, conforming to ASTM C 150, Type I.
- B. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116S.

#### **2.03 REINFORCEMENT**

- A. Tensioning Steel Tendons: ASTM A 416/A 416M, Grade 250 (1725); seven-wire stranded steel cable; low-relaxation type; full length without splices; uncoated.
- B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
  - 1. Plain billet-steel bars.
  - 2. Unfinished.
  - 3. Shop fabricated and bent cold.
- C. Welded Steel Wire Fabric: ASTM A 185 plain type; in flat sheets; unfinished.

#### **2.04 ACCESSORIES**

- A. Connecting and Supporting Devices: Plates, angles, items cast into concrete, and inserts conforming to PCI MNL-123, and as follows:
  - 1. Material: Carbon steel conforming to ASTM A 36/A 36M.
  - 2. Finish: Prime painted, except where device surfaces will be in contact with concrete or will require field welding.
- B. Grout:
  - 1. Non-shrink, non-metallic, minimum yield strength of 10,000 psi (69 MPa) at 28 days.
  - 2. Epoxy.
- C. Bearing Pads: High density plastic, Vulcanized elastomeric compound molded to size, Neoprene (Chloroprene), or Tetrafluoroethylene (TFE); Shore A Durometer; 1/8 inch (3 mm) thick, smooth both sides.
- D. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.

#### **2.05 FABRICATION**

- A. Fabrication procedure to conform to PCI MNL-116S.
- B. Maintain plant records and quality control program during production of precast members. Make records available upon request.
- C. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.
- D. Tension reinforcement tendons as required to achieve design load criteria.
- E. Provide required openings with a dimension larger than 10 inches (250 mm) and embed accessories provided under other sections of the specifications, at indicated locations.

#### **2.06 FINISHES**

- A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.
- B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

- C. Architectural Finish: Surface holes or bubbles over 1/4 inch (6 mm) filled with matching cementitious paste, fins or protrusions removed and surface ground smooth.
- D. Precast manufacturer shall coat inside of all wet well structures and receiving manholes (manhole force main discharges into) with two-component, self-priming, chemically cured, coal tar epoxy protective coating.

## **2.07 FABRICATION TOLERANCES**

- A. Conform to PCI MNL-116S.
- B. Maximum Variation from Nominal Dimension: 1 inch (25 mm).
- C. Maximum Variation from Intended Camber: 5/8 inch (15 mm).
- D. Maximum Out of Square: 1/8 inch/10 feet (3 mm/3 m), non-cumulative.
- E. Maximum Misalignment of Anchors, Inserts, Openings: 1/8 inch (3 mm).
- F. Maximum Bowing of Members: Length of Bow/ 360.

## **2.08 SOURCE QUALITY CONTROL AND TESTS**

- A. Section 01 40 00 - Quality Requirements: Provide mix design for concrete.
- B. Test samples in accordance with applicable ASTM standard.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that site conditions are ready to receive work and field measurements are as shown on shop drawings.

### **3.02 PREPARATION**

- A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.

### **3.03 WETWELLS, UTILITY VAULTS AND MANHOLES**

- A. Concrete bases may be precast or cast-in-place. The concrete base of precast and cast-in-place structures shall be placed on an (eight) 8-inch No. 57 stone mat or as shown on the drawings. Each precast section shall have not more than two holes for the purpose of handling and laying. These holes shall be tapered and shall be plugged with rubber stoppers or mortar installation. Brick or concrete ring to support cover shall be a minimum of 3 inches high but not more than 18 inches high.
- B. Openings larger than 1-1/2 inches in diameter shall be precast into the appropriate section.
- C. Any openings added during construction shall be approved by the precast manufacturer and be formed by coring. No other method for adding holes will be considered.
- D. Joints of the precast sections shall be tongue and groove type. Sections shall be joined using O-ring rubber gaskets conforming to ASTM C443 or preformed mastic sealer. In addition, the joint shall be sealed inside and out with cement mortar using one part Portland cement to two parts clean sand meeting ASTM C144. The joints shall be watertight.

- E. Shaped bottoms shall be as shown on the drawings. They shall be constructed of one monolithic pour using 3000-psi concrete.
- F. Brickwork required to complete the precast concrete structures shall be constructed using mortar of one part Portland cement to two parts clean sand, meeting ASTM C144 and thoroughly mixed to a workable plastic consistency.
- G. Any damage to the coating during storage, handling, transportation or installation of the section shall be repaired immediately to provide complete coverage and protection per manufacturer's recommendations. Mortar joints shall receive two (2) coats of waterproofing after the section is installed and the mortar has set and dried.

### **3.04 ERECTION**

- A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.
- B. Align and maintain uniform horizontal and vertical joints, as erection progresses.
- C. Maintain temporary bracing in place until final support is provided. Protect members from staining.
- D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.
- E. Adjust differential camber between precast members to tolerance before final attachment.
- F. Install bearing pads.
- G. Level differential elevation of adjoining horizontal members with grout to maximum slope of 1:12.
- H. Set vertical units dry, without grout, attaining joint dimension with lead or plastic spacers.
- I. Grout underside of column bearing plates.
- J. Secure units in place. Perform welding in accordance with AWS D1.1.

### **3.05 ERECTION TOLERANCES**

- A. Erect members level and plumb within allowable tolerances.
- B. Conform to PCI MNL-116S.
- C. Design and erect to the following tolerances:
  - 1. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch/10 feet and 3/8 inch in 100 feet (6 mm/3 m and 9 mm in 30 mm), non-cumulative.
  - 2. Maximum Offset from True Alignment between Members: 1/4 inch (6 mm).
  - 3. Maximum Variation from Dimensions Indicated on Reviewed Shop Drawings: Plus or minus 1/8 inch (3 mm).
- D. Exposed Joint Dimension: 3/8 inch (9 mm) plus or minus 1/4 inch (6 mm).
- E. When members cannot be adjusted to conform to design or tolerance criteria, cease work and advise the Engineer. Execute modifications as directed.

### **3.06 PROTECTION**

- A. Protect members from damage caused by field welding or erection operations.
- B. Provide non-combustible shields during welding operations.

**3.07 CLEANING**

Clean weld marks, dirt, or blemishes from surface of exposed members.

**END OF SECTION**

## SECTION 03 48 10

### PRECAST CONCRETE MANHOLES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Precast concrete manholes for sanitary sewers and water lines or as indicated on the Construction Drawings.
- B. Precast concrete sanitary sewer manholes with fiberglass liner or sewer gas resistance epoxy coating where corrosion resistant manholes are specifically required to prevent early deterioration of the manhole.
- C. Pile-supported concrete foundation used for unstable subgrade treatment for manhole base.

##### 1.02 SUBMITTALS

- A. Conform to requirements of Section - Submittals.
- B. Submit manufacturer's data and details of following items for approval:
  - 1. Shop drawings of manhole sections, base units and construction details, including reinforcement, jointing methods, materials and dimensions.
  - 2. Summary of criteria used in manhole design including, as minimum, material properties, loadings, load combinations, and dimensions assumed. Include certification from manufacturer that precast manhole design is in full accordance with ASTM C 478 and design criteria as established in Paragraph 2.01E of this Specification.
  - 3. Frames, grates, rings, and covers
  - 4. Materials to be used in fabricating drop connections
  - 5. Materials to be used for pipe connections at manhole walls.
  - 6. Materials to be used for stubs and stub plugs, if required.
  - 7. Materials and procedures for corrosion-resistant liner and coatings, if required.
  - 8. Plugs to be used for sanitary sewer hydrostatic testing
  - 9. Manufacturer's data for pre-mix (bag) concrete, if used for channel inverts and benches.

#### PART 2 PRODUCTS

##### 2.01 PRECAST CONCRETE MANHOLES

- A. Provide manhole sections, base sections, and related components conforming to ASTM C 478. Provide base riser section with integral floors, unless shown otherwise. Provide adjustment rings which are standard components of manufacturer of manhole sections. Mark date of manufacture and name or trademark of manufacturer on inside of barrel.

- B. Construct barrels for precast manholes from standard reinforced concrete manhole sections of diameter indicated on the Construction Drawings. Use various lengths of manhole sections in combination to provide correct height with fewest joints.
- C. Provide tops to support AASHTO HS-20 vehicle loading, and receive cast iron frame covers, as indicated on the Construction Drawings.
- D. For manholes larger than 48-inch diameter, provide precast base sections with flat slab top precast sections used to transition to 48-inch diameter manhole access riser sections. Transition can be concentric or eccentric unless otherwise requested by Alliance Consulting Engineers, Inc. Locate transition to provide minimum of 7-foot head clearance from base to underside of transition unless otherwise approved by Alliance Consulting Engineers, Inc.
- E. Design Loading Criteria: Manhole walls, transition slabs, cone tops, and manhole base slab shall be designed by manufacturer, to requirements of ASTM C 478 for depth as shown on the Construction Drawings and to resist the following loads.
  - 1. AASHTO HS-20 vehicle loading applied to manhole cover and transmitted down to transition and base slabs
  - 2. Unit soil weight of 120 lbs/ft<sup>3</sup> located above portions of manhole, including base slab projections
  - 3. Lateral soil pressure based on saturated soil conditions producing an at-rest equivalent fluid pressure of 100 lbs/ft<sup>3</sup>
  - 4. Internal liquid pressure based on unit weight of 63 lbs/ft<sup>3</sup>
  - 5. Dead load of manhole sections fully supported by transition and base slabs
- F. Provide joints between sections with o-ring gaskets conforming to ASTM C443.
- G. When base is cast monolithic with portion of vertical section, extend reinforcing in vertical section into base.
- H. Precast Concrete Base: Suitable cutouts or holes to receive pipe and connections. Lowest edge of holes or cutouts: For water line manhole, no less than 6-inches above inside surface of floor of base.

## **2.02 CONCRETE**

- A. Conform to requirements of Section - Cast-In-Place Concrete.
- B. Channel Inverts: Use concrete for inverts not integrally formed with manhole base, with minimum compressive strength of 4000 psi.
- C. Concrete Foundation: Provide concrete with minimum compressive strength of 4000 psi for concrete foundation slab under manhole base section as indicated on the Construction Drawings.

## **2.03 REINFORCING BARS**

- A. Conform to the requirements of Section 03 30 00 – Cast-In-Place Concrete.



## **2.04 FRAMES AND COVERS**

- A. Use castings for frames, grates, rings and covers conforming to ASTM A48, Class 35B.
- B. Use clean castings capable of withstanding application of AASHTO M306- 40,000 pound proof loading without detrimental permanent deformation.
- C. Fabricate castings to conform to shapes and dimensions as shown on the Contract Drawings, and cast with the wording or logo "SEWER" for sanitary sewer and "WATER" for water system frames and covers. Standard dimensions for manhole frames and covers shall be either 24 or 30-inches in diameter as indicated on the Contract Drawings.
- D. Castings shall be smooth and clean, and free from blowholes and other surface imperfections. Use clean and symmetrical cast holes in covers, free of plugs.
- E. Provide watertight manhole frames and covers when the top of the frame and cover is below the 50-year flood elevation or when subjected to ponding. Watertight manhole frames and covers shall be provided with minimum of four bolts and gasket designed to seal cover to frame. Supply approved watertight manhole covers and frames. Watertight manhole covers, where indicated on Drawings, shall be equivalent to Neenah Foundary Co., No. R-1916-F (bolt down). All bolts or screws shall be stainless steel.

## **2.05 DROP CONNECTIONS AND STUBS**

- A. All manhole drop connections shall be inside drop or as noted. Drops shall be provided when the invert elevation into the manhole is 24-inches higher than the manhole invert.
  - 1. Pipe material used for outside drops shall be same pipe material as sewer main, or;
  - 2. Ductile iron pipe as indicated on the Contract Drawings.

## **2.06 PIPE CONNECTIONS TO MANHOLE**

- A. Sanitary Sewers.
  - 1. Provide resilient connectors conforming to requirements of ASTM C923. Use the following materials for metallic mechanical devices as defined in ASTM C923:
    - a. External clamps: Type 304 stainless steel
      - 1) Internal, expandable clamps on standard manholes: Type 304 stainless steel, 11 gauge minimum.
      - 2) Internal, expandable clamps on corrosion-resistant manholes:
        - b. Type 316 stainless steel, 11 gauge minimum
        - c. Type 304 stainless steel, 11 gauge minimum, coated with minimum 16 mil fusion - bonded epoxy conforming to AWWA C213
  - 2. Where rigid joints between pipe and cast-in-place manhole base are specified, provide polyethylene - isoprene waterstop meeting physical property requirements of ASTM C923.

**B. Water Lines**

1. Where smooth exterior pipes, i.e., steel, ductile iron, or PVC pipes are connected to manhole base or barrel, seal space between pipe and manhole wall with assembly consisting of rubber gasket or links mechanically compressed to form a watertight barrier.
2. When connecting concrete or cement mortar coated steel pipes, or as option for connecting smooth exterior pipes to manhole base or barrel, space between pipe and manhole wall may be sealed with an assembly consisting of a stainless steel power sleeve, stainless steel take - up clamp and a rubber gasket. Take - up clamp: Minimum of 9/16-inch wide.

**2.07 SEALANT MATERIALS**

- A. Provide sealing materials between precast concrete adjustment ring and manhole cover frame in accordance with ASTM C443.

**2.08 CORROSION RESISTANT MANHOLE MATERIALS**

- A. Where corrosion - resistant manholes are required, such as a manhole receiving a force main or manholes located within a 1,000 feet down-stream of a force discharge, provide a fiberglass liner or sewer gas resistant epoxy coating for precast cylindrical manhole section, base sections, and cone sections. Liners relying on mechanically fastened batten strips as primary means of anchorage are unacceptable. All manholes with a corrosion resistant interior coating shall be provided with an exterior bituminous coating in locations where ground water table can reach above the base of the manhole.

**2.09 BACKFILL MATERIALS**

- A. Conform to requirements of Section 31 23 33 - Excavation Backfill and Compaction for Utilities.

**2.10 NON-SHRINK GROUT**

- A. Provide prepackaged, inorganic, flowable, non-gas-liberating, non-metallic, cement-based grout requiring only addition of water.
- B. Meet requirements of ASTM C1107 and have a minimum 28-day compressive strength of 7000 psi.

**2.11 VENT PIPES – INTENTIONALLY OMITTED**

**2.12 PROHIBITED MATERIALS**

- A. Do not use brick masonry for construction of sanitary sewer manholes, including adjustment of manholes to grade. Use only specified materials listed herein.

**2.13 MANHOLE LADDER**

- A. Manhole Ladder: Fiberglass with 300-lb rating at appropriate length; conform to requirements of OSHA.
1. Use components, including rungs, made of fiberglass, fabricated with nylon or aluminum rivets and/or epoxy. Apply non-skid coating to ladder rungs. Mount ladder using manufacturer's recommended hardware.

2. Fiberglass: Premium type polyester resin, reinforced with fiberglass; constructed to provide complete wetting of glass by resin; resistant to rot, fungi, bacterial growth and adverse effects of acids, alkalis and residential and industrial waste; yellow in color.

- B. Provide approved petroleum-based tape encapsulating bolts in access manhole.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that lines and grades are correct.
- B. Obtain an adequate foundation for all manhole structures by removing and replacing unsuitable material with well-graded granular material, by tightening with coarse rock, or by such other means as provided for foundation preparation of the connected sewers, or as directed by Alliance Consulting Engineers, Inc.
- C. Dewater sufficiently to maintain the ground water level at or below the bottom of the manhole foundation prior to and during the placement of the foundation.
- D. Do not build manholes in ditches, swales, or drainage paths unless approved by Alliance Consulting Engineers, Inc.

#### **3.02 PLACEMENT**

- A. Install precast manholes to conform to locations and dimensions as shown on the Contract Drawings.
- B. Place sanitary manholes at points of change in alignment, grade, size, pipe intersections, and end of sewer unless otherwise directed by Alliance Consulting Engineers, Inc.

#### **3.03 MANHOLE BASE SECTIONS AND FOUNDATIONS**

- A. Place precast base on 6-inch thick (minimum) foundation of crushed stone, or concrete foundation slab.
- B. Unstable Subgrade Treatment: Notify Alliance Consulting Engineers, Inc. immediately when unsatisfactory material is encountered in the manhole subgrade. With Alliance Consulting Engineers, Inc. approval, up to 12-inches of additional undercut may be permitted to achieve suitable foundation. If the additional undercut does not result in a satisfactory foundation, the Contractor shall obtain a bedding design prepared by a Geotechnical Engineer licensed in the State of South Carolina.

#### **3.04 PRECAST MANHOLE SECTIONS**

- A. Install sections, joints, and gaskets in accordance with manufacturer's printed recommendations.
- B. Install precast adjustment rings above tops of cones or flat-top sections as required to adjust finished elevation and to support manhole frame.
- C. Seal any lifting holes with non-shrink grout.

- D. Where fiberglass liners are required, seal joints between sections in accordance with manufacturer's recommendations.
- E. Precast concrete grade rings shall be permitted to achieve the required grade. Grade rings shall not be permitted to more than 12-inches.
- F. External joint wrap all riser joints to ensure seal. No grout is permitted on the interior of manhole riser joints prior to testing.
- G. Concrete base must be dry prior to setting any sections above it.

### **3.05 PIPE CONNECTIONS AT MANHOLES**

- A. Install approved resilient connectors at each pipe entering and exiting manholes in accordance with manufacturer's instructions.
  - 1. Where smooth exterior pipes, i.e. steel, ductile iron or PVC pipes are connected to manhole base or barrel, space between pipe and manhole wall shall be sealed with an assembly consisting of rubber gaskets or links mechanically compressed to form watertight barrier.
  - 2. When connecting concrete or cement mortar coated steel pipes, or as an option for connecting smooth exterior pipes to manhole base or barrel, space between pipe and manhole wall may be sealed with an assembly consisting of stainless steel power sleeve, stainless steel take-up clamp and rubber gasket. Take-up clamp: Minimum of 9/16-inch wide.
- B. Ensure no concrete, fill, or other rigid material is allowed to enter space between pipe and edge of wall opening at and around resilient connector on either interior or exterior of manhole. If necessary, fill space with compressible material to ensure full flexibility provided by resilient connector.
- C. Where new manhole is constructed on existing sewer, rigid joint pipe may be used. Install waterstop gasket around existing pipe at center of cast-in-place wall. Join ends of split waterstop material at pipe springline using an adhesive recommended and supplied by waterstop manufacturer.
- D. Test connection for watertight seal before backfilling, or at direction of Alliance Consulting Engineers, Inc.

### **3.06 INVERTS FOR SANITARY SEWERS**

- A. Construct invert channels to provide smooth flow transition waterway with no disruption of flow at pipe-manhole connections. Conform to following criteria:
  - 1. Slope of invert bench: 1-inch per foot minimum; 1-1/2 inches per foot maximum.
  - 2. Depth of bench to invert:
    - a. Pipes smaller than 15 inches: one-half of largest pipe diameter
    - b. Pipes 15 to 24 inches: three-fourths of largest pipe diameter
    - c. Pipes larger than 24-inches: equal to largest pipe diameter
  - 3. Invert slope through manhole: 0.17 foot (2-inches) drop across manhole with smooth transition of invert through manhole, unless otherwise indicated on

Drawing.

- B. Form invert channels with concrete if not integral with manhole base section. For direction changes of mains, construct channels tangent to mains with maximum possible radius of curvature. Provide curves for side inlets and smooth invert fillets for flow transition between pipe inverts.

### **3.07 DROP CONNECTIONS FOR SANITARY SEWERS**

- A. Install drop connection when sewer line enters manhole higher than 24 inches above invert of manhole
- B. Backfill drop assembly shall be 3000 psi concrete to form solid encasement for all drop connections. Extend concrete encasement minimum of 4 inches outside bells, all per the Construction Drawings.

### **3.08 STUBS FOR FUTURE CONNECTIONS**

- A. In manholes, where future connections are indicated on the Construction Drawings, install resilient connectors and pipe stubs with approved watertight plugs.

### **3.09 MANHOLE FRAME AND ADJUSTMENT RINGS**

- A. Combine precast concrete or HDPE adjustment rings so elevation of installed casting cover matches pavement surface. Seal between concrete adjustment ring and precast top section with non-shrink grout; do not use mortar between adjustment rings. Apply latex-based bonding agent to precast concrete surfaces joined with non-shrink grout. Set cast iron frame on adjustment ring in bed of approved sealant material. Install sealant bed consisting of two beads of sealant, each bead having minimum dimensions of 1/2-inch and 1/2-inch wide.
- B. Wrap manhole frame and adjustment rings with external sealing material, minimum 3-inches beyond joint between ring and frame and adjustment rings and precast section.
- C. For manholes in unpaved areas, set top of frame flush with existing grade upto a maximum of 12-inches above existing grade, unless otherwise noted. In unpaved areas, encase manhole frame in mortar or non-shrink grout placed flush with face of manhole ring and top edge of frame. Provide rounded corner around perimeter.

### **3.10 BACKFILL**

- A. Place and compact backfill materials in area of excavation surrounding manholes in accordance with requirements of Section 31 23 33 - Excavation Backfill and Compaction for Utilities.
- B. Where rigid joints are used for connecting existing sewers to manhole, backfill existing sewer up to springline of pipe with flowable fill.
- C. In unpaved areas, provide positive drainage away from all manhole frames to natural grade. Provide restoration of disturbed areas in accordance with Section 32 92 00 – Turf and Grasses.

### **3.11 DOGHOUSE MANHOLE**

- A. Existing sewer pipe to remain until satisfactory completion of manhole testing.
- B. Crown of existing pipe shall be flush with concrete shelf that is formed within the manhole.

- C. Doghouse manholes, if required, shall be constructed as per the Construction Drawings.

**3.12 FIELD QUALITY CONTROL**

- A. Conduct testing of manholes in accordance with requirements of Section 33 01 30.13 - Acceptance Testing for Sanitary Sewers.

**3.13 PROTECTION**

- A. Protect manholes from damage until Work has been accepted. Repair damage to manholes at no additional cost to the Owner.

**3.14 METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

- A. Manholes, drop connections, manhole vent pipes, existing manhole removal and existing manhole abandonment shall be paid for at the unit prices specified in the Bid. All prices shall be for full payment for all labor, materials, tools, equipment, backfilling, sheeting, shoring, dewatering, and other costs necessary to complete the work as shown, directed and specified.
- B. Manholes are to be measured and the depth determined as the vertical distance between top of the cast iron frame and the lowest pipe invert rounded to the nearest foot.
- C. Drop Connections will be measured and paid for at the price per vertical foot, rounded to the nearest foot.
- D. Payment for manholes constructed over existing sewers shall be lump sum for each specialty manhole identified, including all appurtenances for a complete installation at each location identified.

**END OF SECTION**

## SECTION 05 53 10

### ALUMINUM HATCHES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

Furnish and install factory fabricated aluminum access hatches with any appurtenances necessary to complete the work shown in the drawings or specified.

##### 1.02 RELATED SECTIONS

- A. Section 03 30 00 - Cast-In-Place Concrete.
- B. Section 03 40 00 - Precast Concrete

##### 1.03 REFERENCES

- A. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1999a.
- B. ASTM A 666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1999.
- C. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 1996.
- D. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 1996.

##### 1.04 SYSTEM DESCRIPTION

- A. All access hatches shall be double, or single leaf as shown on the drawings. Automatic doors shall be equipped with a minimum of two stainless steel hinges with stainless steel pins. Each door leaf shall also have spring operators with a positive hold open arm that engages automatically in full open position, and a non-corrosive release handle. Doors shall open with a maximum lift force of 9 lbs. When closed, doors shall not protrude above the operating surface in which they are installed. Include slam lock feature with removable key.
- B. When subject to vehicular traffic, cover shall be reinforced to support an AASHTO H-20 wheel load with a maximum deflection of 1/150th of the span.

##### 1.05 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 – Administrative Requirements.
- B. Submit fully dimensioned shop drawings with physical characteristics of aluminum hatches including clearances and embedment details.
- C. Product data; manufacturer's specifications and technical data, including installation instructions with catalog cut sheets.
- D. Manufacturer to provide minimum 25-year warranty prior to contract closeout. Should a part fail to function under normal use during this period, manufacturer shall furnish a new part at no charge.

## **1.06 DELIVERY, STORAGE AND HANDLING**

- A. The Contractor shall be responsible for the delivery, storage, and handling of products.
- B. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Acceptable manufacturers for all access hatch doors shall be selected from the following:
  - 1. Thompson Fabricating Company
  - 2. Bilco, Inc.
  - 3. Halliday Products
  - 4. Approved equal

### **2.02 MATERIALS**

- A. Door leaves shall be 1/4-inch aluminum checkered plate reinforced with structural aluminum channels, capable of withstanding 300 pounds per square foot uniform load with minimal deflection.
- B. The gutter frame provided shall be of 1/4-inch aluminum with an anchor flange around the perimeter. Frame shall incorporate a 1-1/2 inch threaded drain fitting and neoprene gasket.
- C. The drain coupling shall be located in an appropriate corner of each channel frame away from the access steps.
- D. Factory finish shall be mill finish.
- E. Hardware shall be stainless steel.
- F. Any surface or portion of the frame contacting concrete shall receive a bituminous coating.
- G. The door shall open to 90 degrees and lock automatically in that position. A vinyl grip handle shall be provided to release and close the cover with one hand.
- H. Doors, which are to receive flooring, shall be smooth plate. Doors which will not receive flooring shall be checkered plate

### **2.03 ACCESSORIES**

Floor Doors: When flush mounted hatches and doors are furnished, provide two wrenches for opening hatches.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install hatches and doors in accordance with manufacturer's recommendations and as specified in this section.
- B. Cast flush mounted hatches and doors into concrete slabs.



- C. Secure curb hatches with stainless steel bolts and seal joint between curb and concrete.
- D. Hatches shall be uniformly supported. Lids shall operate smoothly without binding
- E. Flush mounted hatch and door covers, when closed, shall not protrude above the operating surface in which they are installed, unless otherwise indicated.
- F. Hatch Drains: Drains in watertight flush mounted hatches shall be piped to the outer edge of their respective slabs with 1-1/2 inch Schedule 80 PVC pipe.
  - 1. Where drain outlets are below the surrounding grade, not less than 7 cubic feet of crushed stone shall be placed around the outlet to ensure drainage.

### **3.02 CLEANING**

All equipment installed under this Section shall be cleaned and adjusted for proper operation to the satisfaction of the Engineer.

**END OF SECTION**

## SECTION 09 97 23.12

### EPOXY LINING FOR WETWELL AND MANHOLE INTERIORS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Provide for all manholes, wetwells, structures, etc. as shown on the drawings, specified herein, and needed for a complete and proper installation.
- B. This specification includes the materials and application of a corrosion-resistant, spray-applied, solvent-free epoxy lining to all interior concrete surfaces, and inverts to provide resistance to hydrogen sulfide and acid attack from microbiological sources.
- C. Inverts are to be repaired as/if needed before epoxy lining is done. Need to determine manhole by manholes.

##### 1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Referenced manufacturer of coating system is Raven Lining Systems, Inc. of Tulsa, OK, and is named to establish standards of quality. Products of other manufacturers complying with these specifications may be provided upon approval by the Engineer.
- C. The Contractor and applicable subcontractors must make a pre-bid site visit to visually inspect existing site conditions.
- D. All work under this Section is to be performed by personnel qualified and certified by the manufacturer of the products.
- E. Applicator Qualifications
  - 1. Provide written certification from the protective coating manufacturer that the Applicator's personnel are trained and approved in the handling, mixing, and application of the products to be used.
  - 2. Provide written certification from the protective coating manufacturer that the equipment to be used for applying the products has been approved and Applicator's personnel have been trained and certified for proper use of the equipment.
  - 3. Five (5) recent references of Applicator (projects of similar size and scope) indicating successful application of a high-build solvent-free epoxy coating by spray application. Provide references upon request.
  - 4. Proof of any necessary federal, state or local permits or licenses necessary for the project.
- F. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE and SSPC standards and the protective coating manufacturer's recommendations.

- G. Warranty: Applicator shall warrant all work against defects in materials and workmanship for a period of five (5) years, unless otherwise noted, from the date of final acceptance of the project. Applicator shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said five (5) years period, and any damage to other work caused by such defects or the repairing of the same, at his own expense and without cost to the Owner.

### **1.03 SUBMITTALS**

- A. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements, including ASTM test results.
  - 3. Material safety Data Sheets (MSDS) for each product used.
  - 4. Project specific guidelines and recommendations from the coating manufacturer.
- B. Provide written certification from the coating manufacturer regarding personnel performing the work.

### **1.04 PRODUCT HANDLING**

- A. Materials are to be kept dry, protected from weather and stored under cover.
- B. Protective coating materials are to be stored between 50 degrees F and 90 degrees F. Do not store near flame, heat or strong oxidants.
- C. Protective coating materials are to be handled according to their material safety data sheets.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Provide a leak-resistant lining system consisting of properly prepared substrate, approved repair materials, and solvent-free epoxy coating.

### **2.02 EXISTING PRODUCTS**

- A. Standard Portland cement or new concrete must be properly cured for 28 days prior to application of the protective coating.
- B. Remove existing coatings prior to application of the new protective coating. Maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.

## 2.03 LINER MATERIALS

- A. Infiltration control mix:
  - 1. Provide a rapid setting cementitious product specifically formulated for leak control, used to stop minor water infiltration and mixed and applied according to manufacturer's recommendations and have the following minimum requirements:
    - a. Compressive Strength (ASTM C109) – 600 psi, 1hr.
    - b. Bond (ASTM C321) – 40 psi, 4 hrs.
    - c. Set Time – 60 seconds
  - 2. Acceptable products:
    - a. Strong-Plug as manufactured by Strong-Seal Systems, Corp.
    - b. Quad-Plug as manufactured by Quadex, Inc.
- B. Chemical grout (leak repair):
  - 1. Provide a polymer solution that reacts freely with water to form a strong film, gel, or foam of polyurethane, designed for stopping very active infiltration.
  - 2. Acceptable product:
    - a. 920 PrimeFlex as manufactured by Prime Resins, Inc.
- C. Underlayment Grout:
  - 1. Provide a quick setting cementitious material, designed to fill large voids and repair or reconstruct inverts, mixed and applied according to manufacturer's recommendations, meeting the following minimum requirements:
    - a. Compressive Strength (ASTM C109) – 1400 psi, 6 hrs.
    - b. Flexural Strength (ASTM 348) – 450 psi, 1 hr.
    - c. Bond (ASTM C321) - >130 psi, 28 days
    - d. Density, when applied – 105 +/- 5 pcf
  - 2. Acceptable products:
    - a. QSR as manufactured by Strong-Seal Systems, Corp.
    - b. Hyperform as manufactured by Quadex, Inc.
- D. Cementitious Base (calcium aluminate):
  - 1. Provide a base made with calcium aluminate cement and 100% calcium aluminate aggregate, used to form a structural/structurally enhanced monolithic liner covering all interior manhole surfaces and have the following minimum requirements at 28 days:

- a. Compressive Strength (ASTM C109) - >9000 psi
- b. Tensile Strength (ASTM C496) - >800 psi
- c. Flexural Strength (ASTM C293) - >1200 psi
- d. Shrinkage at 90% relative humidity (ASTM C596) – 0%
- e. Bond (ASTM C882) - >1600 psi
- f. Freeze/Thaw (ASTM C666) – 100 cycles, no damage

2. Acceptable products:

- a. Sewper Coat Pumpable Grade as manufactured by LaFarge Calcium Aluminates.
- b. Strong Seal High Performance mix as manufactured by Strong-Seal Systems, Corp.
- c. Aluminaliner as manufactured by Quadex, Inc.

3. Cementitious application equipment:

- a. Used specially designed machines consisting of a 3-stage progressive cavity rotor-stator style pump capable of producing a minimum of 250 psi pumping pressure, a vertical shaft mixer with twin horizontal mixing paddles, and a minimum 12 cfm/90 psi air system for spray application of the mortar for applying cementitious materials. Use equipment that includes a water storage system, and water metering device. Use a hydraulically powered mixer and pump.
- b. Use the Quadex SprayMaster or Strong-Seal Spraymate for applying the corrosion resistant cementitious materials.

E. Epoxy liner:

1. Provide a high build solvent-free epoxy coating formulated with high physical strengths and chemical resistance to be applied in a multiple pass application to form a monolithic coating within the structure. Provide a product with the following minimum requirements:

- a. Flexural Strength (ASTM D790) - >13,000 psi
- b. Compressive Strength (ASTM D695) - >18,000 psi
- c. Tensile Strength (ASTM D638) - >7,600 psi
- d. Ultimate Elongation (ASTM D638) – 1.50%
- e. Hardness (ASTM D2240) – 88
- f. Water Vapor Transmission (ASTM D1653) – 3.8 gms/sq.m (24hrs)
- g. Adhesion (ASTM D4541) – concrete substrate failure

2. Acceptable Product:
  - a. Raven 405 as manufactured by Raven Lining Systems.
3. Epoxy application equipment:
  - a. Used specially designed heated plural component airless spray equipment in the application of the specified coating.
  - b. The proportioning and dispensing system shall consist of a plural component proportioning pump, plural component heated hose, mix manifold, and an airless spray gun with manufacturer specified tip.

## **2.04 OTHER MATERIALS**

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## **PART 3 EXECUTION**

### **3.01 BEGINNING WORK**

- A. Provide all materials, labor, equipment, etc. required to perform Work.
- B. Inspect structures to determine methods of leak repairs.
- C. Promptly inform Owner of errors or discrepancies found, in order that proper corrections may be made.
- D. Follow all manufacturer's instructions regarding surface preparation, product application and curing.

### **3.02 TEMPERATURE OF WORKING AREA**

- A. Temperature of working area must be between 35° F and 90° F.
- B. Store materials within the 65° F to 80° F range for 48 hours prior to use.
- C. Do not apply in direct sunlight or where rising surface temperatures may result in blistering of the materials due to expansion of entrapped air or moisture in the concrete or grout.
- D. When the surface temperatures are rising, postpone the application or apply during cooler hours.

### **3.03 SURFACE PREPARATION**

- A. New concrete:
  1. Concrete must be sufficient strengths to support cured material.
  2. Concrete surfaces that have been cured with conventional curing compounds or are contaminated with form oils or grease must be chemically cleaned or scarified to remove the contaminants prior to abrasive blasting or hydroblasting.
  3. Suitable finished concrete must have a uniform surface texture, exposing fine aggregate and resembling coarse sandpaper.

- a. If surface texture is not uniform in appearance, repeat abrasive blasting or hydroblasting until the desired surface is obtained.
  4. After surface preparation, fill all voids with underlayment grout.
- B. Existing concrete:
1. Abrasive blast or hydroblast concrete to achieve hard firm surface. Hydroblast using pressure water spray of minimum 5,000 psi at 5 gpm.
  2. After blasting, detergent wash to remove remaining oil, grease and other contaminants.
  3. Repair all structural defects, voids, or cracks in substrate.
  4. Fill in defect voids with underlayment grout.
  5. Where necessary to restore the concrete substrate, attach 2" x 2" x 10 or 12 gauge wire mesh to the concrete, then apply the underlayment grout.
- C. Brick manholes:
1. Remove all oil, grease, chemicals and paints or protective coatings from the brick by chemical cleaning prior to hydroblasting or abrasive blasting.
  2. Abrasive blast or hydroblast surface to achieve hard firm surface. Hydroblast using pressure water spray of minimum of 5000 psi at 5 gpm.
  3. After blasting, detergent wash to remove remaining oil, grease and other contaminants.
  4. Remove all foreign particles and attacked or unsound mortar from the joints.
  5. Regrout loose brickwork with underlayment grout to ensure structural integrity of the manhole.
- D. All surfaces must be free of dust, loose particles, oils, grease, chemical contaminants and previously applied paints or protective coatings.
- E. All surfaces are to be dry after completion of surface preparation.

### **3.04 STOPPING ACTIVE LEAKS**

- A. After surface cleaning, seal all visible leaks with a specified material.
- B. Stop minor infiltration control mix.
- C. Stop larger leaks using chemical grout.
- D. Provide weep holes as required to localize the infiltration during the application. Repair weep holes prior to applying liner coats.

### **3.05 APPLICATION OF LINER**

- A. New Concrete:
  - 1. Mix all products in accordance with manufacturer's instructions.
  - 2. Spray-apply the epoxy coating to a minimum thickness of 120 mils.
- B. Existing Concrete:
  - 1. Mix all products in accordance with manufacturer's instructions.
  - 2. Spray-apply the calcium aluminate base at a minimum 1/2" thickness.
    - a. Trowel and brush finish material immediately following the spray application.
  - 3. Spray-apply the epoxy coating finish over the calcium aluminate base, to a minimum thickness of 120 mils.
- C. Brick Surfaces:
  - 1. Mix all products in accordance with manufacturer's instructions.
  - 2. Spray-apply the calcium aluminate base at a minimum of 1-inch thickness.
    - a. Trowel and brush finish material immediately following the spray application.
  - 3. Spray-apply the epoxy coating finish over the calcium aluminate base, to a minimum thickness of 120 mils.

### **3.06 INSPECTION AND TESTING**

- A. During application, a wet film thickness gage, such as those available through Paul N. Garner Company, Inc. meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.
- B. Inspect the protective coating after it has set hard to the touch with high voltage holiday detection equipment.
- C. Initially set the spark tester at 100 volts per 1 mil (25 microns) of film thickness applied.
- D. Mark all detected holidays and repair by abrading the coating surface with a minimum of 60-grit sandpaper or other manufacturer approved hand-tooling method.
- E. After abrading and cleaning, hand apply additional protective coatings material to the repair area.
- F. All touch-up and repair procedures are to be performed in strict accordance with the protective coating manufacturer's recommendations.

### **3.07 CLEAN-UP OPERATIONS**



- A. Use proper procedures for waste disposal of all residues, adhering to manufacturer's recommendations.
- B. Disposal to be at a sanitary landfill site or other approved disposal site.
- C. All equipment and work areas to be cleaned properly and completely.
- D. Failure to maintain work sites properly cleaned up will be sufficient cause for withholding of monthly payments to the Contractor.

**3.08 MEASUREMENT AND PAYMENT**

- A. Payment for all work under this Section will be included in the lump sum bid or the cost of the unit price item to which it is applied.

**END OF SECTION**

## SECTION 26 05 00

### ELECTRICAL, GENERAL

#### PART 1 – GENERAL

##### 1.1 FEES

- A. Fees for permits and inspections are included. Deliver permits and certificates to the Architect.

##### 1.2 SITE VISIT

- A. Prior to bidding, this Contractor shall visit the job site and shall familiarize himself with all conditions under which work is to be performed and shall include in his bid all labor, material and operations required for a complete job.

##### 1.3 DRAWINGS AND SPECIFICATIONS

- A. Drawings do not indicate all hardware and fittings. Examine all plans and specifications for the project and conditions at site and arrange work accordingly, furnishing required fittings and hardware without extra charge. If a conflict exists, the greater quantity or better quality, in the opinion of the Engineer, governs.
- B. Drawings and specifications are complementary; work called for in either shall be provided as if called for by both.

##### 1.4 CODES AND STANDARDS

- A. Materials, equipment and installation shall conform to the requirements of the codes and standards (latest editions) listed below. In addition, all materials, equipment, and devices shall meet the requirements of the Underwriters' Laboratories, Inc. The label of, or listing by, the Underwriters' Laboratories, Inc. will be accepted as conforming with this requirement. In lieu of the label or listing, the Contractor may submit independent proof satisfactory to the Engineer that the materials, equipment or devices conform to the published standards, including methods of tests, of the Underwriters' Laboratories, Inc. (UL), National Electrical Code (NEC), National Electrical Safety Code, American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Institute of Electrical and Electronics Engineers (IEEE), National Electrical Manufacturers Association (NEMA), Illuminating Engineering Society (IES), National Fire Protection Association (NFPA), National Electrical Contractors Association Standard Practices for Good Workmanship in Electrical Contracting (NECA 1), International Building Code (IBC), South Carolina Department of Public Health (DPH) and ANSI A117.1/Americans with Disabilities Act (ADA).

##### 1.5 BASIC MATERIALS AND METHODS

- A. All materials installed shall be new, clean, in good condition and shall meet applicable provisions of codes and standards listed above.
- B. Workmanship shall be in accordance with best practice. Comply with National Electrical Contractors Association Standard Practices for Good Workmanship in Electrical Contracting (NECA 1).
- C. All materials and equipment shall be installed in accordance with manufacturer guidelines and installation instructions.

##### 1.6 SCOPE

- A. Provide all labor, equipment, material, and operations required for complete, safe and quietly-operating electrical systems in accordance with specifications and drawings and subject to terms and conditions of the contract.
- B. The work includes:
  - 1. Grounding in accordance with specifications, drawings and codes
  - 2. Complete distribution system for power including metering equipment, panelboards, safety switches, feeders, branch circuits, and connections to outlets and devices for power utilization
  - 3. Raceways and conductors for pump station control and instrumentation equipment.
  - 4. Emergency power system
  - 5. Cutting, patching, trenching, and backfilling as required for provision of the work
  - 6. Provision of new raceways, handholes and related underground electrical work

### **1.7 CUTTING AND PATCHING**

- A. Provide under this contract all cutting and patching of curbs, sidewalks, walls, floors, partitions, ceilings, etc. required for proper installation of the new system.
- B. Relocation of existing conduit, equipment, wiring, etc. as required for installation of new system is included in this work. Perform all work in accordance with specifications for new work of the particular type involved.

### **1.8 EXCAVATING AND BACKFILLING**

- A. Provide under this contract all excavating, and backfilling required for the installation of electrical work.
- B. Contractor shall notify Engineer prior to backfilling. Do not begin backfilling until Owner's representative has observed the work. Excavations shall be filled as soon as possible and not left open for prolonged periods.
- C. Provide safety (warning) barricades around all open trenches and holes before leaving unattended. Do not leave exposed wiring in a trench unattended.
- D. Backfilling shall be done in layers of 6 inches fill, wetted down and tamped for each consecutive layer up to grade to a compaction of at least 95 percent of AASHTO T-99-49 Proctor Curve.
- E. Whenever trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored to original conditions to the full satisfaction of the Engineer.

### **1.9 DAMAGES**

- A. Cost of repairing damage to building, building contents, and site during construction and guarantee period resulting from this work is a part of this contract.

### **1.10 MATERIAL AND EQUIPMENT**

- A. New and as specified or approved equal.
- B. Where several units of one type of equipment are used, all units shall be products of the same manufacturer.

- C. Any increase in the cost of this work, resulting from substitution of any product or products for those specified is part of this contract. Such work shall be accomplished in an approved manner at no extra cost to the Owner.

#### **1.11 OPERATING INSTRUCTIONS, PANELBOARD DIRECTORIES AND NAMEPLATES**

- A. Instruct owner in operation of all systems.
- B. Install in each panelboard a single-sided plastic-covered, typewritten circuit directory in metal frame. Indicate name, address and service telephone number of installer. Directory shall list the load served and the location of the load for each breaker.
- C. Nameplates Provided by Contractor: On all panelboards, disconnect switches, transformers and enclosures, provide engraved plastic laminate nameplates. Unless otherwise noted, nameplates to be 1/16" thick plastic with 1/4" high white letters on black background. Attach nameplates with epoxy cement or screws. On main switchboard/panelboard and feeder distribution panelboards, provide nameplate for each circuit breaker.
- D. Nameplates Provided by Equipment Manufacturers: All switchboards, panelboards, transformers, safety switches and the like shall be provided with engraved metal nameplates which state all industry-standard required data about the labeled equipment. Nameplates shall be affixed with screws or rivets. The use of paper nameplates only will not be accepted.

#### **1.12 REQUESTS FOR PRIOR APPROVAL**

- A. Requests for prior approval shall comply with AIA A701, Instructions to Bidders, Article 3.3.
- B. Submit requests for prior approval to Architect no fewer than ten working days prior to bid time.
  - 1. Submit requests to [ahogan@allianceCE.com](mailto:ahogan@allianceCE.com)
  - 2. Requests shall be approved in writing by Engineer.
- C. Requests for prior approval shall provide the following information:
  - 1. Dated list of items for which approval is requested. Include project name and requesting company's name on request. For lighting fixtures, summary shall include same information required on shop drawing submittals.
  - 2. Identification of equipment for which approval is requested, e.g., fixture symbol, etc.
  - 3. Descriptive literature, catalog cuts, etc. which describe equipment or devices for which approval is requested.
- D. Approval of the A/E to use materials and/or equipment, if granted, will be in the form of a written addendum. Approved prior approvals may be used at Contractor's option. No substitutions will be allowed, nor will an increase in contract price or time be allowed (for using materials specified) if prior approvals have been requested later than ten (10) days prior to bid opening date.

#### **1.13 SHOP DRAWINGS**

- A. The Engineer will review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general compliance with the design and with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Engineer's review shall be conducted with reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviations from the Contract

Documents not clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been made.

- B. Prior to submittal of shop drawings to the Engineer, the General Contractor and the Electrical Subcontractor shall review and approve shop drawings. Shop drawings which have not been reviewed and approved in writing by the Electrical Subcontractor will not be reviewed by the Engineer. Electrical Subcontractor shall state in writing on shop drawings, any proposed deviations from contract documents. Such deviations, if not stated in shop drawings submittal, shall be the sole responsibility of the Electrical Subcontractor.

**NOTE:** IN ADDITION TO THE GENERAL CONTRACTOR'S APPROVAL AND STAMP, THE FIRST PAGE OF EACH SHOP DRAWING SUBMITTAL SHALL CONTAIN THE WORDS "APPROVED" OR "APPROVED AS NOTED," AND SHALL BE SIGNED, AND DATED BY THE ELECTRICAL SUBCONTRACTOR BEFORE THE ENGINEER WILL REVIEW THEM.

- C. Lighting fixture submittal shall contain a cover sheet listing:
1. Project name
  2. All proposed fixtures by symbol, manufacturer, and catalog number
  3. Contractor's approval stamp and signature as noted above
  4. Attach lighting fixture catalog pages (cuts) to cover sheet
- D. Electrical subcontractor shall submit for review by the Engineer detailed shop drawings of all equipment and all material listed below. **All submittal data shall be submitted at one time – partial submittals will not be reviewed by the Engineer.** No material or equipment for which Engineer's review is required shall be delivered to the job site or installed until this Contractor has in his possession the reviewed shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein. This Contractor shall submit shop drawings as directed by Architect or, if no procedure is specified by the Architect, submit one electronic .pdf copy to Engineer via email: [ahogan@allianceCE.com](mailto:ahogan@allianceCE.com).
- E. Shop drawings submitted for review shall be detailed, dimensioned drawings or catalog pages showing construction, size, arrangement, operating clearances, performance characteristics and capacity.
- F. Samples, drawings, specifications, catalogs, submitted for review shall be properly labeled indicating specific service for which material or equipment is to be used, section and article number of specifications governing, contractor's name, and project name.
- G. Catalogs, pamphlets, or other documents submitted to describe items on which review is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.
- H. Review rendered on shop drawings shall not be considered as a guarantee of measurements of building conditions. WHERE DRAWINGS ARE REVIEWED, SAID REVIEW DOES NOT MEAN THAT DRAWINGS HAVE BEEN CHECKED IN DETAIL; SAID REVIEW DOES NOT IN ANY WAY RELIEVE THIS CONTRACTOR FROM HIS RESPONSIBILITY OR NECESSITY OF FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS.
- I. Failure of contractor to submit shop drawings in time for review by Engineer with reasonable promptness consistent with sound professional practice shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

- J. The Contractor shall submit shop drawings for the following materials and equipment for review by Engineer: *\*See "Note" in paragraph B, above.*

1. Lighting fixtures, including all related components and accessories
2. Lighting controls
3. Pump control panelboard
4. Panelboards
5. Circuit breakers
6. Safety switches
7. Surge Protection Devices (SPD)
8. Emergency power system (generator, transfer equipment and all related components)
9. Handholes and pullboxes
10. Basic materials: wire, conduit, fittings, connectors
11. Grounding system components: ground rods, fittings, ground bars

#### **1.14 RECORD DATA**

- A. Preserve one set of approved shop drawings and deliver to Owner prior to substantial completion of the work. Owner's shop drawings shall be bound in a 3-ring binder of good quality, with stiff vinyl or cloth front and back. Number of copies shall be as directed by Architect. In addition, provide one electronic copy (.pdf format) to Owner.

#### **1.15 RECORD DRAWINGS**

- A. Contractor shall maintain on the job site one complete set of drawings for this project. All changes authorized by the Engineers and/or the Owner as to the locations, sizes, etc. of equipment, conduit, fixtures, and/or other material and equipment shall be indicated in red pencil on the drawings as the work progresses. At the completion of the project, Contractor shall obtain a complete set of reproducibles of the drawings, and shall transfer all changes to these reproducibles. The number of record prints specified by the Architect shall be delivered to the Architect. In addition, provide one electronic copy (.pdf format) to Owner.

#### **1.16 COORDINATION WITH OTHER TRADES**

- A. Coordinate with other trades to conceal electrical work and provide electrical work in correct locations for each piece of electrical equipment connected.

#### **1.17 ELECTRICAL WORK FOR PUMP STATION EQUIPMENT**

- A. Provide complete power wiring and connections for Owner's pump station equipment. This work includes all raceways, conductors, outlet and pull boxes, line voltage on-off switches where indicated and disconnecting means as indicated and required by applicable codes. Where magnetic motor starters, variable frequency drives or other controllers are furnished by others, install and wire complete; where controllers are provided already mounted on equipment, wire complete. In all cases provide power wiring through controller to load; do not reduce. Make all connections and color code per this division.
- B. Provide complete control and instrumentation wiring required to operate pump station equipment, including all required raceway and conductors. All conductors shall be clearly labeled on each end utilizing machine printed self-laminating, wrap-around wire markers.
- C. Coordinate all work with Owner, pump station vendors and contractors, including scheduling, connection requirements and all other requirements prior to bidding and provide all required electrical work in compliance with such schedules and requirements.

#### **1.18 EQUIPMENT FOUNDATIONS AND MOUNTING**

- A. Unless otherwise noted, set all floor and ground mounted equipment on minimum 6" high concrete pads reinforced with 6 x 6, 10/10 WWM. Epoxy dowel #4 rebar 12" on center along entire perimeter of pad as required to tie pad into base slab. Pads to be approximately 6" larger than equipment base and have 1" x 1" chamfer on all edges. Pads to have carborundum brick rubbed finish. Surface finish to be uniformly smooth.
- B. For generators, large transformers and other large or heavy equipment, provide foundation and equipment pads as directed by equipment vendor and to suit soil conditions.
- C. For utility pad-mounted transformers, provide pad in accordance with Utility's standard construction details.
- D. Provide all required mounting devices, hardware, supplementary steel and other materials to mount equipment and raceway system. Mountings shall be secured to structure and seismically braced to comply with codes. Where additional structural members such as columns, beams, and the like are required to mount equipment, they shall be provided at no additional cost to the Owner.

### **1.19 TESTS, PERFORMANCE**

- A. Upon completion of work, the system shall be free of faults, including short circuits, grounds and open circuits and loads shall be balanced across phases to obtain minimum neutral current in all feeders and branch circuits. Test systems as required in the presence of the Engineer or his representative, and operate to comply with applicable codes and contract documents.
- B. Remove all dirt and debris from interior of all electrical equipment, enclosures, device boxes, wireways, junction boxes, handholes and the like. Wipe down the exterior of all equipment and enclosures and touch up any scratches in painted surfaces with manufacturer furnished touch up paint to prevent corrosion.
- C. All costs associated with correction of deficiencies in the work shall be borne by the Contractor. Defective material and equipment shall be replaced; do not repair.
- D. All devices which must be adjusted or set to operate on a schedule (time clocks, program mechanisms, etc.) shall be set prior to substantial completion to operate on schedules directed by the Owner.
- E. All adjustable breakers shall be adjusted in field to settings determined by an engineering coordination study as required to determine appropriate settings for optimal power distribution coordination. Include in bid all required work and engineering services as required for this study and adjustment.

### **1.20 DEMONSTRATION**

- A. Instruct owner in operation of all systems. Train Owner's maintenance personnel to adjust, operate, and maintain equipment.

### **1.21 WARRANTIES**

- A. The Contractor Agrees:
  1. To correct defects in workmanship, materials, equipment, and operation of all systems for a period of one year from the date of Substantial Completion.
  2. To remove any item not specified or given written approval and replace it with an approved item.
  3. That all systems provided will safely, quietly, and efficiently operate in accordance with the design.

- B. This does not supersede manufacturer's warranties which may extend beyond one year.

#### **1.22 CONSTRUCTION SEQUENCE**

- A. The Contractor is cautioned that the project may be constructed in stages to accommodate the owner's use of the building. This contractor shall verify requirements prior to bidding and shall cooperate in all respects with other contractors and trades on the job to carry out the work with minimum disruption of both the owner's requirements and construction of the project.

#### **1.23 DETAILS**

- A. The details and sketches in the drawings are construction standards applicable to this project.
- B. The contractor shall comply with details as applicable to the work indicated and shall retain on the job site at all times, a complete set of drawings and specifications.

#### **1.24 DEFINITIONS**

- A. In this division of the specifications and accompanying drawings, the following definitions apply:
  1. Provide: To purchase, pay for, transport to the job site, unpack, install and connect complete and ready for operation; to include all permits, inspections, equipment, material, labor, hardware and operations required for completion.
  2. Install: To receive from another contractor, the owner or another entity and install complete and ready for operation. Unless otherwise indicated, receipt is assumed to be at the job site.
  3. Furnish: To purchase, pay for and deliver to the job site for installation by others.
  4. The contractor is cautioned that "furnish" and "install" require coordination with others. Such coordination shall be accomplished prior to bidding and bid amounts shall include all required labor, material and operations for completion of all items and systems specified and indicated.
  5. As Indicated: As shown in drawings.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF SECTION 26 05 00**



## SECTION 26 05 43

### UNDERGROUND ELECTRICAL WORK

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The work covered by this Section consists of providing all labor, material, equipment and performing all operations for construction of underground electrical work as shown on the plans and as described by these specifications. This work shall include coordination with utility companies, other trades, cutting, trenching, backfilling, construction of underground ductbank and raceway systems, handholes, removal and disposal of unsuitable or surplus materials and other work as required for a complete underground electrical system.
- B. All required associated work including traffic control, clearing, dewatering and clean-up is included in this scope.

##### 1.02 RELATED REQUIREMENTS

- A. The following applies to this section with additions and modifications specified herein:
  - 1. Section 26 05 00, Electrical, General
  - 2. Section 26 20 00, Wiring Systems

##### 1.03 REFERENCES

- A. The latest edition of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
  - 1. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
    - a. AASHTO HB14 Highway Bridges
    - b. AASHTO M198 Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
  - 2. AMERICAN CONCRETE INSTITUTE (ACI)
    - a. ACI 318 Building Code Requirements for Structural Concrete
    - b. SP-66 ACI Detailing Manual
  - 3. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
    - a. ANSI C2 National Electrical Safety Code
    - b. ANSI C 119.1 Electric Connectors - Sealed Insulated Underground Connector Systems Rated 600 Volts
    - c. ANSI/SSTE 77 Underground Enclosure Integrity
  - 4. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
    - a. ASTM C478 Precast Reinforced Concrete Manhole Sections

- b. ASTM C857 Minimum Structural Design Loading for Underground Pre-cast Concrete Utility Structures
  - c. ASTM C858 Underground Pre-cast Concrete Utility Structures
  - d. ASTM C990 Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants
5. FEDERAL SPECIFICATIONS (FS)
- a. FS RR-F-621 Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole
6. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
- a. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Conduit
  - b. NEMA TC 3 Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
  - c. NEMA TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation
  - d. NEMA TC 9 Fittings for Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installation
  - e. NEMA WC 8 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
7. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- a. NFPA 70 National Electrical Code
8. UNDERWRITERS' LABORATORIES INC. (UL)
- a. UL 6 Rigid Metal Conduit, Ninth Edition
  - b. UL 83 Thermoplastic-Insulated Wires and Cables, Ninth Edition
  - c. UL 467 Grounding and Bonding Equipment, Sixth Edition
  - d. UL 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors, Seventh Edition
  - e. UL 510 Insulating Tape, Sixth Edition
  - f. UL514A Metallic Outlet Boxes, Seventh Edition
  - g. UL 514B Fittings for Conduit and Outlet Boxes, Second Edition
  - h. UL 651 Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
  - i. UL 651A Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit
  - j. UL 651B Continuous Length HDPE Conduit
  - k. UL 1242 Intermediate Metal Conduit, First Edition

**1.04 DEFINITIONS**

- A. In the text of this section, the words conduit and duct are used interchangeably and have the same meaning.

**1.05 SUBMITTALS**

- A. Preserve record data for the following:

1. Handholes, pullboxes and covers
2. Raceway, fittings, separators and miscellaneous components
3. Warning tape

#### **1.06 FIELD CONDITIONS**

- A. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.
- B. Prior to performing any work, Contractor shall perform a site walkthrough with Owner's Personnel (for existing sites), examine all Civil and Site plans for existing known utilities. Contractor shall contact state utility location service a minimum of three days prior to any digging, trenching or excavation work.

### **PART 2 – PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS FOR DUCTS AND RACEWAYS**

- A. Comply with ANSI C2

#### **2.02 CONDUIT**

- A. Rigid Metal Conduit: Galvanized steel. Comply with ANSI C80.1
- B. Plastic Conduit and Tubing: Type EPC-40, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B

#### **2.03 NONMETALLIC DUCTS AND DUCT ACCESSORIES**

- A. Underground Plastic Utilities Duct: NEMA TC 2, UL 651, ASTM F 512, Type EPC-40 with matching fittings complying with NEMA TC 3 by same manufacturer as the duct.
- B. Underground Plastic Utilities Duct: NEMA TC 6 & 8, ASTM F 512, UL 651A, Type HDPE with matching fittings complying with NEMA TC 9 by same manufacturer as the duct.
- C. Duct Accessories
  1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and size of ducts with which used, and selected to provide minimum duct spacing indicated while supporting ducts during concreting or backfilling.
  2. Warning Tape: Detectable underground warning tape shall be minimum 5-mil metal detectable tape, 3-inch wide, non-degradable, permanent ink, solid core and color coded in accordance with APWA Uniform Color Code.

#### **2.04 PULL ROPE**

- A. Nylon rope having a minimum tensile strength of 200 pounds/foot in each empty conduit/duct.

#### **2.05 POWER WIRE AND CABLE**

- A. Copper only.

- B. Wire and Cable Conductor Sizes: Conductor and conduit sizes indicated are for copper conductors unless otherwise noted. Wires and cables manufactured more than 12 months prior to date of delivery to the site shall not be used.

## **2.06 600-VOLT WIRES AND CABLES**

- A. See Section 26 20 00.

## **2.07 600-VOLT WIRE CONNECTOR AND TERMINALS FOR USE WITH COPPER CONDUCTORS**

- A. See Section 26 20 00.

## **2.08 TAPE**

- A. UL 510, plastic insulating tape, capable of performing in a continuous temperature environment of 80 degrees C.

## **2.09 GROUNDING AND BONDING EQUIPMENT**

- A. UL 467

## **2.10 HANDHOLES AND PULLBOXES**

- A. Shall be heavy duty, open bottom, constructed of all polymer concrete reinforced with fiberglass and with all stainless steel hardware.
- B. Boxes installed in areas of incidental, non-deliberate light vehicular traffic shall meet the Tier 8 cover test load of 12,000# over a 10"x10" plate; those in incidental, non-deliberate heavy vehicular traffic areas shall meet the Tier 15 cover test load of 22,500# over a 10"x10" plate. Boxes indicated as Tier 22 type shall be tested to 33,750# over a 10"x20" plate.
- C. Covers shall include molded lettering indicating use as indicated on drawings or as directed by respective utility. Cover design load shall not exceed the design load of the handhole or box.
- D. Handholes and pullboxes shall be manufactured by Quazite, Highline Products, NewBasis, Armorcast or approved equal.

## **PART 3 – EXECUTION**

### **3.01 PREPARATION**

- A. Coordinate layout and installation of raceway, handholes, boxes and other underground electrical system components with final arrangement of other utilities, site grading and surface features as determined in the field.
- B. Coordinate elevations of raceways, entrances into handholes, boxes and equipment with final locations and profiles of raceways, as determined by coordination with other utilities, underground obstructions and surface features. Revise locations and elevations as required to suit field conditions and to ensure that the raceway runs drain to handholes.
- C. Clear and grub vegetation to be removed, and protect vegetation. Remove and stockpile topsoil for reapplication.

### **3.02 INSTALLATION**

- A. Electrical installations shall conform to requirements of NFPA 70 and ANSI C2, and to requirements specified herein.
- B. Backfill material shall be soil or select material that can be readily compacted. It shall not contain stones larger than 1-inch, debris, chunks of highly plastic clay or any other materials deemed unsuitable by the Engineer.
- C. Concrete: Shall be composed of fine aggregate, coarse aggregate, Portland cement, and water so proportioned and mixed as to produce a plastic, workable mixture. Fine aggregate shall be of hard, dense, durable, clean, and uncoated sand. The coarse aggregate shall be reasonably well graded from 3/16-inch to one inch. The fine and coarse aggregates shall be free from injurious amounts of dirt, vegetable matter, soft fragments or other deleterious substances. Water shall be fresh, clean, and free from salts, alkali, organic matter, and other impurities. Concrete shall have a compressive strength of 3000 psi at the age of 28 days. Slump shall not exceed 3 inches. Re-tempering of concrete shall not be permitted. Exposed, unformed concrete surfaces shall be given a smooth, wood float finish. Concrete shall be cured for a period of not less than 7 days, and concrete made with high early strength Portland cement shall be repaired by patching honeycombed or otherwise defective areas with cement mortar as directed.
- D. Flowable Fill: Shall meet the requirements of Section 210 of the South Carolina Department of Transportation 2007 Standard Specification for Highway Construction.
- E. Earthwork: Perform all required demolition, excavation, backfilling, and pavement repairs for electrical work.
- F. Maintain a minimum 12 inch separation between primary power and communication raceways. A minimum of 12 inch separation shall be maintained, whenever possible, above or below all other utilities at crossings. A minimum of 8 feet horizontal clearance shall be maintained, whenever possible, from all other utilities which parallel the electrical raceways/ductbank.
- G. Contractor shall notify Engineer prior to backfilling. Do not begin backfilling until Owner's representative has observed the work. Excavations shall be filled as soon as possible and not left open for prolonged periods. Provide safety (warning) barricades around all open trenches and holes before leaving unattended. Open trenches shall be covered with metal plates whenever grade cannot be restored the same day.
- H. Trenches shall be excavated to the required depth and width sufficient to allow for proper setting and jointing of the conduit and for thorough compaction of the backfill material under and around the conduit.
- I. When a firm foundation is not encountered at the required grade, all unstable material under the ductbank, and for a width of at least one diameter of largest ductbank conduit on each side of ductbank, shall be removed and the resulting excavation backfilled with suitable material and compacted.
- J. If rock, hard pan, or other unyielding material is encountered, the material shall be excavated to a depth a minimum of 4 inches below the bottom of the lowest conduit. The minimum trench width shall be 4 inches beyond the outside of the nearest conduit.
- K. All conduits shall be securely fastened in place during construction of the work.
- L. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.

- M. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than five spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches (150 mm) between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
- N. Stagger conduit joints by rows and layers to provide a duct line having the maximum strength. During construction, protect partially completed duct lines from the entrance of debris such as mud, sand, and dirt with suitable conduit plugs. As each section of a duct line is completed handhole to handhole draw a stiff bristle brush having the same diameter of the duct through the duct, until duct is clear of particles of earth, sand, and gravel; then immediately install end plugs.
- O. All conduits shall be plugged or capped with approved standard factory made plugs or caps to prevent seepage of soil, flowable fill, water and debris into the ductbank system during construction and/or temporary suspension of work.
- P. Provide all empty conduits with a Nylon pull rope. Leave a minimum of 36" of slack at each end of the pull.
- Q. Whenever trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored to original conditions to the full satisfaction of the Engineer.
- R. Installation of conduit, fittings, connections, manholes, handholes, and the like shall follow the respective utility company specifications and guidelines.
- S. Underground Conduit/Duct Without Concrete Encasement: The conduit shall be EPC-40-PVC conduit. The top of the conduit shall be not less than 30 inches below grade, and shall have a minimum slope of 3 inches in each 100 feet away from buildings and toward manholes, handholes and other necessary drainage points. Run conduit in straight lines except where a change of direction is necessary. As each conduit run is completed, draw a non-flexible testing mandrel not less than 12 inches long with a diameter 1/4 inch less than the inside diameter of the conduit through the conduit. After which, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel; then immediately install conduit plugs. Provide not less than 3 inches clearance from the conduit to each side of the trench. A minimum clearance of 2-1/2 inches shall be provided between adjacent conduits. Grade bottom of trench smooth; where rock, soft spots, or sharp-edged materials are encountered, excavate the bottom for an additional 3 inches, fill and tamp level with original bottom with sand or earth free from particles that would be retained on a 14-inch sieve. Provide warning tape at 12" B.F.G.
- T. Cable Pulling: Test existing duct lines with a mandrel and thoroughly swab out to remove foreign material before pulling cables. Pull cables down grade with the feed-in point at the manhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through manhole opening and into duct runs. Accumulate cable slack at each manhole or junction box where space permits by training cable around the interior to form one complete loop. Maintain minimum allowable bending radii in forming such loops.
1. Cable Lubricants: Use lubricants that are specifically recommended by the cable manufacturer for assisting in pulling jacketed cables. Cable lubricants shall be soapstone, graphite, or talc for rubber or plastic jacketed cables. Lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings.
  2. Cable Pulling Tensions: Tensions shall not exceed the maximum pulling tension recommended by the cable manufacturer.
  3. Secondary Cable Runs in Nonmetallic Duct Conduit: Although not indicated, include an insulated copper equipment grounding conductor sized as required by the rating of the

overcurrent device supplying the phase conductors, in nonmetallic duct conduit, for secondary cable runs, 600 volts and less.

- U. Cable Terminating: Protect terminations of insulated power and lighting cables from accidental contact, deterioration of coverings and moisture by providing terminating devices and materials. Install terminations of insulated power cables, cable joints, and medium voltage terminations in accordance with the manufacturer's requirements. Make terminations with materials and methods as designated by the written instructions of the cable manufacturer and termination kit manufacturer.
  - 1. Splices for 600-Volt Class Cables: Splice in underground systems only in accessible locations such as handholes and pullboxes, with a compression connector on the conductor and by insulating and waterproofing by one of the following methods suitable for continuous submersion in water and pass ANSI C119.1.
    - a. Provide cast-type splice insulation by means of molded casting process employing a thermosetting epoxy resin insulating material applied by a gravity poured method or by a pressure injected method. Provide component materials of the resin insulation in a packaged form ready for convenient mixing without removing from the package. Do not allow the cables to be moved until after the splicing material has completely set.
    - b. Gravity poured method shall employ materials and equipment contained in an approved commercial splicing kit which includes a mold suitable for the cables to be spliced. When the mold is in place around the joined conductors, prepare the resin mix and pour into the mold. Do not allow cables to be moved until after the splicing materials have completely set.
    - c. Provide heat shrinkable splice insulation by means of a thermoplastic adhesive sealant material which should be applied by a clean burning propane gas torch. Cables may be moved when joint is cool to the touch.
- V. Grounding Systems: Shall be as indicated, and as required by NFPA 70 and ANSI C2

### **3.03 HANDHOLE AND PULLBOX INSTALLATION**

- A. Comply with ASTM C 891 unless otherwise indicated.
- B. Set all handholes and pull boxes on gravel base, minimum 6" thick. Gravel bedding shall be No. 57 aggregate meeting requirements of AASHTO M43-88.
- C. Install units level and plumb and with orientation and depth coordinated with connecting raceways, to minimize bends and deflections required for proper entrances. Square covers with roadways, sidewalks, pavers and other site features. Covers shall be set flush with finished grade.
- D. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch finished grade.
- E. Where indicated, cast handhole cover frame integrally with handhole structure.

### **3.04 GENERAL**

- A. This Contractor shall remove all mud and debris from handholes after completion.
- B. It is the intent of these specifications that the underground raceway system shall be waterproof.

### **3.05 TESTING**

- A. Distribution Conductors 600-Volt Class: Perform 600-volt cable tests to verify that no short circuits or accidental grounds exist. Make tests using an instrument which applies a voltage of approximately 500 volts to provide a direct reading in resistance; minimum resistance shall be 250,000 ohms.

**3.06 DOCUMENTATION**

- A. Contractor shall maintain on the job site one complete set of drawings for this project. All changes authorized by the Engineers and/or the Owner as to the locations, sizes, etc. of equipment, conduit, fixtures, and/or other material and equipment shall be indicated in red pencil on the drawings as the work progresses. At the completion of the project, Contractor shall obtain a complete set of reproducibles of the drawings, and shall transfer all changes to these reproducibles.

**END OF SECTION 26 05 43**



## SECTION 26 20 00

### WIRING SYSTEMS

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Section 26 05 00, Electrical, General, applies to the work under this section.

##### 1.02 SCOPE

- A. Provide wiring systems complete and ready for operation, as indicated, specified herein and in compliance with applicable codes and standards.

#### PART 2 – PRODUCTS

##### 2.01 MANUFACTURERS

- A. Materials of like type shall be manufactured by the same company with the exception of lighting fixtures.
- B. Pump controller, panelboards, circuit breakers, safety switches, motor starters, contactors and the like: GE/ABB, Siemens-ITE, Square D, Eaton, or approved equal.
- C. Fittings, Condulets, Boxes and the like: Steel City, Thomas and Betts, O-Z Electrical Manufacturing Company, Appleton, Efcor, Crouse-Hinds, Garvin Industries, or approved equal.
- D. Conductors and Cables: Alpha Wire Company, Belden, Cerro Wire, Southwire Company, General Cable or approved equal.
- E. Cable Markers: 3M Company, E-Z Code, Brady, or approved equal.
- F. Connectors, Lugs and Terminals and the like: 3M Company, Ideal, Thomas and Betts, O-Z Electrical Manufacturing Company, or approved equal.
- G. Wiring Devices and the like: Best Specification Grade; Arrow Hart/Cooper, Hubbell, Legrand/P&S, Leviton, or approved equal.
- H. Fuses: Dual-Element type, "Fusetron" by Bussman or "Econ" by Economy or approved equal.
- I. Grounding Devices, and the like: Cadweld, Thomas and Betts, Appleton, Erico, O-Z Electrical Manufacturing Company, or approved equal.
- J. AC and MC Cable: Only permitted for fixture "whips", maximum 6' length.

##### 2.02 CONDUIT AND FITTINGS

- A. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1.
- B. Rigid Nonmetallic Conduit: PVC Type EPC-40 in accordance with NEMA TC2.
- C. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.

- D. Electrical Metallic Tubing (EMT): ANSI C80.3.
- E. Flexible Metal Conduit: UL 1.
  - 1. Liquid-Tight Flexible Metal Conduit (Steel): UL 360.
- F. Fittings for Metal Conduit, Electrical Metallic Tubing, and Flexible Metal Conduit: UL 514. All ferrous fittings shall be cadmium- or zinc-coated in accordance with UL 514.
  - 1. Fittings for rigid metal conduit and IMC shall be threaded type. Split couplings are not acceptable.
  - 2. Fittings for electrical metallic tubing (EMT) shall be the compression type.
  - 3. Fittings for use in hazardous locations: UL 886
- G. Fittings for Rigid Nonmetallic Conduit: NEMA TC3.
- H. Electrical Nonmetallic Tubing (ENT): Not permitted.

### **2.03 OUTLET BOXES AND COVERS**

- A. UL 514, cadmium- or zinc-coated if of ferrous metal.
- B. Boxes for exposed raceway shall be threaded-hub cast metal, sizes as specified above.
- C. Outlet Boxes in Hazardous Locations: UL 886. Crouse-Hinds, Killark, Appleton, or approved equal.

### **2.04 CABINETS, JUNCTION BOXES, AND PULL BOXES**

- A. UL 50, hot-dip zinc-coated, code gauge sheet steel, screw cover unless indicated otherwise.

### **2.05 WIRES AND CABLES**

- A. Wires and cables shall meet the applicable requirements of NFPA 70 and UL for the type of insulation, jacket, and conductor specified or indicated. All wire and cable shall be new, with size, grade of insulation, voltage and manufacturer's name permanently imprinted on outer covering at regular intervals and delivered to the job site in complete coils and reels.
- B. Conductors: Conductors No. 10 AWG and smaller shall be solid, and those No. 8 AWG and larger shall be stranded. Unless indicated otherwise, conductor sizes shown are based on copper. All conductors shall be copper.
- C. Minimum Conductor Sizes: Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote-control and signal circuits, No. 14 AWG; and for Class 2 low-energy remote-control and signal circuits, No. 16 AWG. All 120 v. branch circuits exceeding 100' in length and all 277 v. branch circuits exceeding 250' in length shall be No. 10 AWG, minimum.
- D. Color Coding: Provide for all service, feeder, branch, control and signaling circuit conductors. Color shall be green for grounding conductors, and white for neutrals, except where neutrals of more than one system are installed in same raceway or box, the neutral of the higher-voltage system shall be white with a yellow stripe or shall be gray. The color of the ungrounded conductors in different voltage systems shall be as follows:
  - 1. 120/208 volt, 3-phase:       Phase A – black  
  Phase B – red

2. 277/480 volt, 3-phase: Phase C - blue  
Phase A - brown  
Phase B - orange  
Phase C – yellow

- E. Insulation: Unless specified or indicated otherwise, or required to be otherwise by NFPA 70, all power and lighting wires shall be 600-volt, Type THHN, THWN, or XHHW; remote-control and signal circuits shall be Type TW, THHN, TF, THWN or XHHW.
- F. Bonding Conductors: ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger.

## **2.06 ELECTRICAL CONNECTIONS**

- A. Comply with NEC Article 110-14.
- B. All termination devices, such as connectors, splicing devices, equipment terminals, device terminals and the like shall be rated and listed for operation at 75 degrees C.

## **2.07 SPLICES AND TERMINATION COMPONENTS**

- A. UL 486A and UL 486B, as applicable for wire connectors, and UL 510 for insulating tapes. Connectors for wires No. 10 AWG and smaller shall be insulated pressure-type in accordance with UL 486A or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.
- B. Splices and/or taps for #8 and larger conductors shall be crimp type by T&B, Burndy, Oz, or approved equal; or IlSCO KUP-L-Tap®, ClearTap, or approved equal.

## **2.08 DEVICE PLATES**

- A. Provide UL listed, one-piece device plates for outlets and fittings to suit the devices installed. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be urea or phenolic, minimum 0.10 inch wall thickness, and shall be the same color as the receptacle or toggle switch with which it is mounted, or shall be satin finish stainless steel or brushed-finish aluminum, minimum of 0.03 inch thick as directed by Architect. Screws shall be machine type with countersunk heads in a color to match the finish of the plate. The use of sectional type device plated will not be permitted. Plates installed in wet locations shall be gasketed. Device plates for telephone outlets shall be as specified in Section 27 05 00. All plates shall be oversize type.

## **2.09 SWITCHES**

- A. Toggle Switches: Fed. Spec. W-S-896, totally enclosed with bodies of thermosetting plastic and a mounting strap. Handles shall be white, gray, brown or ivory. Wiring terminals shall be of the screw type, side wired. Switches shall be rated quiet-type ac only, 120/277 volts, with the current rating and number of poles indicated. Colors shall be as directed by Architect.
- B. Disconnect Switches: NEMA KS1. Provide heavy duty, fusible type. General duty and non-fusible switches are not permitted.
1. Operating mechanisms shall be of the quick-make, quick-break type, with arc-suppressing characteristics.

2. Enclosures shall be NEMA 1 indoors and NEMA 3R outdoors and in wet locations unless otherwise indicated, equipped with cover interlock and provisions for padlocking operating handle in OFF position. Safety switches shall be by the same manufacturer as panelboards.
3. Safety switches used as motor disconnection means and located on load side of variable frequency drives (VFDs) shall be provided with factory mounted auxiliary contacts to allow communication of switch position to VFD.

## **2.10 RECEPTACLES**

- A. NEMA WD1, heavy-duty, grounding type. Ratings and configurations shall be as indicated. Bodies shall be of white, gray, brown or ivory thermosetting plastic supported on a metal mounting strap. Wiring terminals shall be of the screw type, side wired. Connect grounding pole to the mounting strap. Colors shall be as directed by Architect.
- B. Weatherproof Receptacles: In all damp or wet locations, provide in a cast metal box with a gasketed, weatherproof, cast-metal cover plate and a gasketed cap over each receptacle opening. The cap(s) shall be provided with a spring-hinged flap. Cover shall be "in use" type where required by local codes. Receptacle shall be UL listed for use in "damp location" or "wet location" to suit installation location.
- C. Ground Fault Circuit Interrupter Receptacles: UL 943 and shall be duplex type for mounting in a standard outlet box. The device shall be capable of detecting a current leak of 5 milliamperes.
- D. Receptacles shall be by same manufacturer as toggle switches, as specified above.
- E. Install grounding type receptacles with the grounding terminal at the top.

## **2.11 PANELBOARDS**

- A. UL 67 and UL 50. Panelboards for use as service disconnecting means shall additionally conform to UL 869. Panelboards shall be circuit breaker equipped unless indicated otherwise. Panelboards and all circuit breakers shall be fully-rated, series rating is not permitted. Design shall be such that any individual breaker can be removed without disturbing adjacent units or without loosening or removing supplemental insulation supplied as a means of obtaining clearances as required by UL. Where "space only" is indicated, make provisions for the future installation of a breaker sized as indicated. Directories shall be typed to indicate load served by each circuit and mounted in a holder behind transparent protective covering. Directory listing for each breaker shall list the type load served (lighting, receptacles, etc.) and location of load (room name, room number, etc.).
- B. Panelboard Buses: Support bus bars on bases independently of the circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide an isolated neutral bus in each panel for connection of circuit neutral conductors. Provide a separate ground bus marked with a green stripe along its front and bonded to the steel cabinet for connecting grounding conductors.
- C. Circuit Breakers: Fed. Spec. W-C-375 thermal magnetic type with interrupting capacity as indicated on drawings. Breaker terminals shall be UL listed as suitable for the type of conductor provided. Circuit breakers shall be bolt on type unless noted otherwise – plug-in circuit breakers shall be provided only where indicated in drawings.
  1. Multi-pole Breakers: Provide common-trip type with a single operating handle. Breaker design shall be such that an overload in one pole automatically causes all poles to open.

Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2. Circuit Breaker with Ground-Fault Circuit Interrupter: UL 1053 and NFPA 70. Provide with "push-to-test" button, visible indication of tripped condition, and ability to detect a current imbalance of approximately 5 milliamperes.
3. Breakers Used as Switches for Light Fixtures: Breakers shall be marked "SWD" and switch-duty rated in accordance with UL 489.

D. Construction:

1. All panelboards shall have hinged, lockable front covers. All panelboard locks included in the project shall be keyed alike and each shall be provided with two (2) keys.
2. For surface-mount fronts, match box dimensions; for flush-mounted fronts, provide cover with overlap trim. Trims shall cover all live parts and shall have no exposed hardware.

E. Panelboards shall be rated for environmental conditions at location where installed:

1. Indoors, dry and clean conditions: NEMA 250, Type 1
2. Outdoors, NEMA 250, Type 3R
3. Kitchen or wash-down areas: NEMA 250, Type 4X
4. Other wet or damp indoor locations: NEMA 250, Type 4
5. Indoor locations subject to dust, falling dirt and dripping noncorrosive liquids: NEMA 250, Type 5
6. Pump stations, lift stations, vicinity of wastewater, or similar corrosive environments: NEMA 250, Type 4X, Stainless Steel

## 2.12 FUSES

- A. Provide a complete set of fuses for each fusible device provided. Time-current characteristics curves of fuses serving motors or connected in series with circuit breakers or other circuit protective devices shall be coordinated for proper operation; submit coordination data for approval. Fuses shall have a voltage rating not less than the circuit voltage.
- B. Cartridge Fuses, Current-Limiting Type (Class R): UL 198E, time-delay type. Associated fuseholders shall be Class R only.
- C. Cartridge Fuses, Current-Limiting Type (Classes J and L): UL 198C, Class J for 0 to 600 amps and Class L for 601 to 6000 amps.

## 2.13 GROUNDING AND BONDING EQUIPMENT

- A. UL 467.
- B. Ground rods shall be copper-encased steel, with minimum diameter of 3/4" and minimum length of 10 feet.

## 2.14 HAZARDOUS LOCATIONS

- A. Electrical materials, equipment, and devices for installation in hazardous locations, as defined by NFPA 70, shall be specially approved by Underwriters' Laboratories, Inc., or Factory Mutual for the particular "Class," "Division," and "Group" of hazardous locations involved. The boundaries and classifications of hazardous locations shall be as indicated on the drawings and as defined by applicable codes.

## **PART 3 – EXECUTION**

### **3.01 ELECTRICAL SERVICE SYSTEMS**

- A. Provide service entrance of voltage and phase characteristics indicated.
- B. Provide the required meter sockets, cabinets, raceways, fittings, and connections to comply with power company metering requirements for the service entrance capacity and characteristics to be utilized.
- C. Coordinate with power company to determine requirements for service and metering and include in this work all provisions for compliance with these requirements.
- D. Color code service entrance conductors at transformer and as specified above.
- E. Service entrance conductors shall be as specified for feeders.
- F. Provide label on main service equipment indicating available fault current. Fault current shall be calculated using data obtained from serving utility and shall include date. Comply with NEC 110.24.

### **3.02 RACEWAYS**

- A. Provide raceways for all conductors and cables. See drawings for raceway types approved for various locations and applications in the project.
- B. Provide flexible metal conduit for connection to rotating or vibrating equipment. In all potentially wet locations, provide waterproof flexible conduit. In no case shall length of flexible conduit exceed 3 feet. Support in accordance with NEC and as approved by Engineer.
- C. Contractor shall size pull and junction boxes. Comply with requirements for dimensions and conduit spacings as defined in the NEC Article 314.
- D. Raceways shall be continuous between outlets and enclosures. Bond raceway system as described in drawings and grounding specifications and make all connections wrench tight for electrical continuity. Connect raceways at boxes and enclosures using locknuts and bushings. Provide insulating bushings with grounding lug on all raceways one inch and larger.
- E. Install raceways generally as follows:
  - 1. Run concealed raceways in straight lines with long sweep bends and offsets.
  - 2. Where raceways turn up out of floor, curved portion shall not be visible.
  - 3. Run exposed raceways parallel and perpendicular with building lines. For exposed raceways in finished areas, strap with two-hole flat straps; do not use minerallac straps. Minerallac straps may be utilized in equipment rooms or utility areas.
  - 4. Support raceways within 3' of each outlet box, fitting, or enclosure, and at 10' intervals. Use malleable iron or stamped steel clamps for branch circuit raceways; use pipe hangers for feeder raceways. Do not hang conduit with wire, perforated strap, or nails.
  - 5. Cut all joints square, thread, ream and draw tight. Make bends and offsets with standard conduit ells or with an approved bender or hickey.
  - 6. No more than three quarter-bends equivalent in any run.
  - 7. Cap raceway ends to prevent entrance of debris during construction. Cap with approved pennies, plastic caps or covers; do not tape.
  - 8. Complete raceway installation and clean thoroughly before pulling conductors.

9. Where conduits pass through fire-rated walls and/or floors, provide a UL-listed through-penetration assembly with fire rating equal to wall or floor penetrated. Materials shall be by 3M Company or equal. Each assembly shall be specific to the penetrating device, e.g., single conduit, multiple conduits, busway, etc. and shall be specific to the wall or floor construction penetrated, e.g., concrete, gypsum board on wall studs, etc. Install assemblies in accordance with material manufacturer's instructions and UL Building Materials Directory, latest edition.
  10. Install expansion fittings with copper bonding jumpers in conduit runs which cross building expansion joints.
  11. Do not attach raceway, boxes or cables directly to roof decking. Provide mounting from building structure and maintain a minimum of 1-1/2" separation from lowest surface of roof deck.
  12. Ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, metal elbows, couplings, nipples, fittings, supports, and support hardware shall be suitably protected against corrosion inside and outside (except threads at joints) by a coating of approved corrosion-resistant material (Thomas & Betts, Kopr-Shield, or equal). Where corrosion protection is necessary and the conduit is threaded in the field, the threads shall be coated with an approved electrically conductive, corrosion-resistant compound.
- F. Install pull boxes as shown in drawings and as required to pull conductors without damage to insulation. Provide pull boxes in accessible locations only, and size in accordance with NEC.
  - G. Unless otherwise indicated, underground service entrance conduits may be Schedule 40 PVC or coal-tar painted IMC or coal-tar painted GRS conduit at the contractor's option. All elbows shall be GRS type. Maintain conduit spacing in compliance with NEC.
  - H. Cover all raceways below grade and in concrete slabs with two brushed applications of a coal tar base coating conforming to MIL-C-18480. In lieu of asphalt coated conduit, Schedule 40 PVC conduit may be used for branch circuit raceways (conduits 1" and smaller), provided that grounding conductors are provided in all runs sized per NEC.
  - I. At Contractor's option, Schedule 40 PVC conduit may be used for underground feeder raceways, provided that GRS elbows and grounding conductors are provided for all runs. Exposed conduits shall be metallic as specified.
  - J. All underground/in-slab raceways shall transition to GRS/IMC prior to penetrating slab. No PVC raceway allowed above slab.
  - K. Install raceways of sizes shown in drawings and comply with Table 1 of NEC (latest edition). In case of conflict, install larger size.
  - L. Communication conductors/cables shall not be routed in the same conduit or raceway containing line voltage (120V and above) power conductors.
  - M. Provide in each empty raceway a pull cord or wire, identified with a cardboard tag as to location of equipment or outlet fed by conduit.

### **3.03 OUTLET, SWITCH, AND JUNCTION BOXES, FITTINGS**

- A. Provide outlet and junction boxes as required for power, lighting, and communications systems as shown in drawings.
- B. Boxes shall be held securely in place by being imbedded in masonry or shall be secured to a fixed structural unit such as a stud or joist.

### **3.04 CONDUCTORS**

- A. Provide conductors in raceways as shown in drawings for service, feeders and branch circuits.
- B. Wire and cable shall be suitably protected from weather during storage and handling and shall be in good condition when installed.
- C. Do not pull conductors before completion of masonry, concrete and other trades which generate dust and debris. See raceways section, above.
- D. Conductors No. 8 and larger shall be connected to equipment by means of pressure type mechanical lugs. Where multiple conductors are connected to the same terminal each conductor shall be provided with an individual lug.
- E. Soldered splices shall be made mechanically secure before soldering.
- F. Join conductors with approved connectors, or by soldering, brazing or welding. Tape all connections or cover with approved prefabricated insulating devices to provide insulation resistance at the connection equal to that of the wire. Make splices in boxes or fittings only.
- G. All electrical connections and terminations shall be in accordance with NEC Section 110.14 requirements.
- H. Where tightening torque values are indicated on equipment or in equipment installation instructions, torque connections to achieve stated values utilizing a calibrated torque tool. Where equipment manufacturer provides an alternative method for achieving require torque values, this method may be used in lieu of torque tool.
- I. Where conductors are connected in parallel, the parallel conductor sets shall be installed in groups consisting of not more than one conductor per phase or neutral conductor to prevent current imbalance due to inductive reactance.

### **3.05 PANELBOARDS**

- A. Where shown on drawings and indicated in riser diagram, provide panelboards of the types and sizes indicated. Panelboards shall be installed with top of cabinet 72" above finished floor.
- B. Comply with NFPA-70, Section 408, for installation requirements and with other applicable sections for clearances. Lay out all equipment rooms in advance of roughing and notify Engineer immediately, in writing, if interferences are encountered or if code requirements cannot be met with equipment proposed.
- C. Provide multi-pole breakers of common-trip type to simultaneously disconnect all ungrounded conductors in multiwire branch circuits.
- D. Allow in bid for panelboard skirts, painted to match panelboard above and/or below panelboards, wherever there are exposed conduits. Also allow in bid for painting panelboards cans wherever skirts are used.

### **3.06 SAFETY SWITCHES**

- A. Provide heavy duty, fusible safety switches as shown on drawings and in accordance with NEC requirements. Provide nameplates on switches as specified in Section 26 05 00. Wording shall identify the load which switch disconnects.



- B. Coordinate switch locations with all trades and install so that adequate workspace and clearance is provided to allow for safe access. Comply with NEC Article 110 requirements.
- C. For switches used as motor disconnects on load side of variable frequency drives, provide signaling cable as required from VFD to auxiliary contacts in safety switch. Connect complete.
- D. Provide fuses to match nameplate rating for equipment served. In no case shall fuse size exceed manufacturer's stated maximum overcurrent protection rating of equipment being served.

### **3.07 SWITCHES AND RECEPTACLES**

- A. Provide switches and receptacles for power and lighting as shown in drawings. Where indicated, verify location of receptacles with Owner prior to roughing.
- B. Install devices at locations indicated in details.
- C. Install outlets and devices plumb and level.
- D. Protect devices during painting and clean-up of job. Leave devices clean and free from paint, dirt and debris.
- E. Prior to final completion, check all receptacles for shorts, opens and grounds and correct all incorrect connections. Check all GFCI and AFCI receptacles for proper function. Use receptacle tester as manufactured by Daniel Woodhead Company, General Electric, Leviton, or equal.

### **3.08 GROUNDING**

- A. Provide grounding system to comply with NEC, as shown on drawings and as specified.
- B. Ground main service by bonding grounding conductor to steel building frame, concrete-encased electrode, main cold water pipe and three ground rods driven twelve feet apart outside building and located at least six feet away from building footings. Do not locate under paving; drive in planted areas only. Where ground rings are indicated, bond grounding conductor to ground ring.
- C. All ground system components and fittings used shall be free from paint, grease, and other poorly conducting material, and contact surfaces shall be cleaned thoroughly to ensure good metal-to-metal contact.
- D. Install bonding jumpers between all panelboards and feeder raceways connected thereto; across pull box and raceway expansion joints and across water meters located within buildings.
- E. All connections to grounding conductors shall be accessible for inspection and shall be made with solderless connectors brazed or bolted to the equipment or structure to be grounded. Unless otherwise indicated in drawings, grounding conductors within raceway system shall be installed in exposed rigid steel conduit with both conductor and conduit bonded at each end. Do not cover main service grounding until Engineer has observed connections.
- F. Provide a ground wire in all circuits sized per NEC Table 250-122 as applicable.
- G. Provide in all runs of flexible conduit a separate grounding conductor sized per NEC Table 250-122.

**END OF SECTION 26 20 00**

## SECTION 26 32 13

### EMERGENCY POWER SYSTEM

#### PART 1 – GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The following apply to the work under this Section:
  - 1. Section 26 05 00, Electrical, General
  - 2. Section 26 20 00, Wiring Systems

##### 1.2 SCOPE

- A. Provide, complete and ready for operation, an emergency power system consisting of diesel-electric engine generator set, unit-mounted radiator, silencer, emergency power off switch, fuel storage/supply system, automatic transfer switch, line circuit breaker, controls, electrical distribution, piping and all other accessories, supplies, foundation, labor and materials required for a complete system.
- B. The entire system including fuel storage, but excluding automatic transfer switch, shall be mounted inside a weatherproof housing and on a single, steel skid base. Entire unit shall be factory assembled, tested, shipped and lifted onto a job-furnished concrete mounting slab, sized to suit equipment furnished. Individual components brought to and assembled on the job site will not be accepted.
- C. The system shall be as manufactured by Caterpillar, MTU-Online, Cummins-Onan, Kohler or approved equal. Equipment shall be furnished by a dealer with service facilities and spare parts stock, as approved by Engineer, within two hours time of the job site by normal ground transportation. In addition, the dealer shall be able to demonstrate, in the judgment of the Engineer, adequate experience in the installation/service of standby power equipment of equivalent size and type specified herein. Dealer shall also demonstrate, to the satisfaction of the Engineer, successful installation and operation of at least two installations of packaged emergency power plants.

##### 1.3 GENERAL

- A. Materials and Workmanship: All materials, equipment and parts comprising the unit specified herein shall be new and unused, of current manufacture, and of highest grade.
- B. Warranty: Equipment furnished under this section shall be guaranteed against defective parts or workmanship under terms of the manufacturer's and dealers standard warranty, for a period of two (2) years from acceptance by the Owner.
- C. Tests: The generator set shall receive the manufacturer's standard factory load testing. Prior to acceptance of the installation, equipment shall be tested to show it is free of any defects and will start and be subjected to full load test.
- D. Start-up and Instructions: On completion of installation, start-up shall be performed by a factory-trained dealer service representative. Operating and maintenance instruction books shall be supplied upon delivery to the unit and procedures explained to operating personnel.
- E. Specifications and Drawings: Prior to bidding, bidders shall furnish information showing manufacturer's model numbers, dimensions and operating data for the generator set, radiator,

silencer, transfer switch and major equipment. The successful bidder shall submit copies of pertinent drawings and wiring diagrams for approval prior to manufacture and assembly.

#### 1.4 QUALITY ASSURANCE AND CODE CRITERIA

- A. Manufacturer Qualifications: Maintain a service center capable of emergency maintenance and repairs at the project within two hours maximum response time (100 miles of the project site). The manufacturers' distribution responsible for the project territory will only be allowed to supply the product in order to provide Owner with local future service. Distributors outside of the project territory will not be allowed to provide product. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24 hours and 95% within 48 hours.
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70-2020 Article 100, by a testing agency acceptable to authorities having jurisdiction.
- C. The generator set covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards, including, but not limited to:
  - 1. NFPA 70 (National Electrical Code)
  - 2. NFPA 99
  - 3. NFPA 110
  - 4. CSA 100
  - 5. CSA C22.2 No14
  - 6. CSA 282
  - 7. EN61000-6
  - 8. EN55011
  - 9. FCC Part 15 Subpart B
  - 10. ISO8528
  - 11. IEC61000
  - 12. UL508
  - 13. UL2200
  - 14. UL142
- D. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- E. Engine Exhaust Emissions: Comply with applicable state and local government requirements. Actual engine emissions values shall be in compliance with applicable EPA emissions standards per ISO 8178 – D2 Emissions Cycle at specified eKW/bHP rating. Utilization of the “Transition Program for Equipment Manufacturers” (also known as “Flex Credits”) to achieve EPA certification is not acceptable. Emissions requirements/certifications of this package: EPA T2

### PART 2 - PRODUCTS

#### 2.1 GENERATOR SET CHARACTERISTICS

- A. Rating at 1800 RPM Section 2.1:
  - 1. Standby capacity without Fan: **as indicated on drawings**
  - 2. Power Factor: 0.8
  - 3. Frequency: 60 Hertz
- B. The specified standby capacity shall be for continuous electrical service during interruption of the normal utility source.

- C. These ratings must be substantiated by manufacturer's standard published curves. Special ratings or maximum ratings are not acceptable.
- D. Voltage: The generator output voltage shall be 277/480 volts, 3-phase, 4-wires.

## **2.2 GENERAL**

- A. Safety Standard: Comply with ASME B15.1.
- B. Resistance to Seismic Forces: Supports for internal and external components, and fastenings for batteries, wiring, and piping are designed and constructed to withstand static or anticipated seismic forces, or both in any direction.
- C. Skid: Adequate strength and rigidity to maintain alignment of mounted components without depending on a concrete foundation.
- D. Space Heater: Provide a generator mounted space heater, 208 or 480 VAC to suit site conditions, and single phase. Space heater shall be thermostatically controlled and shall be disconnected when engine is running.
- E. The generator set shall be mounted on steel spring type vibration isolators rated for International Building Code (IBC) seismic requirements. Anchor generator to concrete pad.

## **2.3 ENGINE**

- A. Type: The engine shall be water-cooled, in-line or Vee-type, four-stroke cycle compression ignition diesel. It shall meet specifications when operating on No. 2 domestic burner oil. Diesel engines requiring premium fuels will not be considered. The engine shall be equipped with lube oil and intake air filters; lube oil coolers, fuel transfer pump, fuel priming pump, and gear-driven water pump.
- B. The engine governor shall be the electronic type and shall maintain frequency regulation not to exceed 3% (1.8 Hertz) from non load to full rated load.
- C. Mounting: The unit shall be mounted on a structural steel sub-base and shall be provided with suitable vibration isolators.
- D. Safety Devices: Safety shut-offs for high water temperature, low oil pressure, overspeed, and engine overcrank shall be provided.
- E. Start Time: Comply with NFPA 110, Type 1 system requirements

## **2.4 GENERATOR**

- A. Type: The generator shall be a 12-lead, re-connectable, three-phase, 60 Hertz, single bearing, synchronous type built to NEMA standards. Class F insulation shall be used on the stator and rotor, and both shall be further protected with 100% epoxy impregnation and an overcoat of resilient insulation material to reduce possible fungus and/or abrasion deterioration. Generator shall incorporate reactive droop compensation.
- B. Regulator: A generator-mounted, volts-per-Hertz type regulator shall be provided to match the characteristics of the generator and engine. Voltage regulation shall be plus or minus 2 percent from no load to full rated load. Readily accessible voltage droop, voltage level and voltage gain controls shall be provided. Voltage level adjustment shall be a minimum of plus or minus 5

percent. The solid state regulator module shall be shock-mounted and epoxy-encapsulated for protection against vibration and atmospheric deterioration.

- C. Excitation: Generator shall utilize Permanent Magnet (PMG) method of excitation.
- D. Steady State Voltage Operational Bandwidth: Four percent of rated output voltage from no load to full load.
- E. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
- F. Transient Frequency Performance: Less than 5 percent variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within five seconds.
- G. Output Waveform: At no load, harmonic content measured line to line to neutral does not exceed 5 percent total and 3 percent for single harmonics. The telephone influence factor, determined according to NEMA MG 1, shall not exceed 50.
- H. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, the system will supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to any generator system component.
- I. Load Sensitivity: The generator and its controls shall be capable of handling any connected VFD or UPS loads.
- J. The generator winding shall be form wound. The winding shall have an intake filter that is easily removable and cleanable on the intake end.

## **2.5 COOLING SYSTEM**

- A. Radiator: A unit-mounted radiator with blower type fan shall be sized to maintain safe operation at 110 degrees F maximum ambient temperature without derating the unit.
- B. Antifreeze: The engine cooling system shall be filled with a solution of 50 percent ethylene glycol.

## **2.6 FUEL SYSTEM**

- A. Fuel Storage Tank: Provide manufacturer's standard UL 142, double wall fuel storage tank mounted integrally with steel base, with vents, gauges, and valves. Provide locking filler cap on fill pipe. Tank capacity shall be sufficient for 24 hours' operation at full load.
- B. An engine-mounted fuel filter, fuel pressure gauge, and engine fuel **[piping]** priming pump shall be provided.

## **2.7 EXHAUST SYSTEM**

- A. Exhaust Silencer: Provide a critical type silencer including flexible exhaust fitting for unit mounting, properly sized and installed according to the manufacturer's recommendations. Silencer shall be mounted so that its weight is not supported by the engine. Exhaust pipe size shall be sufficient to ensure that measured exhaust back pressure does not exceed the maximum

limitations specified by the generator set manufacturer. Silencer shall be mounted on top of weatherproof housing.

## **2.8 AUTOMATIC STARTING SYSTEM**

- A. Starting Motor: Provide a 24-volt dual DC electric starting system with positive engagement drive. Starting system shall incorporate an automatically reset circuit breaker for antipump engagement.
- B. Automatic Controls: Fully automatic generator set start-stop controls in the generator control panel shall be provided. Controls shall provide shutdown for low oil pressure, high water temperature, overspeed, overcrank, and one auxiliary contact for activating accessory items. Controls shall include a 30-second single cranking cycle limit with lockout.
- C. Jacket Water Heater: A unit-mounted thermal circulation type water heater shall be furnished to maintain engine jacket water to 90 degrees F in an ambient temperature of 30 degrees F.
- D. Batteries: A 24-volt lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. The battery set shall be of sufficient capacity to provide for one and one-half minutes total cranking time without recharging and will be rated no less than 170 amp-hours. A battery rack and necessary cables and clamps shall be provided. Comply with NFPA 70, Article 480.
- E. Battery Charger: A current-limiting battery charger shall be furnished to automatically recharge batteries. Charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressors, DC ammeter and voltmeter, and fused AC input. AC input voltage shall be 120 volts. Current output shall be not less than 10 amperes.

## **2.9 GENERATOR CONTROL PANEL**

- A. Type: A generator-mounted NEMA 1 type, vibration isolated, dead front, 14-gauge steel control panel shall be provided.
- B. Equipment: Panel shall contain, but not be limited to, the following equipment:
  - 1. Voltmeter, 3-1/2 inch, 2 percent accuracy
  - 2. Ammeter, 3-1/2 inch, 2 percent accuracy
  - 3. Ammeter phase selector switch
  - 4. Frequency meter, 3-1/2 inch, dial type
  - 5. Automatic starting controls as specified
  - 6. Panel illumination lights and switch
  - 7. Voltage level adjustment rheostat
  - 8. Engine oil pressure gauge
  - 9. Engine water temperature gauge
  - 10. Dry contacts for remote alarms wired to terminal strips
  - 11. Fault indicators for low oil pressure, high water temperature, overspeed and overcrank
  - 12. Four position function switch marked "auto," "manual," "off/reset," and "stop"
- C. In lieu of individual equipment, manufacturer may provide standard digital control panel incorporating functions indicated.

## **2.10 MAIN LINE CIRCUIT BREAKER**

- A. Type: A generator-mounted main line molded case circuit breaker shall be provided as a load circuit interrupting and protection device. It shall operate both manually for normal switching function and automatically during overload and short circuit conditions.

- B. The trip unit for each pole shall have elements providing inverse time delay during overload conditions and instantaneous magnetic tripping for short circuit protection. The circuit breaker shall meet standards established by Underwriters' Laboratories, National Electric Manufacturer's Association, and National Electrical Code.
- C. Generator exciter field circuit breakers will not be accepted for line protection.

## **2.11 AUTOMATIC TRANSFER SWITCH**

- A. The automatic transfer switch shall be supplied by the manufacturer of the engine-generator set. It shall be listed by Underwriters' Laboratories Standard 1008. The manufacturer shall furnish schematic and wiring diagrams for the automatic transfer switch and a typical interconnection wiring diagram for the entire standby system.
- B. The automatic transfer switch shall be rated as indicated and wall mounted in a NEMA 4X enclosure. The transfer switch shall have, but not be limited to, the following characteristics.
  1. Four-position cranking selector: Auto, Hand, Test, Off.
  2. Time delay on start variable to 120 seconds.
  3. Time delay on shut down variable to 10 minutes.
  4. Time delay on re-transfer variable to 10 minutes.
  5. Auxiliary contacts: four.
  6. Battery charge - two-rate ambient temperature compensated.
  7. Normal and emergency line indicators.
  8. Cabinet locks.
  9. Exerciser: Field settable, to exercise plant on a once-per-week or other schedule, as directed by Owner; adjustable 30 to 50 minutes running time under load.
  10. Maintenance bypass switch
  11. Service entrance rated

## **2.12 EMERGENCY POWER OFF (EPO)**

- A. Provide emergency power off device to comply with NFPA 110, Level 1 Installations.

## **PART 3 – EXECUTION**

### **3.1 INSTALLATION**

- A. Contractor shall lay out all work in advance of construction. Coordinate all field measurements for conduit entry points, piping connections, and auxiliaries and accessories prior to laying out work.
- B. All work shall be neatly arranged and executed in a workmanlike manner.
- C. Provide and install equipment on concrete foundation suitable to support weight of equipment, including all liquids and accessories. Foundation construction, thickness, dimensions and reinforcing shall be in accordance with manufacturer's guidelines and as appropriate for soil conditions at installation location. Foundation shall be level, flat and include provisions for seismic mounting of equipment furnished.
- D. Coordinate with all trades to avoid conflict with the Owner's use of the building and grounds and provide at least 72 hours notice to the Owner prior to running of the engine.
- E. Provide all cutting and patching of the building and the site in accordance with Section 26 05 00 of these specifications.

- F. Make all connections for power, control, fuel and water as required for a complete system, including all plant auxiliaries.
- G. Connect factory-provided auxiliary power load center complete to power source in accordance with manufacturer instructions and NFPA 110 requirements. Include all required raceway, conductors, circuit breakers and associated work. Power source shall be clearly identified in building and at load center utilizing a permanently affixed nameplate indicating serving panelboard, circuit designation and location of panelboard.

### **3.2 FUEL**

- A. Provide all fuel as required for startup, testing and training.
- B. Upon completion of startup, testing and training, Contractor shall fill tank with fuel to rated capacity.

### **3.3 START-UP**

- A. A factory-trained technician, in the full-time employ of the engine generator supplier, shall be present at initial start-up of the emergency system and operational tests shall be performed at that time. The Engineer and/or Architect reserve the right to be present during such tests. Prior to start-up, the engine generator supplier shall furnish the necessary engine oil and antifreeze and make all adjustments necessary to make the entire system operational. In addition to start-up, the generator representative shall instruct the Owner's operating personnel in proper operation and care of the unit, along with supplying complete operating and maintenance manuals.
- B. After installation is complete and normal power is available, a factory approved technician shall perform a four (4) hour loadbank test at 1.0 power factor at full nameplate rating. Include loadbank, cabling and all associated equipment and work as required for this test.

### **3.4 TRAINING**

- A. Provide a minimum of four (4) hours on-site training of Owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, service and testing procedures and emergency service procedure.

**END OF SECTION 26 32 13**



## SECTION 26 43 13

### SURGE PROTECTION DEVICES

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The following apply to the work under this section:
  - 1. Section 26 05 00, Electrical, General
  - 2. Section 26 20 00, Wiring Systems

##### 1.02 SCOPE

- A. Provide an operational surge suppression system for protection of selected sections of facility's AC Distribution System utilizing Surge Protective Devices (SPDs).
- B. Provide all labor, materials and equipment as required for a complete and operational surge protection system.

##### 1.03 APPLICABLE CODES AND STANDARDS

- A. In addition to the codes and standards listed in Section 26 05 00, the latest editions of the following codes and standards apply to this work:
  - 1. UL 1449, Fourth Edition; UL 1283, Fifth Edition
  - 2. ANSI/IEEE C62.41, C62.45, C62.62, C62.72 – Surge Protective Devices
  - 3. MIL-STD 220A - Electrical Line Noise Attenuation
  - 4. NFPA 70, Article 285 – Surge-Protective Devices (SPDs), 1kV or Less
  - 5. UL96A – Requirements for Master Label Certificates (Lightning Protection)
  - 6. IEEE 1100 (Emerald Book)

##### 1.04 WARRANTY

- A. Provide a minimum full five-year manufacturer's warranty against failure for each unit installed.

#### PART 2 – PRODUCTS

##### 2.01 MATERIALS/CONSTRUCTION

- A. SPDs shall be of solid state, hybrid, parallel circuit design; series elements will not be accepted.
- B. SPDs shall protect all modes: L-L, L-N, L-G (N-G where applicable).
- C. The SPD shall be marked with a Short Circuit Current Rating (SCCR), which shall be greater than available fault current at the connection point in the system. Comply with National Electric Code, Article 285, Section 6.
- D. Service entrance SPDs shall incorporate hybrid 2-tier design utilizing metal oxide varistors and filter capacitors. Units shall contain modular, field replaceable surge devices and shall incorporate integral disconnection means and internal fusing to allow direct connection to switchgear bussing.

- E. Distribution and Branch Circuit SPDs shall incorporate hybrid 2-tier design utilizing metal oxide varistors and filter capacitors.
- F. Response time of all suppression components shall be equal to or less than one (1) nanosecond as measured with 6-inch lead length.
- G. The device shall provide a joule rating that meets or exceeds ANSI/IEEE C62.41 Category C requirements.
- H. SPDs shall have indicator status lights that monitor the operational status of the device.
- I. All SPDs with the exception of point of use models shall include form C contacts for remote monitoring.
- J. SPDs shall have a pulse life equal to or greater than 1,000 sequential ANSI/IEEE Category C waveforms. Submit certified test reports if requested by Engineer.
- K. The TVSS surge current capacity of each SPD shall be equal to or greater than:

		Phase	Mode
Service Entrance	277/480 v.	400K	200K

- L. The SPD suppression (clamping) voltage, in accordance with UL 1449, Fourth Edition, shall not exceed:

		L-L	L-N	L-G	N-G
Service Entrance	277/480 v.	2000	1200	1200	1200
	120/240 v.	1200	900	800	700
	120/208 v.	1200	900	800	700
Distribution Panel	277/480 v.	2000	1200	1200	1200
	120/240 v.	1000	700	700	800
	120/208 v.	1000	700	700	800
Branch Circuit Panel	277/480 v.	2000	900	800	700
	120/240 v.	1000	700	700	800
	120/208 v.	1000	700	700	800
Point of Use (120 v. outlet)			400	400	400

- M. SPDs shall be stand alone type. SPDs integral to switchgear or panelboards are not permitted.
- N. SPD Short Circuit Current Rating (SCCR) shall exceed the available short circuit current at the point of attachment.

- O. SPD Devices shall meet UL Certification code VZCA and listed as Suitable for LPS or TVSS/Arrester as designated by UL.

## **2.02 MANUFACTURERS**

- A. Current Technology, Thor Systems, LEA International or Liebert. No substitutions permitted.
- B. All SPD devices shall be from the same manufacturer.

## **PART 3 – EXECUTION**

### **3.01 INSTALLATION**

- A. Provide SPDs at panelboards, as indicated.
- B. For service entrance SPDs, provide lugs on gear bussing to allow direct connection.
- C. Install strictly in accordance with manufacturer's recommendations. Wire lead length shall be equal to or less than manufacturer's recommended lengths and shall be kept as straight as possible.
- D. Provide overcurrent protection in current ratings and number of poles per manufacturer's instructions and in accordance with the National Electrical Code.

**END OF SECTION 26 43 13**

## SECTION 26 51 00

### LIGHTING SYSTEMS

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS

- A. The following apply to the work under this section:
  - 1. Section 26 05 00, Electrical, General
  - 2. Section 26 20 00, Wiring Systems

##### 1.02 SCOPE

- A. Provide lighting fixtures, fixture assemblies, controls and appurtenances as indicated on drawings and as required, complete with the required lamps, power supplies, drivers, hangers, escutcheons, end caps, spacers, foundations and structural supports to make a complete, safe and operable system.

#### PART 2 – PRODUCTS

##### 2.01 LIGHTING FIXTURES

- A. Fixtures scheduled in drawings indicate the type and quality of equipment which will be accepted. Substitutions may be considered on the basis of equal LED, lens and driver quality, structural rigidity, and performance.
- B. Fixtures scheduled generally include metal or acrylic louvers and lenses. The intent of these specifications is that 100% virgin acrylic material be furnished where indicated. Copolymer and polystyrene lens materials will not be accepted. Lenses may be subjected to test on the job by the Engineer. Where prismatic lenses are scheduled, minimum thickness shall be 0.125 inch.
- C. Metal Parts:
  - 1. Free of burrs and sharp corners and edges
  - 2. Sheet metal components shall be steel unless otherwise indicated.
  - 3. Form and support to prevent warping and sagging
  - 4. Variations in finishes are unacceptable in the same piece.
- D. All doors, frames and other internal access shall be smooth operating, free of light leakage under operating conditions and designed to permit minor servicing without use of tools. Fixtures shall be designed to prevent doors, frames, lenses, diffusers and other components from falling accidentally during servicing and when secured in operating position.
- E. Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. Luminaires and LED assemblies shall be labeled vibration and shock resistant.
- F. All electrical components, devices and accessories shall be listed and labeled as defined in NFPA 70.

##### 2.02 LAMPS

- A. LED luminaires/lamps shall have an average rated life of 50,000 hours minimum (L70).

### LIGHTING SYSTEMS

- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- C. Minimum CRI shall be 80 for all LED luminaires and lamps.
- D. Color temperature for all lamps shall be as indicated on drawings.

### **2.03 POWER SUPPLIES AND DRIVERS**

- A. Power supplies and drivers shall be provided to suit the voltage applied, regardless of whether fixture catalog numbers shown in drawings include designation of voltage or not.
- B. Power supplies and drivers shall be compatible for use with controls furnished.

### **2.04 OUTDOOR**

- A. Luminaires shall be weatherproof and shall be of multiple enclosed type for lamps with distribution as indicated. The luminaire shall permit easy access for LED assembly and driver servicing. Glass refractors where specified shall be resistant to thermal shock. LED luminaires shall be provided with a surge protected driver with rating, to suit the lamp and circuit specified, and mounted integrally in the luminaire. Wiring of luminaires shall be internal and rated at 600 volts. Floodlights shall be of the enclosed type conforming to NEMA FA 1 and shall be Class HD, heavy duty, NEMA type and beam spreads as indicated.
- B. Brackets and Supports: Brackets and supports shall be steel or aluminum and conform to NEMA SH 7 or NEMA SH 5, as applicable, with mountings as indicated.

## **PART 3 – EXECUTION**

### **3.01 INSTALLATION**

- A. Comply with NECA 1.
- B. Install luminaires level, plumb and square with ceilings and walls.
- C. Provide lamps/lamp assemblies in each luminaire.

### **3.02 EXTERIOR LIGHTING SYSTEMS**

- A. For underground circuits serving outdoor fixtures, cables shall be in accordance with the requirements of NFPA 70 and Section 26 20 00. If paving is already in place, galvanized steel pipes shall be driven under it. Where conduit installed underground is indicated, the conduit shall be Schedule 40 PVC conduit or IMC or GRS. If IMC or GRS conduit is utilized, it shall be field coated with a coal tar base conforming to MIL-C-18480, per Section 26 20 00.
- B. Non-current-carrying parts of outdoor lighting assemblies shall be grounded. The ground conductor shall be soft-drawn copper, having a current capacity of at least 20 percent of that of the largest conductor to which it is connected, but not smaller than No. 6 AWG and not smaller than indicated. Ground conductors shall be connected to a 3/4" x 10' copper-clad steel ground rod driven at least 11 feet into the ground approximately 3 feet out from the base of the pole. After installation is completed, top of the ground rod shall be approximately 1 foot below finished grade. All ground connections shall be made with direct-burial, solderless connectors or by the molded fusion-welding process.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Operational Test: After installing luminaires, controls and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- B. Luminaire will be considered defective if it does not pass operational tests and inspections.
- C. All damaged fixtures or lenses shall be replaced with new. In lieu of replacement, minor scratches on exterior poles may be touched up with manufacturer provided touch-up paint if approved by Architect.
- D. Adjust all aiming to illuminate pump control equipment.

**END OF SECTION 26 51 00**

## **SECTION 31 00 00**

### **EARTHWORK**

#### **PART 1 GENERAL**

##### **1.01 SCOPE**

- A. This Section includes earthwork and related operations, including, but not limited to dewatering, excavating all classes of material encountered, pumping, draining and handling of water encountered in the excavations, handling, storage, transportation and disposal of all excavated and unsuitable material, construction of fills and embankments, backfilling around structures, compacting, all sheeting, shoring and bracing, preparation of subgrades, surfacing and grading and any other similar, incidental or appurtenant earthwork operations which may be necessary to properly complete the work.
- B. The Contractor shall provide all services, labor, materials and equipment required for all earthwork and related operations, necessary or convenient to the Contractor, for furnishing complete work as shown on the Drawings or specified in these Contract Documents.

##### **1.02 RELATED SECTIONS**

- A. Section 00 21 13 – Instructions to Bidders
- B. Section 01 45 29 – Testing Laboratory Services
- C. Section 31 10 00 - Site Preparation
- D. Section 31 22 00 – Grading
- E. Section 31 22 16 - Excavation
- E. Section 31 25 00 - Erosion and Sedimentation Control

##### **1.03 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 and the Contractor shall become satisfied as to the exact quantities of excavation and fill required.
- B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.
- C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.
- D. The Contractor shall 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 fire hydrants and meters.
- E. Tests for compaction and density shall be conducted by an independent testing laboratory selected in accordance with Section 01 45 29 of these Specifications.

1. The soils testing laboratory is responsible for the following:
  - a. Field compaction testing shall be based on using the maximum dry density determined by the Standard Proctor Compaction Test in accordance with ASTM D 698.
  - b. Determination of in-place backfill density shall be done in accordance with ASTM D 1556, "Density and unit weight of Soil In Place by the Sand-Cone Method", ASTM D 2937, "Density of Soil In Place by the Drive-Cylinder Method" or ASTM D 2922, "Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)".
  - c. Field density tests for each lift; one test for each 5,000 square feet of fill or minimum one test per lift.
  - d. Inspecting and testing stripped site, subgrades and proposed fill materials.
2. Contractor's duties relative to testing include:
  - a. Notifying laboratory of conditions requiring testing.
  - b. Coordinating with laboratory for field testing.
  - c. Providing representative fill soil samples to the laboratory for test purposes. Provide 50 pound samples of each fill soil.
3. Inspection
  - a. Earthwork operations, suitability of excavated materials for fill and backfill and placing and compaction of fill and backfill is subject to inspection. Engineer will observe earthwork operations.
  - b. Foundations and shallow spread footing foundations are required to be inspected by an engineer to verify suitable bearing and construction.

F. All earthwork operations shall 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 and shall be conducted in a manner acceptable to the Engineer.

G. It is understood and agreed that the Contractor has made 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. The Contractor shall be responsible for providing all services, labor, equipment and materials necessary or convenient to the Contractor for completing the work within the time specified in these Contract Documents.

H. Safety

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P "Excavation, Trenching & Shoring" as described in OSHA publication 2226.



## PART 2 PRODUCTS

### 2.01 SOILS CLASSIFICATIONS

Bedding materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D 2487, Standard Method for Classification of Soils for Engineering Purposes. (See below for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application:

- A. Class I - Angular, 1/4 to 1 1/2 inches (6 to 40 mm) graded stone, including such as coral, slag, cinders, crushed shells and crushed stone. Note - The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 1/4 inch (6 mm) and the gradation properly designed to limit the size of the voids.
- B. Class II - Coarse sands and gravels with maximum particle size of 1 1/2 inch (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. Note - Sands and gravels which are clean or borderline between clean and with fines should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and foundation.
- C. Class III - Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types SM, GC, SM and SC are included in this class.
- D. Class IV - Silt, silty clays and clays, including inorganic clays and silts of not to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. Note- Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.
- E. Class V - This class includes the organic soils OL, OH and PT as well as soils containing frozen earth, debris, rocks larger than 1 1/2 inch (40 mm) in diameter and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

## DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS

SOIL CLASS	SOIL TYPE	DESCRIPTION MATERIAL CLASSIFICATION
Class I Soils *	---	Manufactured angular, granular material, 3/4 to 1-1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone, or rock, broken coral, crushed slag, cinders, or crushed shells.
Class II Soil **	GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean
	SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SP	Poorly graded sands and gravelly sand, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
Class III Soil ***	GM	Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 200 sieve.
	GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	SM	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
	SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
Class IV Soils	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
Class V Soils	OL	Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or less. 50% or more passes No. 200 sieve.
	OH	Organic clays of medium to high plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve.

PT Peat, muck and other highly organic soils.

\* Soils defined as Class I materials are not defined in ASTM D2487.

\*\* In accordance with ASTM D2487, less than 5% pass No. 200 sieve.

\*\*\* In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g. GP-GC.

## **2.02 FILL MATERIAL**

- A. Sand Fill: Material shall consist of a clean sand with a fineness modulus of 1.6 to 3.1 and containing not more than 10 percent by weight finer than No. 200 U.S. Standard Sieve.
- B. Earth Fill: Material shall consist of inorganic material free of roots, cobbles and boulders and classified as SM, ML, SC, or CL by ASTM D2487-85 "Standard Methods for Classification of Soils for Engineering Purposes". Earth Fill shall also conform to the following:
  - 1. Liquid Limit = 50 maximum
  - 2. Plasticity Index = 20 maximum
  - 3. Dry Unit Weight = 90 pcf minimum maximum density

## **2.03 UNSUITABLE SITE FILL MATERIAL**

- A. Material which does not conform to the above classifications (soil classification SP, SW.GM, CH, MH, OH, OL and PT) may be used as Site Fill material in areas identified on the drawings as "spoil areas", in areas with no structures and or roads and other non-critical areas.

## **2.04 SHEETING, BRACING AND TIMBERING**

- A. Sheeting, Bracing and Timbering: The Contractor shall furnish, place and maintain all sheeting, bracing and timbering required to properly support trenches and other excavations in open cut and to prevent all movement of the soil, pavement, structures, or utilities outside of the trench or pit.
  - 1. General
    - a. Cofferdams and bracing design, including computations, shall be prepared before commencing construction operations. Drawings and design computations shall be signed and sealed by a professional engineer registered in the State of South Carolina. The drawings and design computations shall be submitted to the Engineer for informational purposes only.
    - b. Sheeting, bracing and timbering shall be so placed as to allow the work to be constructed to the lines and grades shown on the Drawings and as ordered by the Engineer.
    - c. If at any time the method being used by the Contractor for supporting any material or structure in or adjacent to any excavation is not reasonably safe, the Contractor shall provide additional bracing and support necessary to furnish the added degree of safety.
    - d. All sheeting in contact with the concrete or masonry shall be cut off as directed by the Engineer and left in place.
  - 2. Timber: Timber may be substituted for steel sheet piling when approved by the

Engineer. Timber for shoring, sheeting or bracing shall be sound and free of large or loose knots and in good condition. Size and spacing shall be in accordance with OSHA regulations.

3. Steel Sheet Piling: Steel sheet piling shall be the continuous interlock type. The weight, depth and section modulus of the sheet piling shall be sufficient to restrain the loads of earth pressure and surcharge from existing foundations and/or live loads. Procedure for installation and bracing shall be so scheduled and coordinated with the removal of the earth that the ground under existing structures shall be protected against lateral movement at all times. The Contractor shall provide closure and sealing between sheet piling and existing facilities. Steel piling shall be removed, unless otherwise directed by the Engineer.
4. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the structures and adjacent property. Leave sheeting in place when, in the opinion of the Engineer, it cannot be safely removed. Cut off sheeting left in place at least two feet below the surface.

## 2.05 FILTER FABRIC

- A. Filter fabric associated with bedding shall be a UV stabilized, spunbonded, continuous filament, needle punched, polypropylene, nonwoven geotextile.
- B. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

Fabric Property	Unit	Test Procedure	Average Value	
			Typical	Minimum
Weight	oz/yd <sup>2</sup>	ASTM D 3776	8.3	
Thickness	mils	ASTM D 1777	105	
Grab Strength	lbs.	ASTM D 4632	240	210
Grab Elongation	%	ASTM D 4632	>50	50
Tear Strength	lbs.	ASTM D 4533	100	85
Mullen Burst	psi	ASTM D 3786	350	320
Puncture Resistance	lbs.	ASTM D 4833	115	100
Permittivity	sec <sup>-1</sup>	ASTM D 4491	1.7	
Water Permeability	cm/sec	ASTM D 4491	0.4	
Water Flow Rate	gpm/ft <sup>2</sup>	ASTM D 4491	120	
UV Resistance (500 hrs)	%	ASTM D 4355	>85	
PH			2 - 13	

- C. Filter fabric shall be Polyfelt TS 700, Trevira 1125, SuPac 7-MP or approved equal.

## 2.06 CONCRETE

Concrete for initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. 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. Safety: Comply with local regulations and with the provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc., Occupational Safety and Health Act and all other applicable safety regulations.
- B. Topsoil
  - 1. Remove all topsoil to a depth at which subsoil is encountered, from all areas under buildings, pavements and from all areas which are to be cut to lower grades or filled.
  - 2. With the Engineer's approval, topsoil to be used for finish grading may be stored on the site.
  - 3. Other topsoil may be used for fill in non-critical areas with approval of the Engineer.
  - 4. Properly dispose of all excess topsoil in the designated area.
- C. Bracing and Sheeting
  - 1. Furnish, put in place and maintain all sheeting, bracing and shoring as may be required to properly support the sides of all excavations and to prevent all movement of earth which could in any way injure the work, adjacent property or workers.
  - 2. Properly support all excavations where necessary to conform to all pertinent rules and regulations and these Specifications, even though, such locations are not indicated on the Drawings.
  - 3. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of the excavation faces being supported and damage to the work and adjacent property.
  - 4. Do not leave any sheeting or bracing in the trench or excavation after completion of the work, unless approved by the Engineer.
- D. Obstructions
  - 1. Remove and dispose of all boulders, sidewalks, driveways, pavement, pipes and the like, as required for the performance of the work.
  - 2. Exercise care in excavating around catch basins, inlets and manholes so as to not disturb or damage these structures.
  - 3. Avoid removing or loosening castings or pushing dirt into catch basins, inlets and manholes.
  - 4. Damaged or displaced structures or casting shall be repaired, replaced and dirt entering the structures during the performance of the work shall be removed at no additional cost to the Owner.
- E. Utilities to be Abandoned
  - 1. When pipes, conduits, sewers, or other structures are removed from the trench, leaving dead ends in the ground, such ends shall be fully plugged or sealed with brick

and non-shrink grout.

2. Abandoned structures such as manholes or chambers shall be entirely removed.
3. All materials from abandoned utilities shall be removed from the site.
4. All salvageable materials shall become the property of the Owner.
5. All equipment to be salvaged is noted in the Specifications and shall be turned over to the Owner at a designated location.

F. Extra Earth Excavation

1. In case soft or excessively wet material which, in the opinion of the Engineer, is not suitable, is encountered below the final subgrade elevation of an excavation or underneath a structure, the Engineer may order the removal of this material and its replacement with crushed stone, filter fabric, or other suitable material in order to make a suitable foundation for the construction of the structure.

G. Cutting Paved Surfaces and Similar Improvements

1. Remove existing pavement as necessary for installing pipe utilities and appurtenances or as otherwise shown on the Drawings.
2. Before removing any pavement, mark the pavement neatly, paralleling pipe lines and existing street lines. Space the marks the width of the trench.
3. Break asphalt pavement along the marks using rotary saws or other suitable tools. Break concrete pavement along the marks by use of scoring with a rotary saw and breaking below the score by the use of jackhammers or other suitable tools.
4. Do not pull pavement with machines until completely broken and separated from pavement to remain.
5. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement. No additional payment will be made for removing and replacing damaged adjacent pavement.
6. Remove and replace sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.
7. The Contractor may tunnel under curbs that are encountered. Remove and replace any curb disturbed by construction to the nearest undisturbed joint.

### 3.02 EXCAVATION

A. Method

1. All excavation shall be by open cut from the surface except as indicated on the Drawings.
2. All excavations for pipe appurtenances and structures shall be made in such a manner and to such depth and width, as will give ample room for building the structures and for bracing, sheeting and supporting the sides of the excavation, for pumping and draining groundwater which may be encountered and for the removal from the excavation of all materials excavated.

3. Take special care so that the soil below the bottom of the structure to be built is left undisturbed.
- B. Grades: Excavate to grades indicated on the Drawings. Where excavation grades are not indicated on the Drawings, excavate as required to accommodate installation.
- C. Disposal of Excavated Material
1. Remove and properly dispose of all excavated material not needed to complete filling, backfilling and grading.
  2. Dispose of excess earth and rock excavated materials at locations on-site designated by the Engineer. Off-site disposal of all other material shall be and in accordance with all requirements of federal, state, county and municipal regulations. No debris of any kind shall be deposited in any stream or body of water, or on any street. No debris shall be deposited on any private property, except by written consent of the property owner. In no case shall any material be shoved onto abutting private properties, or be buried in embankments or trenches on the Project.

### **3.03 EXCAVATING FOR STRUCTURES**

- A. Earth Excavation: Earth excavation shall include all substances to be excavated other than rock. Earth excavation for structures shall be to limits not less than two feet outside wall lines, to allow for formwork and inspection and further as necessary to permit the trades to install their work. All materials loosened or disturbed by excavation shall be removed from surfaces to receive concrete or crushed stone.
- B. Excavation for Foundations: Footings and slabs on grades shall rest on undisturbed earth, rock or compacted materials to insure proper bearing.
1. Unsuitable Foundation Material: Any material, in the opinion of the Engineer, which is unsuitable for foundation shall be removed and replaced with compacted crushed stone, or with compacted fill material as directed by the Engineer. No determination of unsuitability will be made until all requirements for dewatering are satisfactorily met.
  2. Pipe Trenches Beneath Structures: Where piping or conduit passes beneath footings or slabs resting on grade, trenches shall be excavated to provide a minimum 6-inch clearance from all surfaces of the pipe or conduit. The trench shall be backfilled to the base of the structure with concrete.
  3. Unauthorized Excavation: Care shall be taken that excavation does not extend below bottom levels of footings or slabs on earth. Should the excavation, through carelessness or neglect, be carried below such levels, the Contractor shall fill in the resulting excess excavation with concrete under footings and compacted crushed stone or other approved material under slabs. Should excavation be carried beyond outside lines of footings such excess excavation shall be filled with concrete, or formwork shall be provided, as directed by the Engineer.
- C. Unsuitable Bearing
1. If suitable bearings for foundations are not encountered at the elevations indicated on the Drawings, immediately notify the Engineer.
  2. Do not proceed further until instructions are received.

### **3.04 DEWATERING REQUIREMENT**

- A. The Contractor may use any dewatering method he deems feasible so long as it results in working in the dry and stable soil conditions.
- B. The Contractor shall conform and meet all conditions, obtain necessary permits and requirements of the regulatory agencies that have jurisdiction.
- C. It is the intent of these specifications that an adequate dewatering system be installed to lower and control the groundwater in order to permit excavation, construction, grading and the placement of fill materials, all to be performed under dry conditions. The dewatering system shall be adequate to pre-drain the water-bearing strata above and below the bottom of the excavation.
- D. The Contractor shall be solely responsible for the arrangement, location and depths of dewatering system necessary to accomplish the work described under this section of the specifications. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head below any excavation to the extent that the water level in the construction area are a minimum of three (3) feet below the prevailing excavation surface and any surface to be compacted; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.
- E. The Contractor shall promptly dispose of all water removed from the excavations in such a manner as will not endanger public health, damage public or private property, or affect adversely any portion of the work under construction or completed by him or any other Contractor. Contractor shall obtain written permission from the Owner for any property involved before digging ditches or constructing water courses for the removal of water.
- F. The disposal of water from the dewatering system shall meet the requirements of all regulatory agencies having jurisdiction.
- G. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation strata, or instability of the slopes, or damage to the foundations or structures may occur. The supply of all labor and materials and the performance of all work necessary to carry out additional work for reinstatement of the structures of foundation soil resulting from such inadequacy or failure shall be undertaken by the Contractor subject to the approval of the Engineer and at no additional expense to the Owner.

### **3.05 COMPACTION**

- A. Fill materials supporting roadways, parking areas, sidewalks, structures and buildings and backfill around structures shall be compacted to 95 percent of the standard proctor density. The top 12-inches of fill materials supporting structures or pavement shall be compacted to 98 percent of the standard proctor density. Fill placed for general site grading shall be compacted to 90 percent of the standard proctor density.
- B. Compaction of embankments shall be by vibratory sheepsfoot or pad-foot rollers with staggered, uniformly spaced knobs and suitable cleaning devices. The projected area of each knob and the number and spacing of the knobs shall be such that the total weight of the roller and ballast when distributed over the area of one row of knobs shall be 250 psi. Placement and compaction of materials shall extend at least 5 feet beyond the final contours sufficiently to insure compaction of the material at the resulting final surface. Final contours shall then be achieved by a tracked bulldozer shaping the face of the embankment.
- C. Compaction of backfill next to walls shall be accomplished with hand-powered tamping



equipment. The backfill shall be placed in 8-inch maximum lifts, with each lift compacted to 95 percent of standard proctor density.

- D. If tests indicate that density of fill is less than that specified, the area shall be, as directed by the Engineer, either recompacted or undercut, filled and compacted until specified density is achieved.

### **3.07 FILL**

#### **A. Controlled Fill**

1. The fill for roadways, parking areas, walks, structures and building slabs on grade shall be controlled fill.
2. After the existing ground or excavated area has been proofrolled and examined by the Engineer, all holes and other irregularities shall be filled and compacted before the main fill is placed.
3. The fill shall be placed in even layers not exceeding 8-inches in depth and shall be thoroughly compacted as herein specified.
4. If an analysis of the soil being placed shows a marked difference from one location to another, the fill being placed shall not be made up of a mixture of these materials.
5. Each different type of material shall be handled continuously so that field control of moisture and density may be based upon a known type of material.
6. No fill shall be placed following a heavy rain without first making certain on isolated test areas that compaction can be obtained without damage to the already compacted fill.

#### **B. Proofrolling**

1. All areas where roadways, parking areas, sidewalks, structures and buildings are to be constructed on cut areas, compacted fill and other areas where indicated on the Drawings, shall be proofrolled to detect soft spots prior to the placement of fill material or building foundations.
2. Proofrolling shall be performed using a fully loaded tandem-axle dump truck 20 tons or other suitable pneumatic tired equipment over the subgrade before the subgrade is shaped.
3. Proofrolling shall be witnessed by the Engineer.
4. Subgrade shall be proofrolled with 10 overlapping passes of the roller. Depressions that develop during the proofrolling operation shall be filled with suitable material and those filled areas shall be proofrolled with six passes of the roller. If, after having been filled and proofrolled, the subgrade areas that still "pump" or "rut", shall be further evaluated by a geotechnical engineer and remedial work be determined based on the conditions found at locations under structures or pavement. The contractor shall execute remedial work determined by the geotechnical engineer to achieve a subgrade acceptable to the Engineer.
5. After the proofrolled subgrade has been accepted by the Engineer, the surface of the subgrade shall be finish rolled with a smooth steel wheel roller weighing not less than 10 tons. Finished surface of the subgrade shall be within a tolerance of 1/4-inch at every point.

6. Conduits, pipes, culverts and underdrains shall be neither disturbed nor damaged by proofrolling operations. Rollers shall neither pass over, nor approach closer than five feet to, conduits, pipes, culverts and underdrains unless the tops of those products are deeper than three feet.

C. Placement

1. Prior to placement of any material in embankments, the area within embankment limits shall be stripped of topsoil and all unsuitable materials removed in accordance with this Section. The area shall then be scarified to a depth of at least 6-inches.
2. Fill materials shall be placed in continuous, approximately horizontal layers extending the full width of the embankment cross-section and the full dimension of the excavation where practical and having an uncompacted thickness of not over 8-inches.

D. Final Grading: Upon completion of construction operations, the area shall be graded to finish contour elevations and grades shown on the Drawings. Graded areas shall be made to blend into conformation with remaining ground surfaces. All surfaces shall be left smooth and free to drain.

E. Excess Material: Surfaces and slopes of waste fills shall be left smooth and free to drain.

F. Moisture

1. Fill materials shall be placed at optimum moisture content within practicable limits, but not less or more than two percent of optimum. Optimum moisture shall be maintained by sprinkling the layers as placed or by allowing materials to dry before placement.
2. If fill material is too wet, provide and operate approved means to assist the drying of the fill until suitable for compaction.
3. If fill material is too dry, provide and operate approved means to add moisture to the fill layers.

### 3.08 BACKFILLING

A. Backfill carefully to restore the ground surface to its original condition. Dispose of excess material in accordance with this Section.

B. Compact backfill underlying roadways, parking areas, sidewalks, structures and buildings in accordance with the requirements of Article 3.06 of this Section.

C. Backfilling Around Structures

1. General

- a. Remove debris from excavations before backfilling.
- b. Do not backfill against foundation walls until so directed by the Engineer nor until all indicated perimeter insulation and/or waterproofing is in place.
- c. Protect such insulation and/or waterproofing during filling operations.
- d. Do not backfill against water retaining structures until successful leakage

tests have been completed.

- e. Wherever possible, backfilling shall be simultaneous on both sides of walls to equalize lateral pressures.
  - f. Do not backfill against walls until all permanent construction is in place to furnish lateral support on both top and bottom of wall.
  - g. Backfilling against walls shall take place after all the concrete in the affected members has attained the specified strengths.
  - h. To prevent excessive lateral pressure on external walls, large compaction equipment shall not be allowed within a zone wall footing.
2. Materials: Backfill material placed against structures built or encountered during the work of this Section shall be suitable fill material. No broken concrete, bricks or similar materials will be permitted as backfill.

### **3.09 GRADING**

- A. General: Perform all rough and finish grading required to attain the elevations indicated on the Drawings. Perform finish grading to an accuracy of  $\pm 0.10$  foot.
- B. Treatment After Completion of Grading
  - 1. After grading is completed, permit no further excavation, filling or grading, except with the approval of the Engineer.
  - 2. Use all means necessary to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

### **3.09 SETTLEMENT**

- A. The Contractor shall be responsible for all settlement of backfill, fills and embankments which may occur within one year after final acceptance of the Work by the Owner.
- B. The Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

### **3.13 CLEAN-UP**

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

**SECTION 31 10 00**  
**SITE PREPARATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of built site elements.
- B. Clearing and protection of vegetation.
- C. Removal of existing debris.

**1.02 RELATED SECTIONS**

- A. Section 31 25 00 - Erosion and Sedimentation Control.
- B. Section 01 74 19 - Waste Management: Limitations on disposal of removed materials; requirements for recycling.
- C. Section 31 11 00- Clearing and Grubbing.
- D. Section 31 22 00 – Grading.
- E. Section 31 23 16 - Excavation.
- F. Section 31 23 23.13 – Backfill and Compaction.

**1.03 REFERENCES**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration and Demolition Operations; 2013.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
  - 1. Vegetation removal limits.
  - 2. Areas for temporary construction and field offices.
  - 3. Areas for temporary and permanent placement of removed materials.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**1.05 PROJECT CONDITIONS**

- A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers or other pollution.

- B. Comply with other requirements specified in Section 01 73 00.

## **PART 2 PRODUCTS – NOT USED**

## **PART 3 EXECUTION**

### **3.01 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least seven (7) days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least three (3) days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

### **3.02 VEGETATION**

- A. Scope: Remove trees, shrubs, brush and stumps in areas to be improved.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Do not remove or damage vegetation beyond the following limits:
  - 1. Limits of Disturbance as illustrated on Construction Drawings
  - 2. 25 feet outside perimeter of pervious paving areas that must not be compacted by construction traffic.
  - 3. Exception: Specific trees and vegetation indicated on drawings to be removed.
  - 4. Exception: Selective thinning of undergrowth specified elsewhere.
- D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
  - 1. Chip, grind, crush or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.

2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
  3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
  4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
  5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- F. Dead Wood: Remove all dead trees (standing or down), limbs and dry brush on entire site; treat as specified for vegetation removed.
- G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

### **3.03 DEBRIS**

- A. Remove debris, junk and trash from site.

### **3.04 WASTE REMOVAL**

- A. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 00 - Waste Management.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

### **3.05 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the overall lump sum bid for this project.

**END OF SECTION**

**SECTION 31 11 00**  
**CLEARING AND GRUBBING**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

- A. Work included: Remove all organic vegetative mater as required to complete the construction as indicated on the construction plans.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
  - 2. Section 01 71 23 - Field Engineering.
  - 3. Section 31 10 00 - Site Preparation.
  - 4. Section 02 41 13 – Existing Wastewater Lagoon Decommissioning and Demolition
  - 5. Section 31 25 00 - Erosion and Sedimentation Control.
  - 6. Section 32 92 00 – Turf and Grasses.

**1.02 QUALITY ASSURANCE**

- A. Use required number of workmen that are properly trained and have experience in the crafts and who are completely familiar with the specified requirements herein and the methods for proper performance of the work specified in this section.
- B. Use the proper equipment that is adequate in size, capacity and numbers to accomplish the work within the timeframe of the Project schedule.
- C. Comply with requirements of governmental agencies having jurisdiction within the Project area.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 AREA INCLUDED**

- A. All areas where new construction is taking place or as illustrated on the plans.

**3.02 PROCEDURES**

- A. Clearing and grubbing: The entire area within the limits described above shall be cleared and grubbed at a minimum depth of 6-inches.
- B. Areas that are to be selectively cleared shall consist of removing vegetation, brush, stumps, etc., from the area. Special care shall be taken to avoid damage to trees that are left. Grubbing will not be required in areas designated for selective clearing.

- C. Removal of trees and shrubs: All trees being taken down must be removed avoiding damage to trees and existing features that are to remain. All parts of the trees being removed are to be completely taken from the site and properly disposed of. Any shrubs or small trees that are undesirable may be selectively removed as directed.
- D. Stumps and roots: All stumps and roots larger than 2-inches in diameter shall be completely removed by grubbing except in areas of building site, parking areas and drives; they must be cut off no less than 18-inches below any subgrade. The area of operation then shall be cleared of resulting debris and matted roots, weeds and other organic matter shall be hauled away from the site. Generally, all material that cannot be compacted to 90-percent maximum density in lawn areas and 95-percent of maximum density elsewhere must be removed.
- E. Protection of trees: Trees that are to remain in place will need to be protected in areas where earthwork cut or fill is eighteen inches or less and in existing parking areas. Contractor must obtain approval from Engineer prior to removal of significant trees covered by local tree ordinances. Existing trees that are remaining in place during and after construction must be protected by constructing barricades around each tree.
- F. Erosion and Sediment Control: Construct and maintain erosion and sediment control devices as illustrated on the construction plans and in accordance with Section 31 25 00 – Erosion and Sedimentation Control of these specifications.

### **3.03 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the lump sum price bid.

**END OF SECTION**



## SECTION 31 23 16

### EXCAVATION

#### PART 1 GENERAL

##### 1.01 WORK REQUIRED BY THIS SECTION

- A. Excavating for Utility Structures, Water and Wastewater Lines

##### 1.02 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Sections in Division 01 of these Specifications.
- B. Section 01 70 00 - Execution Requirements: General requirements for dewatering of excavations and water control.
- C. Section 31 22 00 - Grading.
- D. Section 31 23 23.13 - Backfill and Compaction.
- E. Section 31 23 16.13 – Trenching for Site Utilities.
- F. Section 31 37 00 - Riprap.
- G. Section 31 25 00 - Erosion and Sedimentation Control.

##### 1.03 PROJECT CONDITIONS

- A. Verify that survey benchmarks and intended elevations for the Work are as indicated.
- B. Protect plants, lawns, rock outcroppings and other features to remain.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

##### 1.04 CLASSIFICATION:

- A. Classification: All excavation is unclassified and excavation of every description, regardless of material encountered within the excavation limits of the structure, shall be performed to the lines and grades indicated.

##### 1.05 DEFINITIONS:

- A. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.
- B. Maximum density: Maximum weight in pounds per cubic foot of a specific material.
- C. Optimum moisture: Percentage of water in a specific material at maximum density.
- D. Rock excavation: Excavation of any hard natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels or similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery. To be considered as rock excavation, the material shall be continuous; individual boulders or rocks in soil will not be considered rock excavation.

- E. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be moved by dragline, dredge, or other special equipment, are designated as muck. No extra payment will be made for muck removal.
- F. Unsuitable material: Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technicians. In addition to organic matter, sod, muck, roots and rubbish, highly plastic clay soils of the CH and MH descriptions and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.
- G. Suitable material: Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the Engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SC, SM, ML, CI or as designated in these specifications.
- H. Select material: Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil Classification types SW, SM, GW, or GM or as otherwise approved by the Engineer as select fill. Select material shall contain no stones or rubble larger than 1-1/2 inches in diameter.
- I. Crushed stone (gravel): Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C 33.
- J. Excavation: Excavation is defined as unclassified excavation of every description regardless of materials encountered.

#### **1.06 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with requirements of governmental agencies having jurisdiction
- C. Testing: A testing laboratory, retained by the Contractor and approved by the Owner, will make such tests as are deemed advisable. Test as specified in Section 01 45 29, Testing Laboratory Services.
  - 1. Schedule fill and backfill operations so as to permit a reasonable time for inspection and testing before placing succeeding lifts and keep the laboratory and Engineer informed of progress.
  - 2. Notify the Engineer and allow sufficient time for observation and/or testing of foundation subgrades prior to commencing any work on the exposed excavation.

#### **1.07 JOB CONDITIONS**

- A. If conditions encountered during construction warrant additional removal of unsuitable material below foundation subgrades, then remove unsuitable material and replace it as specified at no additional expense to the Owner.

#### **1.08 PRODUCT HANDLING**

- A. Comply with pertinent provisions of Section 01 60 00.

## **PART 2 PRODUCTS – NOT USED**

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Identify required lines, levels, contours and datum locations.
- B. See Section 31 22 00 - Grading, for additional requirements.
- C. Locate, identify and protect utilities that remain and protect from damage.
- D. Notify utility company to remove and relocate utilities.

#### **3.02 EXCAVATING**

- A. Underpin adjacent structures that could be damaged by excavating work.
- B. Excavate to accommodate new structures and construction operations.
- C. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.
- E. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Cut utility trenches wide enough to allow inspection of installed utilities.
- H. Hand trim excavations. Remove loose matter.
- I. Remove lumped subsoil, boulders and rock up to 1/3 cu yd (0.25 cum) measured by volume.
- J. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; See Section 31 23 23.13 – Backfill and Compaction.
- K. Conform to elevations and dimensions shown within a tolerance of 0.10 feet and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required and for construction observation.
- L. Where earth will stand, shallow footing excavations may be cut to the exact size of the footing.
- M. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- N. Remove excavated material that is unsuitable for re-use from site.
- O. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00 - Grading.

- P. Remove excess excavated material from site.

### **3.03 FOUNDATION SUBGRADES**

- A. Excavate foundations and footings to a level bottom in firm, solid, suitable material.
- B. Take care not to disturb the bottom of the excavation unless further compaction of the subgrade is required.
- C. Notify the Engineer in due time to permit observation of the completed excavation prior to performing work on the foundation subgrade.
- D. Should unsuitable or soft material be encountered at subgrade elevation, remove such material and replace with compacted suitable material or crushed stone from firm earth up to the indicated elevation.
  - 1. In wet excavations or where groundwater is normally present, replace unsuitable material with crushed stone or lean concrete.
  - 2. In dry excavations above the normal groundwater level, replace unsuitable material with compacted suitable material.
  - 3. Unsuitable material shall be removed and replaced at no expense to the Owner.
  - 4. Where rock is encountered at foundation level:
    - a. Use drilling, picking, wedging or similar methods leaving the foundation rock in an entirely solid and unshattered condition.
    - b. Roughen approximately level surfaces to provide satisfactory bond with concrete.
    - c. Cut steps or benches in sloped surfaces to provide satisfactory bond.

### **3.04 DRAINAGE**

- A. Provide drainage and control grading in the vicinity of the work to prevent drainage into the excavation.

### **3.05 ROCK EXCAVATION**

- A. Notify the Engineer upon encountering rock or similar material that cannot be removed or excavated by conventional earth moving or ripping equipment.
- B. Do not use explosives without written permission from the Engineer.
- C. When explosives are permitted, use only experienced powdermen or persons who are licensed or otherwise authorized to use explosives. Store, handle and use explosives in strict accordance with all regulatory bodies and the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc.
- D. The Contractor shall be solely responsible for any damage resulting from the use of explosives.
- E. The Contractor is responsible for securing all permits required in performing this work.

- F. Do not use blasting adjacent to existing buildings or structures. Remove rock at such locations using jack hammers and bull points.

### **3.06 UNAUTHORIZED EXCAVATION**

- A. Excavation of material to depths below the grades indicated unless so directed by the Engineer will be deemed unauthorized excavation.
- B. Backfill and compact unauthorized over excavation at no expense to the Owner.
  - 1. In wet excavations or excavations below normal groundwater elevations: Use crushed stone or lean concrete as directed by the Engineer.
  - 2. In dry excavations above normal groundwater elevations: Use compacted suitable material.

### **3.07 DEWATERING**

- A. Remove all surface and subsurface waters from excavations and maintain the excavation in a dry condition during construction operations.
- B. Maintain the water level below the excavation subgrade during excavation and construction.
  - 1. Material disturbed below the foundation subgrade due to improper dewatering shall be removed and replaced with crushed stone or lean concrete at no expense to the Owner.
  - 2. Use sumps, pumps, drains, trenching or well point system as necessary to maintain a dry excavation.
  - 3. Dewatering by trench pumping will not be permitted if migration of fine grained natural material (running sand) from bottom, side walls or bedding material will occur.
- C. Dispose of water pumped from excavations in storm drains having capacity, canals, trenches or other approved locations.
  - 1. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation.
  - 2. Prevent flooding of streets, roadways, or private property.
  - 3. Provide engines driving dewatering pumps with residential type mufflers.

### **3.08 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

### **3.09 PROTECTION**

- A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.
- D. Unless shown to be removed, locate and protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
- E. If active utility lines are encountered and are not shown on the drawings or otherwise made known to the Contractor, promptly notify the Engineer and take necessary steps to assure that service is not interrupted.
- F. Barricade open holes and depressions occurring as part of this work and post warning lights on property adjacent to or with public access. Operating warning lights during hours from dusk to dawn each day and as otherwise required.
- G. Side slopes: Slope, bench and/or shore sides of excavations and trench walls to maintain stability of the wall or sides. Pile materials obtained from the excavation a minimum of four feet from the edge of the excavation.
- H. Shoring and sheeting: Where necessary, shore and sheet excavations with members of sizes and arrangement sufficient to prevent injury to persons, damage to structures or injurious caving or erosion.
  - 1. Furnish, put in place and maintain such sheeting and bracing as may be required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures from undermining or other damage. Any movement or bulging that may occur shall be corrected immediately by the Contractor. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and compacted.
  - 2. Take all precautions to prevent distress of existing structures because of sheeting installation or removal. Where the removal of sheeting may cause damage to existing or newly constructed structures, such sheeting shall be left in place at no expense to the Owner.
  - 3. All sheeting and shoring operations and maintenance thereof shall be the responsibility of the Contractor.

### **3.10 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the lump sum bid.

**END OF SECTION**

## SECTION 31 23 16.13

### TRENCHING FOR SITE UTILITIES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Backfilling and compacting for underground utilities.

##### 1.02 RELATED REQUIREMENTS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Sections in Division 1 of these Specifications.
- B. Section 01 71 23 - Field Engineering.
- C. Section 31 22 00 - Grading.
- D. Section 31 23 16 - Excavation.
- E. Section 31 23 23.13 – Backfill and Compaction.
- F. Section 33 41 00 - Storm Utility Drainage Piping.

##### 1.03 DEFINITIONS

- A. Subgrade Elevations: Indicated on drawings.

##### 1.04 REFERENCES

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010 (2009).
- B. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.
- C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2012.
- D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012.
- F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.
- G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.
- H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

- I. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
- J. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils; 2010.
- K. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 lb. sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

#### **1.06 DELIVERY, STORAGE AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.
- D. Protect plants, lawns, rock outcroppings and other features to remain.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.

#### **1.07 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity and numbers to accomplish the work in a timely manner.

#### **1.08 JOB CONDITIONS**

- A. Existing utilities:



1. Approximate location of certain underground lines and structures are shown on the plans for information only, other underground lines or structures are not shown.
2. Locate these and other possible unknown utility lines using electronic pipe finder, or other approved means.
3. Locate, excavate and expose all existing underground lines in advance of trenching operations.
4. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these utilities in the execution of his work under this Section.
5. The Contractor shall familiarize himself with the existing conditions and be prepared to adequately care for and safeguard himself and the Owner from damage.

B. Notification of intent to excavate:

1. South Carolina Underground Utility Damage Prevention Act (S.C. Code Ann, 58-35-10, CT-SEQ, Supp. 1978) requires persons to ascertain the location of underground public utility property prior to excavation or demolition in certain situations. The Act also requires such persons to give timely notice of intent to excavate or demolish prior to commencing such operations. Failure to comply could subject the violator to a civil penalty of up to one thousand dollars (\$1,000) for each violation of the Act.
  - a. Notification of intent to excavate may be given by calling this toll free number: 811.

C. Protecting trees, shrubbery and lawns:

1. Trees and shrubbery in developed areas and along the trench line shall not be disturbed unless absolutely necessary and subject to the approval of the Engineer.
  - a. Any such trees and shrubbery necessary to be removed shall be heeled in and replanted.
2. Where trenches cross private property through established lawns, sod shall be cut, removed, stacked and maintained in suitable condition until replacement is approved by the Engineer.
  - a. Topsoil underlying lawn areas shall be removed and kept separate from general excavated materials.

D. Clearing:

1. Perform all clearing necessary for installation of the complete work.
2. Clearing shall consist of removing all trees, stumps, roots, brush and debris in the rights-of-way obtained for the Work.
3. All timber of merchantable size shall remain the property of the Owner and shall be trimmed and cut in such lengths as directed and stacked along the edge of the right-of-way.

4. All other material, including trimmings from above, shall be completely disposed of in a satisfactory manner.
- E. Removing and resetting fences:
1. Where existing fences must be removed to permit construction of utilities:
    - a. Remove such fences and, as the Work progresses, reset the fences in their original location and condition.
    - b. Provide temporary fencing or other safeguards as required to prevent stock and cattle from wandering to other lands.
- F. Restoration of disturbed areas:
1. Restore all areas disturbed by, during or as a result of construction activities to their existing or better condition.
  2. Do not interpret this as requiring replacement of trees and undergrowth in undeveloped sections of the rights-of-way.
- G. Minimizing silting and bank erosion during construction:
1. During construction, protective measures shall be taken and maintained to minimize silting and bank erosion of creeks and rivers adjacent to the work being performed during construction.

## **PART 2 PRODUCTS**

### **2.01 FILL MATERIALS**

- A. General Fill: Subsoil excavated on-site.
1. Graded.
  2. Free of lumps larger than three (3) inches, rocks larger than two (2) inches and debris.
  3. Conforming to ASTM D 2487 Group Symbol CL.
- B. Granular Fill - Fill Type No. 57: Coarse aggregate, conforming to State of South Carolina Highway Department standard.
- C. Granular Fill - Gravel: Pit run washed stone; free of shale, clay, friable material and debris.
1. Graded in accordance with ASTM D 2487 Group Symbol GW.
  2. Graded in accordance with ASTM C 136, within the following limits:
    - a. 2 inch sieve: 100 percent passing.
    - b. 1 inch sieve: 95 percent passing.
    - c. 3/4 inch sieve: 95 to 100 percent passing.
    - d. 5/8 inch sieve: 75 to 100 percent passing.

- e. 3/8 inch sieve: 55 to 85 percent passing.
  - f. No. 4 sieve: 35 to 60 percent passing.
  - g. No. 16 sieve: 15 to 35 percent passing.
  - h. No. 40: 10 to 25 percent passing.
  - i. No. 200: 5 to 10 percent passing.
- D. Granular Fill - Pea Gravel: Natural stone; washed, free of clay, shale and organic matter.
- 1. Grade in accordance with ASTM D 2487 Group Symbol GM.
  - 2. Graded in accordance with ASTM C 136, within the following limits:
    - a. Minimum Size: 1/4 inch.
    - b. Maximum Size: 5/8 inch.
- E. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials and organic matter.
- 1. Grade in accordance with ASTM D 2487 Group Symbol SW.
  - 2. Graded in accordance with ASTM C 136; within the following limits:
    - a. No. 4 sieve: 100 percent passing.
    - b. No. 14 sieve: 10 to 100 percent passing.
    - c. No. 50 sieve: 5 to 90 percent passing.
    - d. No. 100 sieve: 4 to 30 percent passing.
    - e. No. 200 sieve: 0 percent passing.
- F. Topsoil: Topsoil excavated on-site.
- 1. Select.
  - 2. Graded.
  - 3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
  - 4. Acidity range (pH) of 5.5 to 7.5.
  - 5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
  - 6. Conforming to ASTM D2487 Group Symbol OH.

## **2.02 EXCAVATED MATERIALS**

- A. Perform all excavation of every description and of whatever substances encountered to depths indicated or specified.
- B. Pile material suitable for backfilling in an orderly manner at safe distance from banks or trenches to avoid overloading and to prevent slides or cave-ins.
- C. Remove and deposit unsuitable or excess materials as directed by the Engineer.

## **2.03 BACKFILL MATERIALS**

- A. Provide from materials excavated for installation of utility.
  - 1. Select soil material free from organic matter and deleterious substances, containing no rocks or lumps over 2-inches in greatest dimension for backfill up to 12-inches above top of utility being covered.
  - 2. Do not permit rocks larger than 2-inches in greatest dimension in top 6-inches of backfill.

## **2.04 OTHER MATERIALS**

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.
- B. Should the quantity of suitable on-site material be insufficient to complete the work, provide suitable borrow material as approved by the Engineer at no additional expense to the Owner.
- C. Provide select materials from on-site if acceptable material as approved by the Engineer is available on-site. Otherwise, provide approved select material from an off-site source.

## **2.05 SOURCE QUALITY CONTROL**

- A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

### **3.02 PREPARATION**

- A. Identify required lines, levels, contours and datum locations.
- B. See Section 31 22 00 – Grading for additional requirements.
- C. Locate, identify and protect utilities that remain and protect from damage.

- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.
- F. Protect plants, lawns, rock outcroppings and other features to remain.

### **3.03 PROTECTION OF EXISTING UTILITIES AND ADJACENT STRUCTURES**

- A. Existing utilities:
  - 1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.
  - 2. If active utility lines are encountered and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
  - 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
  - 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
  - 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.
  - 6. Locations within streets or highways:
    - a. Comply with the South Carolina Department of Transportation's (SCDOT) "Encroachment Permit" issued for the Work and the South Carolina Department of Transportation's (SCDOT) "A Policy for Accommodating Utilities on Highway Rights-of-Way".
    - b. Take all precautions and comply with all requirements as may be necessary to protect the improvements, including barricades for protection of traffic.
    - c. Keep minimum of one lane open to traffic at all times where utility crosses street or highway.
  - 7. Protection of persons and property:
    - a. Barricade open holes and depressions occurring as part of the Work and post warning lights on property adjacent to or with public access.
    - b. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
    - c. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.

8. Dewatering:
  - a. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains and other approved methods.
  - b. Keep trenches and site construction area free from water.
9. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.
10. Maintain access to adjacent areas at all times.

### **3.04 TRENCHING**

- A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove lumped subsoil, boulders and rock up to 1/3 cu. yd. measured by volume.
- H. Remove excavated material that is unsuitable for re-use from site.
- I. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00.
- J. Remove excess excavated material from site.
- K. Trench Excavation:
  1. Remove all materials of whatever substance encountered.
- L. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.
- M. Open cut:
  1. Excavate for utilities by open cut.
  2. If conditions at the site prevent such open cut and if approved by the Engineer, tunneling may be used.
  3. Short sections of a trench may be tunneled if, in the opinion of the Engineer, the conductor can be installed safely and backfill can be compacted properly into such tunnel.

4. Remove boulders and other interfering objects and backfill voids left by such removals, at no additional cost to the Owner.
  5. Remove wet or otherwise unstable soil incapable of properly supporting the utility, as determined by the Engineer, to depth required and backfill to proper grade with stone bedding material, at no additional cost to the Owner.
  6. Excavating for appurtenances:
    - a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12-inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
    - b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer and at no additional cost to the Owner.
- N. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.
1. Dig to a true grade and to provide a smooth continuous support along the entire length of the pipe line.
  2. Excavate to a width not less than 12 inches greater than the outside diameter of the pipe.
  3. Trench depth shall provide a minimum of 4 feet of cover over the pipe as measured along the pipe centerline.
  4. Where the pipeline crosses creeks, drainage ditches or land subject to flooding, the depth of cover shall be 4' minimum.
  5. Where the pipeline crosses existing gas mains or other utilities, a minimum of 24 inches of separation under the existing utility shall be maintained. Additional depth of excavation as required to maintain separation shall be completed at no additional cost to the Owner.
  6. At any creek, draw, gully, embankment or other place where rough terrain exists, the trench shall be graded to avoid the use of bends or deflections greater than 2-1/2° per joint unless otherwise approved by the Engineer.
    - a. Where changes in direction occur requiring greater than 2-1/2° deflection, field bending of the pipe is to be used with minimum bending radius being no less than 10 times the pipe diameter.
- O. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel.
1. Remove in units when level of backfilling has reached the elevation necessary to protect the utility work and adjacent property.
  2. Shoring at the bottom of trenches over 10-feet deep for sewers 15-inches and larger in size, shall remain in place and be cut off no less than 2-inches above top of pipe, at no additional cost to the Owner.

3. When, in the opinion of the Engineer, other sheeting cannot be safely removed, it shall be left in place and the Contractor will be paid for such sheeting at the prices bid.
  - a. Cut such sheeting off at least 2-feet below finished surface.
  - b. No lumber for sheeting or shoring exceeding that size customarily used will be paid for unless the use of larger sizes has been ordered, in writing, by the Engineer.
- P. Depressions:
  1. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.
  2. Except where rock is encountered, do not excavate below the depth indicated or specified.
  3. Where rock is encountered, excavate rock to a minimum overdepth of 4-inches below the trench depth indicated or specified and to provide 6-inches clearance in any horizontal direction from all parts of the utility and appurtenances.
- Q. Comply with pertinent OSHA regulations in regards to the excavation of utilities.

### **3.05 PREPARATION FOR UTILITY PLACEMENT**

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

### **3.06 BACKFILLING**

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Backfill trenches and excavations immediately after the pipes are laid, unless other protection is directed or indicated.
- C. Select and deposit backfill materials with special reference to the future safety of the pipes.
- D. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.
- E. Surplus material shall be disposed of as directed by the Engineer.
- F. Original surface shall be restored to the approval of the Engineer.
- G. Fill up to subgrade elevations unless otherwise indicated.
- H. Lower portion of trench:



1. Deposit approved backfill and bedding material in layers of 6-inches maximum thickness and compact with suitable tampers to the density of the adjacent soil until there is a cover of not less than 36-inches over sewers and 12-inches over other utility lines.
  2. Take special care in backfilling and bedding operations not to damage pipe and pipe coatings.
- I. Remainder of trench:
1. Except for special materials for pavements, backfill the remainder of the trench with material free from stones larger than 6-inches or 1/2 the layered thickness, whichever is smaller, in any dimension.
  2. Deposit backfill material in layers not exceeding the thickness specified and compact each layer to the minimum density directed by the soil engineer.
- J. Undeveloped areas:
1. Backfill in wooded, swampy or undeveloped areas shall be as specified hereinbefore, except that tamping of the backfill above a level 2-feet over the top of the pipe will not be required.
  2. Mound excavated material neatly over the ditch to provide for future settlements.
- K. Employ a placement method that does not disturb or damage other work.
- L. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- M. Maintain optimum moisture content of fill materials to attain required compaction density.
- N. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- O. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- P. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- Q. Correct areas that are over-excavated.
1. Thrust bearing surfaces: Fill with concrete.
  2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- R. Compaction Density Unless Otherwise Specified or Indicated:
1. Under paving, slabs-on-grade and similar construction: 100 percent of maximum dry density.
  2. At other locations: 95 percent of maximum dry density.
- S. Reshape and re-compact fills subjected to vehicular traffic.

### **3.07 BEDDING AND FILL AT SPECIFIC LOCATIONS**

- A. Use general fill unless otherwise specified or indicated.
- B. Utility Piping:
  - 1. Bedding: Use general fill.
  - 2. Cover with general fill.
  - 3. Fill up to subgrade elevation.
  - 4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
- C. At Pipe Culverts:
  - 1. Bedding: Use general fill.
  - 2. Cover with general fill.
  - 3. Fill up to subgrade elevation.
  - 4. Compact in maximum 8 inch lifts to 95-percent of maximum dry density.

### **3.08 TOLERANCES**

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

### **3.09 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.
- C. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- D. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
- E. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- F. Frequency of Tests:
  - 1. At least one (1) field density test for every fifty (50) linear feet of trench within each lift.

### **3.10 CLEANING**

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

## SECTION 31 23 23.13

### BACKFILL AND COMPACTION

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Filling, backfilling and compacting for structure volume below grade.
- B. Backfilling and compacting for utilities outside the structure to utility main connections.
- C. Filling holes, pits and excavations generated as a result of removal (demolition) operations.

##### 1.02 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Sections in Division 01 of these Specifications.
- B. Document 02 30 00.10 - Geotechnical Data – Geotechnical Exploration Reports
- C. Section 31 22 00 – Grading.
- D. Section 31 23 16 - Excavation.
- E. Section 31 23 16.13 – Trenching for Site Utilities
- F. Section 31 37 00 - Riprap.
- G. Section 31 25 00 - Erosion and Sedimentation Control.
- H. Section 03 30 00 - Cast-in-Place Concrete.

##### 1.03 REFERENCES

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2001 (2004).
- B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.
- C. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2000a.
- D. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2000.
- E. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2002
- F. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 1994(R 2001).
- G. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2006.

### BACKFILL AND COMPACTION

- H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.
- I. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
- J. ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils; 2005.

#### 1.04 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings.
- C. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.
- D. Maximum density: Maximum weight in pounds per cubic foot of a specific material.
- E. Optimum moisture: Percentage of water in a specific material at maximum density.
- F. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be moved by dragline, dredge, or other special equipment, are designated as muck. No extra payment will be made for muck removal.
- G. Unsuitable material: Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technicians. In addition to organic matter, sod, muck, roots and rubbish, highly plastic clay soils of the CH and MH descriptions and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.
- H. Suitable material: Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the Engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SC, SM, ML, CI or as designated in these specifications.
- I. Select material: Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil Classification types SW, SM, GW, or GM or as otherwise approved by the Engineer as select fill. Select material shall contain no stones or rubble larger than 1-1/2 inches in diameter.
- J. Crushed stone (gravel): Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C 33.

#### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 lb (4.5 kg) sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.

### BACKFILL AND COMPACTION

- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

#### **1.06 PROJECT CONDITIONS**

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.

#### **1.07 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with requirements of governmental agencies having jurisdiction.
- C. Testing: A testing laboratory, retained by the Contractor and approved by the Owner, will make such tests as are deemed advisable. Test as specified in Section 01 45 29, Testing Laboratory Services.
  - 1. Schedule fill and backfill operations so as to permit a reasonable time for inspection and testing before placing succeeding lifts and keep the laboratory and Engineer informed of progress.
  - 2. Notify the Engineer and allow sufficient time for observation and/or testing of foundation subgrades prior to commencing any work on the exposed excavation.

#### **1.08 JOB CONDITIONS**

- A. Comply with pertinent provisions of Section 01 60 00 – Product Requirements.

### **PART 2 PRODUCTS**

#### **2.01 SOIL MATERIAL GENERAL**

- A. Soil material used as fill, backfill or subgrade for structures shall consist of suitable material.
  - 1. Provide suitable material free from organic matter and deleterious substances, containing no rocks or lumps over 6 inches in greatest dimension and with not more than 15% of the rocks or lumps larger than 2-1/2 inches in their greatest dimension.
  - 2. Do not permit rocks having a dimension greater than 1 inch in the upper 6 inches of fill or subgrade.

### **BACKFILL AND COMPACTION**

- B. Where select material is indicated on the drawings or specified, use select granular material as defined herein and approved by the Engineer.
- C. Where indicated on the drawings or specified, use gravel or crushed stone as defined herein.
- D. Where indicated on the drawings or otherwise where desired, provide a lean concrete "mud slab" beneath foundations.
- E.
  - 1. Use 2000 psi concrete and a minimum thickness of 2-1/2 inches.
  - 2. With prior approval of the Engineer, a "mud slab" may be substituted for gravel base material except where the gravel base is required for drainage or for use with pressure relief valves.

## **2.02 FILL MATERIALS**

- A. General Fill: Subsoil excavated on-site.
  - 1. Graded.
  - 2. Free of lumps larger than 3 inches (75 mm), rocks larger than 2 inches (50 mm) and debris.
  - 3. Conforming to ASTM D 2487 Group Symbol CL.
- B. Granular Fill- Fill Type #57: Coarse aggregate, conforming to State of South Carolina Highway Department standard.

## **2.03 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Identify required lines, levels, contours and datum locations.

### **3.02 PREPARATION**

- A. Scarify subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### 3.03 FILLING AND BACKFILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 ft (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
  - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated.
- H. Reshape and re-compact fills subjected to vehicular traffic.
- I. Use suitable material for all filling and backfilling operations.
- J. Fill under structures: Deposit suitable material in layers not exceeding 8" in depth and compact each layer using proper equipment.
- K.
  - 1. Do not place rock that will not pass through a 6-inch diameter ring within the top 12" of the surface of the completed fill or rock that will not pass through a 3-inch diameter ring within the top 6 inches of the completed fill.
  - 2. Do not place broken concrete, bricks, or asphaltic pavement in fills.
  - 3. Where indicated on the drawings, provide select granular material.
- L. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
  - 1. Inspection and acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
  - 2. Inspecting, testing, approving and recording locations of underground utilities.
  - 3. Removing concrete formwork.
  - 4. Removing shoring and bracing and backfilling of voids with satisfactory materials.
  - 5. Removing trash and debris.
  - 6. Foundation walls have been in place seven days.
- M. Placing and compacting:
  - 1. Place backfill and fill materials in layers not more than 8 inches in loose depth.

### BACKFILL AND COMPACTION



2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content within  $\pm 2\%$ .
3. Compact each layer to required percentage of maximum density for area.
4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
7. Do not operate heavy equipment closer to foundation or retaining walls than a distance equal to height of backfill above the footing.
  - a. Compact remaining area using power driven hand tampers.
8. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

### **3.04 FILL AT SPECIFIC LOCATIONS**

#### **A. Over Buried Utility Piping, Conduits and Duct Bank in Trenches:**

1. Bedding: Use general fill.
2. Cover with general fill.
3. Fill up to subgrade elevation.
4. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.

#### **B. At Lawn Areas:**

1. Use general fill.
2. Fill up to 6 inches (150 mm) below finish grade elevations.
3. Fill up to subgrade elevations.
4. Compact to 95 percent of maximum dry density.
5. See Section 31 22 00 - Grading for topsoil placement.

### **3.05 COMPACTION REQUIREMENTS**

- A. Compact soils to not less than the following percentages of maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor).
- B. Existing in place subgrade below structures where subgrade has been disturbed by water, improper dewatering, or construction traffic.
  1. Top 12 inches of subgrade: 100%

2. Below top 12 inches of subgrade: 98%
- C. Fill beneath structures and beneath an area extending 10 feet beyond the limits of the foundation:
1. Top 12 inches of subgrade: 100%
  2. Below top 12 inches of subgrade: 98%
- D. Compaction of suitable material used to replace unsuitable material below foundation subgrades:
1. Top 12 inches of subgrade: 100%
  2. Below top 12 inches of subgrade: 98%

### **3.06 BACKFILLING, FILLING AND COMPACTION**

- A. Use suitable material for all filling and backfilling operations.
- B. Fill under structures: Deposit suitable material in layers not exceeding 8 inches in depth and compact each layer using proper equipment.
1. Do not place rock that will not pass through a 6-inch diameter ring within the top 12 inches of the surface of the completed fill or rock that will not pass through a 3-inch diameter ring within the top 6 inches of the completed fill.
  2. Do not place broken concrete, bricks, or asphaltic pavement in fills.
  3. Where indicated on the drawings, provide select granular material.
- C. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
1. Inspection and acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
  2. Inspecting, testing, approving and recording locations of underground utilities.
  3. Removing concrete formwork.
  4. Removing shoring and bracing and backfilling of voids with satisfactory materials.
  5. Removing trash and debris.
  6. Foundation walls have been in place seven days.
- D. Placing and compacting:
1. Place backfill and fill materials in layers not more than 8 inches in loose depth.
  2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content within  $\pm 2\%$ .
  3. Compact each layer to required percentage of maximum density for area.

### **BACKFILL AND COMPACTION**

4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
7. Do not operate heavy equipment closer to foundation or retaining walls than a distance equal to height of backfill above the footing.
  - a. Compact remaining area using power driven hand tampers.
8. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

### **3.07 TOLERANCES**

- A. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations

### **3.08 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Secure the Engineer's construction observation and approval of subgrades and fill layers before subsequent construction is permitted thereon.
- C. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- D. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.
- E. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- F. Frequency of Tests:
  1. At areas to receive paving, at least one field density test for every 5,000 sq.ft. of subgrade area, but not less than three (3) tests.
  2. In each compacted fill layer, one field density test for every 5,000 sq.ft. of overlaying paved area, but not less than three (3) tests.
  3. In fill beneath structures, one field density test for every 2,500 sq.ft. in each layer.
  4. Other tests as deemed necessary by the Engineer
- G. If, the Engineer's opinion based on reports of the testing laboratory, subgrade or fills that have been placed are below specified density, provide additional compacting and testing until specified requirements are met.

1. Additional testing will be provided by the Owner's selected testing laboratory and all costs for the additional testing will be borne by the Contractor.

H. Proofrolling:

1. Upon request by the Engineer, proofroll the subgrade of structure foundations.
  - a. Make not less than three (3) passes of a 25 to 50 ton rubber tired roller over the full area.
  - b. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory material and compacted as specified herein.

**3.09 DEWATERING**

- A. Remove all surface and subsurface waters from excavations and maintain the excavation in a dry condition during construction operations.
- B. Maintain the water level below the excavation subgrade during excavation and construction.
  1. Material disturbed below the foundation subgrade due to improper dewatering shall be removed and replaced with crushed stone or lean concrete at no expense to the Owner.
  2. Use sumps, pumps, drains, trenching or well point system as necessary to maintain a dry excavation.
  3. Dewatering by trench pumping will not be permitted if migration of fine grained natural material (running sand) from bottom, side walls or bedding material will occur.
- C. Dispose of water pumped from excavations in storm drains having capacity, canals, trenches or other approved locations.
  1. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation.
  2. Prevent flooding of streets, roadways, or private property.
  3. Provide engines driving dewatering pumps with residential type mufflers.

**3.10 CLEAN-UP**

- A. Leave unused materials in a neat, compact stockpile.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.
  1. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory material and compacted as specified herein.
- C. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stock

**3.11 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the lump sum bid.

**END OF SECTION**

## SECTION 31 25 00

### EROSION AND SEDIMENTATION CONTROLS

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. Work included: Implement, Protect, Comply and Enforce the Department of Health and Environmental Control approved construction stormwater pollution prevention plan (C-SWPPP) during the construction of this project to reduce soil erosion and siltation to the lowest reasonably achievable level.

##### 1.02 GENERAL

- A. Exercise every reasonable precaution, throughout the life of the project, to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground or roadway surfaces, or other property. Erosion control practices to be used for this project are shown on the drawings and are to conform to South Carolina Department of Environmental Services regulations.

#### PART 2 PRODUCTS

##### 2.01 CRUSHED STONE

- A. Provide #57 crushed stone for project entrance and exit.
- B. Provide #57 crushed stone for temporary sediment barriers around inlets and for temporary stone check dams.

##### 2.02 GRASSING

- A. Comply with Section 32 92 00 – Turf and Grasses.

##### 2.03 SILT FENCE

- A. Posts:
  - 1. Posts shall be self-fastener angle steel, 5' in length.
- B. Woven wire shall conform to the requirements of ASTM A 116, Class I zinc coating for wire. Each woven square shall measure 5.33" X 12". The top and bottom wires shall be 10 gauge. All other wires shall be 12-1/2 gauge.
- C. Filter fabric shall be synthetic fabric as manufactured by Celanese Fibers Co., DuPont, Industrial Netting or approved equal.

##### 2.04 EROSION CONTROL BLANKET

- A. Use erosion control blanket S150 if North American Green, or similar products by profile products, or approved equal.

##### 2.05 RIP-RAP

- A. Comply with Section 31 37 00 - Rip-Rap.

## **2.06 FILTER FABRIC (Temporary Stone Check Dam)**

- A. Use Stabilenka Filter Fabric (T-140N), Mirafil (140N) or approved equal.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Construct and maintain all erosion control measures until the substantial completion of the project.

### **3.02 TEMPORARY CONSTRUCTION ENTRANCE/EXIT**

- A. Construct a gravel area or pad at points where vehicles enter and leave a construction site.
- B. Clear the entrance and exit area of all vegetation, roots and other objectionable material and properly grade and place gravel to the grade and dimensions shown on the plans.
- C. Construct drainage channels to carry water to a sediment trap or other suitable outlet.
- D. Use geotextile fabrics to improve stability of the foundation in locations subject to seepage or high water table.
- E. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site by periodic top dressing with two inches of stone.
- F. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary.
- G. Immediately remove objectionable materials spilled, washed, or tracked onto public roadways.

### **3.03 TEMPORARY GRASSING**

- A. Provide a temporary cover for erosion control on disturbed areas that will remain unstabilized for a period of more than thirty (30) days in accordance with Section 32 92 00 – Turf and Grasses.
- B. This practice applies to cleared areas, diversions, dams, temporary sediment basins, temporary road banks and topsoil stockpiles where vegetation is needed for less than one (1) year.
- C. Provide grassing on slope 5% or greater within fourteen (14) days of disturbance. Comply with Section 32 92 00 – Turf and Grasses.

### **3.04 SILT FENCE**

- A. Provide silt fence barrier where shown on the plans and on utility construction parallel to the disturbed trench where perpendicular sheet flow runoff occurs on disturbed areas with slopes greater than 4%.
- B. Place at the extreme limits of the area to be disturbed as shown on the plans.

- C. Construct temporary sediment barriers of filter fabric, buried at the bottom, stretched and supported by posts and install below small disturbed areas as indicated on the drawings to retain sediment by reducing the flow velocity to allow sediment deposition.
- D. Provide spacing between posts 5'-0" on center, minimum.
- E. Remove sediment deposits prior to reaching one-third height of the fence.
- F. Monitor site frequently and place additional silt fencing should evidence indicate that erosion is about to occur at locations other than those shown on plan.

### **3.05 INLET PROTECTION**

- A. Construct temporary sediment barriers around storm drain curb inlets using block and gravel as indicated on the drawings.
- B. Inspect structure after each rainfall and repair as required.
- C. Remove sediment when trap reaches one-half capacity.
- D. Remove structure when protected areas have been stabilized.

### **3.06 EROSION CONTROL BLANKET**

- A. Provide on areas as shown on the plans or on all embankments with slopes equal to or steeper than 2-1/2:1.

### **3.07 TEMPORARY STONE CHECK DAMS**

- A. Utilize temporary stone check dams as indicated on the plans or directed by Engineer.
- B. Provide temporary stone check dams constructed of both rip-rap and #57 stone, as illustrated on the plans.

### **3.08 MAINTENANCE**

- A. Place all erosion control devices or measures prior to any land disturbing activity within the drainage area they are located.
- B. Periodically check erosion control devices and clean or otherwise remove silt build-up as necessary to maintain them in proper working order.

### **3.09 REMOVAL**

- A. Remove temporary structures after protected areas have been stabilized.

### **3.10 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the lump sum bid.

**END OF SECTION**



## SECTION 31 50 00

### EXCAVATION SUPPORT AND PROTECTION

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

- A. Section includes temporary excavation support and protection systems.
- B. Related Sections:
  - 1. Section 01 50 00 - Temporary Facilities and Controls for temporary utilities and support facilities.

##### 1.03 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
  - 1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a licensed professional engineer in South Carolina, using performance requirements and design criteria indicated.
  - 2. Prevent surface water from entering excavations by grading, dikes, dewatering or other means.
  - 3. Install excavation support and protection systems without damaging existing buildings, structures and site improvements adjacent to excavation.
  - 4. Monitor vibrations, settlements and movements.

##### 1.04 SUBMITTALS

- A. Shop Drawings: For excavation support and protection system.
- B. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a professional engineer licensed in South Carolina responsible for their preparation.
- C. Coordinate first paragraph below with qualification requirements in Section 01 40 00 - Quality Requirements. Qualification Data: For qualified professional engineer.
- D. Other Informational Submittals:
  - 1. Photographs: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection

systems. Submit before Work begins.

2. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
  - a. Note locations and capping depth of wells and well points.

#### **1.05 QUALITY ASSURANCE**

- A. Pre-installation Conference: Conduct conference at Project site.
  1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
    - a. Geotechnical report.
    - b. Existing utilities and subsurface conditions.
    - c. Proposed excavations.
    - d. Proposed equipment.
    - e. Monitoring of excavation support and protection system.
    - f. Working area location and stability.
    - g. Coordination with waterproofing.
    - h. Abandonment or removal of excavation support and protection system.

#### **1.06 PROJECT CONDITIONS**

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  1. Notify Owner no fewer than two days in advance of proposed interruption of utility.
  2. Do not proceed with interruption of utility without Owner's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.
  1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
  2. The geotechnical report is included elsewhere in the Technical Specifications.
- C. Survey Work: Engage a qualified land surveyor to survey adjacent existing buildings, structures and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36, ASTM A 690, or ASTM A 992.
- C. Steel Sheet Piling: ASTM A 328, ASTM A 572, or ASTM A 690; with continuous interlocks.
  1. Corners: Site-fabricated mechanical interlock.
- D. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- E. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- F. Tiebacks: Steel bars, ASTM A 722.
- G. Tiebacks: Steel strand, ASTM A 416.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards that could develop during excavation support and protection system operations.
  1. Shore, support and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks and other adjacent occupied and used facilities.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

### **3.02 SOLDIER PILES AND LAGGING**

- A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

### **3.03 SHEET PILING**

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

### **3.04 TIEBACKS**

- A. Tiebacks: Drill, install, grout and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.
  - 1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
  - 2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

### **3.05 BRACING**

- A. Bracing: Locate bracing to clear columns, floor framing construction and other permanent work. If necessary to move brace, install new bracing before removing original brace.
  - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.
  - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
  - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

### **3.06 REMOVAL AND REPAIRS**

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
  2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Sections.
  3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

**3.07 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the price bid for the item to which it pertains.

**END OF SECTION**

## SECTION 32 11 23

### AGGREGATE BASE COURSE

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Stone Base Course.
- B. Paving aggregates.

##### 1.02 RELATED REQUIREMENTS

- A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 1 of these Specifications.
- B. Section 31 22 00 - Grading: Preparation of site for base course.
- C. Section 31 23 23.13 – Backfill and Compaction: Topsoil fill at areas adjacent to aggregate base course.
- D. Section 31 23 16.13 – Trenching for Site Utilities: Compacted fill over utility trenches under base course.
- E. Section 32 13 13 - Bituminous Concrete Paving: Binder and finish asphalt courses.

##### 1.03 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; American Association of State Highway and Transportation Officials; 1965 (2012).
- B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010
- C. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2012.
- E. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
- F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012.
- G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.
- H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

- I. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.
- J. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.
- K. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils; 2010.

#### **1.04 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

#### **1.05 PRODUCT HANDLING**

- A. Comply with pertinent provisions of Section 01 60 00 – Product Requirements.

#### **1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 lb. sample of each type of aggregate; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction Density Test Reports.

#### **1.07 DELIVERY, STORAGE AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. Aggregate Storage, General:
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey benchmarks and intended elevations for the Work are as indicated.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Coarse Aggregate Type retained on No. 4 sieve: Coarse aggregate, conforming to State of South Carolina Highway Department standards.

1. Furnish a coarse aggregate consisting of hard, durable particles of stone, reasonably free from soft, thin, elongated or laminated pieces and deleterious substances.
  2. Furnish aggregate with an abrasion loss of less than 65% as measured by the Los Angeles Abrasion Test.
- B. Fine Aggregate: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials and organic matter.
1. Furnish a fine aggregate consisting of material produced by stone crushing operations.
  2. Liquid limit shall not exceed 25 and the plasticity index shall not exceed 6 when tested in accordance with AASH TO T-89 and T-90, respectively.
  3. Grade in accordance with ASTM D2487 Group Symbol SW.
  4. Graded in accordance with ASTM C136; within the following limits:
    - a. No. 4 sieve: 100 percent passing.
    - b. No. 14 sieve: 10 to 100 percent passing.
    - c. No. 50 sieve: 5 to 90 percent passing.
    - d. No. 100 sieve: 4 to 30 percent passing.
    - e. No. 200 sieve: 0 percent passing.
- C. Composite Mixture:
1. Produce in one crushing operation or by blending the fine and coarse aggregate in proper proportions.
  2. Graded in accordance with ASTM C136; within the following limits:
    - a. No. 2-0" Sieve 100 Percent Passing
    - b. No. 1-1/2" Sieve 95-100 Percent Passing
    - c. No. 1-0" Sieve 70-100 Percent Passing
    - d. No. 0-1/2" Sieve 48-75 Percent Passing
    - e. No. 4 Sieve 30-50Percent Passing
    - f. No. 30 Sieve 11-30 Percent Passing
    - g. No. 200 Sieve 0-12 Percent Passing
    - h. Liquid Limit 25 max.
    - i. Plasticity Index 6 max.



- D. Provide Aggregate Type Materials that comply with Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

## **2.02 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.
- C. Where aggregate materials are specified using ASTM D2487 classification, testing of samples for compliance will be provided before delivery to site.
- D. If tests indicate materials do not meet specified requirements, change material and retest.
- E. Provide materials of each type from same source throughout the Work.

## **2.03 PRIME ASPHALT**

- A. Use either MC-30, RC-30, RC-70, or EA-P complying with requirements of Sections 406, 407 and 408 of the South Carolina Department of Transportation specifications.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct and is dry.

### **3.02 PREPARATION**

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping and recompacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.
- C. Proofroll all areas to receive crushed stone paving.
  - 1. Make not less than three passes over the full area, using a 35 to 50 ton rubber tired roller.
- D. Remove all soft, unstable or unsuitable material that will not compact readily.
  - 1. Remove to full depth of unsuitable material, or to a depth of 30-inches, whichever is less.
  - 2. Replace with satisfactory materials.
- E. Fill all holes, ruts or depressions which develop in the subgrade with approved on-site material, bringing subgrade to indicated line and grades.
- F. Compact subgrade using suitable construction procedures to provide not less than 95% Standard Proctor Maximum Dry Density.

- G. Seal roll the subgrade surface with a steel wheel roller, sealing the surface against excessive water infiltration.
- H. Preparation of Subgrade
  - 1. Proofroll all areas to receive crushed stone paving.
    - a. Make not less than three passes over the full area, using a 35 to 50 ton rubber tired roller.
  - 2. Remove all soft, unstable or unsuitable material that will not compact readily.
    - a. Remove to full depth of unsuitable material, or to a depth of 30-inches, whichever is less.
    - b. Replace with satisfactory materials.
  - 3. Fill all holes, ruts or depressions which develop in the subgrade with approved on-site material, bringing subgrade to indicated line and grades.
  - 4. Compact subgrade using suitable construction procedures to provide not less than 95% Standard Proctor Maximum Dry Density.
  - 5. Seal roll the subgrade surface with a steel wheel roller, sealing the surface against excessive water infiltration.

### **3.03 INSTALLATION**

- A. Spread aggregate over prepared substrate to a total compacted thickness of 6 inches.
- B. Under Bituminous Concrete Paving:
  - 1. Compact to 95 percent of maximum dry density.
- C. Place aggregate in maximum 4-inch layers and roller compact to specified density.
- D. Place aggregates using spreader boxes or other approved spreaders uniformly on one operation.
- E. Take care to avoid segregation of the fine from the coarse aggregate during handling, spreading or shaping operations.
- F. Mix, while at proper moisture, with motor grader or other equipment and maintain to required section and grade until thoroughly compacted.
- G. Level and contour surfaces to elevations and gradients indicated.
- H. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- I. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- J. Perform using 3-wheel steel wheel roller weighing not less than 10-tons, tandem roller weighing at least 8-tons, or other rollers approved by the Engineer.

- K. Start rolling at edges and proceed toward the center, continue rolling until aggregates are firmly keyed or set.
- L. When initial compaction is completed, should voids remain, place fine aggregates on the surface in an amount only sufficient to fill the voids.
- M. Broom, wet and roll until coarse aggregate is set, bonded and thoroughly compacted for full width and depth.
- N. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- O. Apply herbicide to finished surface.

### **3.04 TOLERANCES**

- A. Thickness tolerance: Provide the compacted thicknesses shown on the Drawings within a tolerance of minus 1/2-inch.
  - 1. Depth measurements will be made by digging through the base at intervals no closer than 250-feet, nor greater than 500-feet apart.
  - 2. Where thickness is less than depth specified minus 1/2-inch, it shall be corrected as directed by the Engineer.
- B. Variation From Design Elevation: Within 3/8- inch in 10-feet, parallel to the center line of the roadway nor more than 1/2-inch from a template conforming to the cross-sections illustrated on the Construction Plans.
- C. Deviations: Correct by removing materials, replacing with new materials and reworking or recompacting as required.

### **3.05 FIELD QUALITY CONTROL**

- A. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with South Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition.
- C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.
- F. Allow no traffic on surface until mixture has hardened sufficiently to prevent distortion.

### **3.06 PLACING PRIME COAT**

- A. Allow base course to season sufficiently to permit uniform penetration.

- B. Do not apply to wet surfaces or when the temperature is below 60°F in the shade and falling, or below 55°F in the shade and rising.
- C. Clean surfaces of all dust, dirt, clay, etc. using mechanical brooms, etc.
- D. Apply prime material, using pneumatic mounted distributors, at a rate of 0.25 to 0.30 gallon per square yard.
- E. Permit no traffic on primed surfaces until bituminous material has penetrated and dried sufficiently that it does not pick up under traffic.

**3.07 CLEANING**

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.
- D. Allow no traffic on surface until mixture has hardened sufficiently to prevent distortion.

**END OF SECTION**

## **SECTION 32 12 16**

### **ASPHALT PAVING**

#### **PART 1 GENERAL**

##### **1.01 DESCRIPTION:**

###### **A. Section Includes:**

1. Placement of asphalt pavement on commercial driveway within the South Carolina Department of Transportation (SCDOT) Right-of-Way, as specified herein, and as needed for a complete and proper installation.

###### **B. Related work:**

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 00 and 01 of these specifications.

##### **1.02 QUALITY ASSURANCE:**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.

##### **1.03 SUBMITTALS:**

- A. Comply with pertinent provisions of Section 01 30 00 – Administrative Requirements.

##### **1.04 PRODUCT HANDLING:**

- A. Comply with pertinent provisions of Section 01 60 00 – Product Requirements.

##### **1.05 WARRANTY:**

- A. All pavement work within the South Carolina Department of Transportation (SCDOT) rights-of-way shall be warranted for two years beginning on the date of acceptance by the SCDOT.

#### **PART 2 PRODUCTS**

##### **2.01 ASPHALTIC CONCRETE:**

- A. Use Types 1 complying with South Carolina Department of Transportation Standard Specifications, Section 403.

##### **2.02 AGGREGATE BASE COURSE WITH PRIME:**

- A. Comply with applicable portions of South Carolina Department of Transportation Standard Specifications, Section 306.

#### **PART 3 EXECUTION**

##### **3.01 GENERAL:**

- A. Saw cut and remove to neat lines and dispose of as directed.
- B. Replace the removed pavement with bases and pavements similar to type removed, unless otherwise indicated.

### 3.02 CUTTING:

- A. Concrete pavement or base:
  - 1. Cut on straight and true lines, to a minimum depth of 2-inches, using powered concrete saw.
  - 2. Shear off remaining depth with pneumatic tools.
- B. Concrete sidewalks shall be removed back to the nearest joint on each side of the crossing.
- C. Concrete Curb and Gutter shall be removed back to the nearest joint on each side of the crossing.
- D. Asphaltic concrete pavements: Cut to straight and true lines with powered concrete saw.

### 3.03 PAVING:

- A. Flexible pavements (Paving) - Driveways:
  - 1. Compact subgrade thoroughly as specified on construction drawings.
  - 2. Place aggregate base course as included on drawings.
  - 3. Top asphaltic surface, binder course as included on drawings.
  - 4. Top with bituminous asphaltic surface course as included on drawings.
  - 5. A tack coat of asphaltic concrete shall be applied between each lifted installed.

### 3.04 MEASUREMENT AND PAYMENT:

- A. No separate measurement or direct payment will be made for the work under this Section and all cost for the same shall be included in the lump sum or unit price for the item to which it pertains.

**END OF SECTION**

**SECTION 32 92 00**  
**TURF AND GRASSES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Seeding and Fertilization
- B. Provide grassing for the area specified herein, or as indicated, for a complete and proper installation.
- C. Water and sanitary sewer easements, including highway and street shoulders: All areas disturbed by the construction process.

**1.02 RELATED REQUIREMENTS**

- A. Documents affecting work in this section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these Specifications.
- B. Section 31 23 23.13 – Backfill and Compaction
- C. Section 31 25 00 – Erosion and Sedimentation Control
- D. Section 32 92 23 – Sodding

**1.03 DEFINITIONS**

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Johnsongrass, Poison Ivy, Nut Sedge, Nimble Will, Blindweed, Bentgrass, Wild Garlic, Perennial Sorrel, and Brome Grass.

**1.04 QUALITY ASSURANCE**

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Seed: Conform to all State laws and to all requirements and regulations of the South Carolina Department of Agriculture.
  - 1. Deliver to site each variety of seed individually packaged and tagged to show name, net weight, origin, and lot number.
- C. Fertilizer: Conform to State fertilizer law.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Comply with pertinent provisions of Section 01 30 00 – Administrative Requirements.

- C. Product Data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Complete materials list of items proposed to be provided under this Section.
  - 2. Material Safety Data Sheets for all materials to be used.
  - 3. Installation/Application Instructions for all relevant materials (i.e. erosion blankets, hydraulic mulches)

#### **1.06 DELIVERY, STORAGE AND HANDLING**

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- C. Comply with pertinent provisions of Section 01 60 00 – Produce Requirements
- D. At time of delivery, furnish the Engineer invoices of all materials received in order that application rates may be determined.
- E. Immediately remove from the site materials that do not comply with the specified requirements, and promptly replace with materials meeting the specified requirements.

### **PART 2 PRODUCTS**

#### **2.01 GRASS SEED**

- A. Provide grass seed that is:
  - 1. Free from noxious weed seeds
  - 2. Current year crop seed
  - 3. Treated with appropriate fungicide at time of mixing
  - 4. Delivered to the site in sealed containers with dealer's guaranteed analysis
- B. Water: Clean, fresh and free of substances that could inhibit vigorous growth of grass.
- C. Stakes: Softwood lumber, chisel pointed
- D. String: inorganic fiber
- E. Lime and pH Adjustment
  - 1. For Dry Seeding operations provide agricultural grade, standard ground limestone conforming to the current "Rules, Regulations and Standards of the Fertilizer Board of Control" issued at Clemson University.
  - 2. For Hydraulic Seeding operations, provide NeutraLime Dry by Profile Products or approved equal to raise pH or Aqua-pHix by Profile Products or approved equal to



lower pH at rate determined by soil analysis or at manufacturer's recommended rate.

3. Bag tags or delivery slip for bulk loads shall indicate brand or trade name, calcium carbonate equivalent, and other pertinent data to identify the lime.

F. Wood Fiber Mulch

1. Provide 100% thermally processed wood fiber or blended 70/30 wood/cellulose fiber manufactured specifically for discharging uniformly on the ground surface when dispersed by a hydro-seeding machine.
2. Material shall contain thermally processed wood fibers so as to contain no germination or growth inhibiting factors and to achieve phyto-sanitization.
3. Material shall contain basic green dye to facilitate visual metering.

G. Flexterra HP-FGM or approved equal

1. Provide Flexterra HP-FGM as manufactured by Profile Products or approved equal.
2. Material shall contain thermally refined wood fibers and crimped synthetic fibers so as to contain no germination or growth inhibiting factors.
3. Materials shall contain non-toxic green dye to facilitate metering.
4. Material shall be 100% Bio-degradable.

H. Straw Mulch/Dry Applied Mulching Pellets

1. Provide straw or hay material.
  - a. Straw to be stalks of wheat, rye, barley or oats.
  - b. Hay to be timothy, peavine, alfalfa, or coastal Bermuda
2. Material to be reasonably dry and reasonably free from mature seed bearing stalks, roots, or bulblets or Johnson Grass, Nutgrass, Wild Onion or any other Noxious weeds detailed in part 1.04 of this Section.
3. Seed Aide Aero® manufactured by Profile Products or approved equal at a rate of 3,000 LBS/ACRE can be used as a weed free alternative to straw mulch.

I. Erosion Control Blanket

1. Provide on areas as shown on the plans
2. Provide Erosion Control Blanket S-2, from Western Excelsior, or approved equal.

## 2.02 TESTS

- A. Provide analysis of topsoil fill under provisions of Section 01 40 00 – Quality Requirements

- B. Analyze to ascertain the percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter, and pH value.
- C. Submit minimum 10 oz (280 g) sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.
- D. Testing is not required if recent test are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.
- E. If pH is not in the range of 6.0 to 7.0, adjust accordingly with Lime.
- F. Organic matter must be 2.0% or greater. If organic matter percentage is less than 2%, contractor shall apply JumpStart or approved equal and/or BioPrime by Profile Products or approved equal to modify soil organic matter. JumpStart or approved equal and BioPrime or approved equal to be applied at rate determined by soil analysis or at manufacturer's recommended rate

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that prepared soil base is ready to receive the work of this Section.

#### **3.02 PREPARATION**

- A. Seed these areas immediately upon completion of grading or construction and cleanup operations.
  - 1. Slopes greater than 4:1
  - 2. Utility right-of-ways or any other disturbed area adjacent to wetlands.
- B. Bring all areas to proper line, grade and cross section indicated on the plans.
- C. Repair erosion damage prior to commencing seeding operations.
- D. Loosen seed bed to a minimum depth of 3" and track in slope so as the direction of the track marks is perpendicular to the direction of the slope.
- E. Ensure a minimum of 2-inches of topsoil exists in areas to be seeded.
- F. Remove all roots, clods, stones larger than 1" in any dimension, and other debris.

#### **3.03 FERTILIZATION**

- A. Apply fertilizer in accordance with manufacturer's instructions and the Soil Analyses as detailed in part 2.03 of this Section.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
- D. If seeding using a hydro-seeder apply fertilizer in slurry with mulch, seed, and lime.

- E. Spread uniformly over areas to be seeded at:
  - 1. Rate of 11 LBS/1000 sq. ft. when using 19-19-19.
  - 2. Rate of 20 LBS/1000 sq. ft. when using 10-10-10.
  - 3. Use approved mechanical spreaders for dry seeding application.
- F. Second Application of Fertilizer
  - 1. When plants are established and showing satisfactory growth, apply Nitrogen at the rate of 1 lb. per 1000 sq. ft.
  - 2. Apply using dry seeding application unless otherwise directed by Engineer.
  - 3. Do not apply to stands of temporary grasses.

### 3.04 SEEDING

- A. Mixtures of different types of seed for the various schedules shall be weighted and mixed in proper proportions in the presence of the Engineer.
- B. Permanent Seeding Mix – Slopes 4:1 or Greater
  - 1. Schedule No. 1 – Planting Dates April 1 – September 15:
    - a. Slopemaster Spring/Summer Mix by Pennington Seed, Inc. or approved equal.
      - 25% Hulled Sahara Bermudagrass
      - 25% Unhulled Sahara Bermudagrass
      - 25% Pensacola Bahiagrass
      - 10% Durana White Clover
      - 10% Brown Top Millet
      - 5% Weeping Lovegrass
    - b. Rate 75 LBS/ACRE or 1.75 LBS/1000 sq. ft.
    - c. Seed to be coated with MYCO Advantage by Pennington Seed, Inc. or approved equal.
  - 2. Schedule No. 2 – Planting Dates September 15 – March 31:
    - a. Slopemaster Fall/Winter Mix by Pennington Seed, Inc. or approved equal.
      - 25% Unhulled Sericea Lespedeza
      - 20% Unhulled Sahara Bermudagrass
      - 20% Greystone Tall Fescue
      - 10% Pensacola Bahiagrass
      - 10% Durana White Clover
      - 10% Rye Grain
      - 5% Weeping Lovegrass
    - b. Rate 100 LBS/ACRE or 2.25 LBS/1000 sq. ft.

- c. Seed to be coated with MYCO Advantage by Pennington Seed, Inc. or approved equal.
- C. Permanent Seeding Mix – Slopes 4:1 or Less
  - 1. Schedule No. 1 – Planting Dates April 1 – September 15:
    - a. Hulled Sahara Bermudagrass
    - b. Rate 75 LBS/ACRE or 1.75 LBS/1000 sq. ft.
  - 2. Schedule No. 2 – Planting Dates September 15 – March 31:
    - a. Unhulled Sahara Bermudagrass
    - b. Rate 100 LBS/ACRE or 2.25 LBS/1000 sq. ft.
- D. Temporary Seeding Mix – All Disturbed Areas
  - 1. Schedule No. 1 – Planting Dates April 1 – September 15:
    - a. Brown Top Millet  
Rate 45 LBS/ACRE or 1 LBS/1000 sq. ft.
  - 2. Schedule No. 2 – Planting Dates September 15 – March 31:
    - a. Rye Grain  
Rate 80 LBS/ACRE or 2 LBS/1000 sq. ft.
- E. Do not seed areas in excess of that which can be mulched on same day.
- F. Do not sow during rain, when the ground is too dry, or during windy periods.
- G. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches (3 mm). Maintain clear of shrubs and trees.
- H. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches (100 mm) of soil.
- I. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches (100 mm by 100mm).

### **3.05 SOWING METHODS**

- A. General:
  - 1. Perform seeding during the periods and at the rates specified in the seeding schedules.
  - 2. Do not conduct seeding work when ground is frozen or excessively wet.
  - 3. Produce satisfactory stand of grass regardless of period of the year the Work is performed.

- B. Seeding, slopes less than four horizontal to one vertical:
1. Seeding of slopes of 4:1 or less will be done in one of the following two ways:
  2. Dry Seeding:
    - a. Sow seed not more than 24 hours after application of fertilizer and lime.
    - b. Use mechanical seed drills on accessible areas, rotary hand seeders, power sprayers, etc. may be used on steep slopes or areas not accessible to seed drills.
    - c. Cover seed and lightly compact with culti-packer if seed drill does not.
    - d. Within 24 hours following compaction of seeded areas, uniformly apply straw mulch, as defined in Section 2.01, at a rate of 4000 LBS/ACRE or 90 LBS/1000 sq. ft.
  3. Hydraulic Seeding:
    - a. Apply seed, fertilizer, lime, and wood fiber mulch using hydraulic equipment.
    - b. Equipment to have built-in agitation system with capacity to agitate, suspend and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, lime, and water.
    - c. Minimum capacity of slurry tank: 1000 gallons.
    - d. Apply 100% wood or 70/30 wood/cellulose blend fiber mulch, defined in Section 2.01, at a rate of 2500 LBS/ACRE or 60 LBS/1000 sq. ft.
    - e. Regulate slurry mixture so that amounts and rates of application will result in uniform application of all materials at not less than the specified amounts.
    - f. Apply slurry in two directions so as to avoid "shadowing."
    - g. Use color of fiber mulch as guide, spraying the prepared seed bed until a uniform visible coat is obtained.
- C. Seeding, slopes greater than four horizontal to one vertical:
1. Seeding of slopes of 4:1 or greater will be done in one of the following two ways
  2. Dry Seeding:
    - a. Sow seed not more than 24 hours after application of fertilizer and lime.
    - b. Use mechanical seed drills on accessible areas, rotary hand seeders, power sprayers, etc. may be used on steep slopes or areas not accessible to seed drills.

- c. Cover seed and lightly compact with culti-packer if seed drill does not.
- d. Within 24 hours following compaction of seeded areas, uniformly lay double netted excelsior blanket, as defined in Section 2.01, over seeded areas. Excelsior blanket installation and staple pattern shall conform strictly to manufacturer's instructions.

3. Hydraulic Seeding:

- a. Apply seed, fertilizer, lime, and Flexterra HP-FGM or approved equal mulch using hydraulic equipment.
- b. Equipment to have built-in agitation system with capacity to agitate, suspend and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, lime, and water.
- c. Minimum capacity of slurry tank: 1000 gallons.
- d. Apply Flexterra HP FGM or approved equal, as defined in Section 2.01, at a rate of 3000 LBS/ACRE or 68 LBS/1000 sq. ft.
- e. Regulate slurry mixture so that amounts and rates of application will result in uniform application of all materials at not less than the specified amounts.
- f. Apply slurry in two directions so as to avoid "shadowing."
- g. Use color of fiber mulch as guide, spraying the prepared seed bed until a uniform visible coat is obtained.

**3.06 MAINTENANCE**

- A. Water to prevent grass and soil from drying out.
- B. Roll surface to remove minor depressions or irregularities.
- C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- D. Remedy damage resulting from improper use of herbicides.
- E. Areas not showing satisfactory evidence of germination within six weeks of the seeding or which show bare spots, shall be immediately reseeded, fertilized and/or mulched.
- F. Protect seeded areas with warning signs during maintenance period.
- G. Maintain all seeded areas in satisfactory condition until final acceptance of Work.
- H. Repair any eroded areas.
- I. Mow as necessary to maintain healthy growth rate until final acceptance of the Work.

**3.07 ACCEPTANCE**

- A. Permanently seeded areas will be accepted when the stand of grass reaches 70% coverage.

B. No acceptance will be made of temporary seeded areas.

**3.08 MEASUREMENT AND PAYMENT**

A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the price bid for the item to which it pertains.

**END OF SECTION**

## SECTION 33 01 30.13

### ACCEPTANCE TESTING FOR SANITARY SEWERS

#### PART 1 GENERAL

##### 1.01 PERFORMANCE REQUIREMENTS

- A. Gravity flow sanitary sewers are required to have straight alignment and uniform grade between manholes.
- B. Flexible pipe, including "semi-rigid" pipe, is required to show no more than 5 percent deflection. Test pipe no sooner than 30 days after backfilling and compacting of line segment but prior to final acceptance using standard mandrel to verify that installed pipe is within specified deflection tolerances.
- C. All new sanitary sewers shall be Mandrel Tested. If the Mandrel Test is failed, the pipe shall also be televised in accordance with the requirements outlined in this Specification.
- D. Maximum allowable leakage for Infiltration or Exfiltration
  - 1. The total exfiltration, as determined by hydrostatic head test, shall not exceed 200 gallons per inch diameter per mile of pipe per 24 hours at minimum test head of 2 feet above crown of pipe at upstream manhole or 2 feet above groundwater elevation, whichever is greater.
  - 2. When pipes are installed more than 2 feet below groundwater level, use infiltration test in lieu of exfiltration test. Total infiltration shall not exceed 200 gallons per inch diameter per mile of pipe per 24 hours. Groundwater elevation must be at least 2 feet above crown of pipe at upstream manhole.
  - 3. Refer to Table 1 at the end of this section, for water test allowable leakage in sewers. Perform leakage testing to verify that leakage criteria are met.
- E. Perform air testing in accordance with requirements of this Specification and SCDHEC or local environmental agency requirements.
  - a. Refer to Table 2 at the end of this section, for time allowed for pressure loss from 3.5 psig to 2.5 psig;
  - b. Refer to Table 3 at the end of this section, for minimum testing times for low pressure air test; and
  - c. Refer to Table 4 at the end of this section, for vacuum test time table.

##### 1.02 SUBMITTALS

- A. Conform to requirements of Section – 01 30 00 Administrative Requirements.
- B. Test Plan: Test plan shall be submitted to Alliance Consulting Engineers, Inc. for review two weeks prior to testing. Test plan shall include testing procedures, methods, equipment, and tentative schedule. Contractor shall obtain advance written approval for deviations from the Contract Drawings and Specifications.
- C. Test Reports: Submit test reports for each test on each segment of sanitary sewer.

##### 1.03 GRAVITY SANITARY SEWER QUALITY ASSURANCE

- A. Repair, correct, and retest manholes or sections of pipe which fail to meet specified requirements when tested.
- B. Provide testing reports as directed by Alliance Consulting Engineers, Inc.



## 1.04 SEQUENCING AND SCHEDULING

- A. Contractor shall perform testing as work progresses. Schedule testing so that no more than 1000 linear feet of installed sewer remains untested at one time.
- B. Coordinate testing schedules with Alliance Consulting Engineers, Inc. Perform testing under observation of Alliance Consulting Engineers, Inc.

## PART 2 PRODUCTS

### 2.01 DEFLECTION MANDREL

- A. Mandrel Sizing. Rigid mandrel shall have OD equal to 95 percent of inside ID of pipe. ID of pipe, for purpose of determining OD of mandrel, shall be average OD minus two minimum wall thicknesses for OD controlled pipe and average ID for ID controlled pipe, dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.
- A. Mandrel Design. Rigid mandrel shall be constructed of metal or rigid plastic material that can withstand 200 psi without being deformed. Mandrel shall have nine or more "runners" or "legs" as long as total number of legs is odd number. Barrel section of mandrel shall have length of at least 75 percent of ID of pipe. Rigid mandrel shall not have adjustable or collapsible legs which would allow reduction in mandrel diameter during testing. Provide and use proving ring for modifying each size mandrel.
- B. Proving Ring. Furnish "proving ring" with each mandrel. Fabricate ring of 1/2-inch-thick, 3-inch-wide bar steel to diameter 0.02 inches larger than approved mandrel diameter.
- C. Mandrel Dimensions (5 percent allowance). Average ID and minimum mandrel diameter are specified in Table 5, Pipe vs. Mandrel Diameter, at end of this Section. Mandrels for higher strength, thicker wall pipe or other pipe not listed in table may be used when approved by Alliance Consulting Engineers, Inc.

### 2.02 EXFILTRATION TEST

- A. Test Equipment:
  - 1. Pipe plugs.
  - 2. Pipe risers where manhole cone is less than 2 feet above highest point in pipe or service lead.

### 2.03 INFILTRATION TEST

- A. Test Equipment:
  - 1. Calibrated 90 degree V-notch weir.
  - 2. Pipe plugs.

### 2.04 LOW PRESSURE AIR TEST

- A. Minimum Requirement for Equipment:
  - 1. Control panel
  - 2. Low-pressure air supply connected to control panel.
  - 3. Pneumatic plugs: Acceptable size for diameter of pipe to be tested; capable of withstanding internal test pressure without leaking or requiring external bracing.
  - 4. Air hoses from control panel to:
    - a. Air supply.
    - b. Pneumatic plugs.
    - c. Sealed line for pressuring.
    - d. Sealed line for monitoring internal pressure.

- B. Testing Pneumatic Plugs: Place pneumatic plug in each end of length of pipe on ground. Pressurize plugs to 25 psig; then pressurize sealed pipe to 5 psig. Plugs are acceptable when they remain in place against test pressure without external aids.

## **2.05 GROUND WATER DETERMINATION**

- A. Equipment: Pipe probe or small diameter casing for ground water elevation determination.

## **2.06 SMOKE TESTING**

- A. Equipment:
  - 1. Pneumatic plugs.
  - 2. Smoke generator.
  - 3. Blowers producing 2500 scfm minimum.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Provide labor, equipment, tools, test plugs, risers, air compressor, air hose, pressure meters, pipe probe, calibrated weirs, or any other device necessary for proper testing and inspection.
- B. Determine selection of test methods and pressures for gravity sanitary sewers based on ground water elevation. Determine ground water elevation using equipment and procedures conforming to Control of Ground Water and Surface Water.

### **3.02 MANDREL TESTING FOR GRAVITY SANITARY SEWERS**

- A. Perform deflection testing on flexible and semi-rigid pipe to confirm pipe has no more than 5 percent deflection. Mandrel testing shall conform to ASTM D3034. Perform testing no sooner than 30 days after backfilling of line segment, but prior to final acceptance testing of line segment.
- B. Pull approved mandrel by hand through sewer sections. Replace any section of sewer not passing mandrel. Mandrel testing is not required for stubs.
- C. Retest repaired or replaced sewer sections.

### **3.03 LEAKAGE TESTING FOR GRAVITY SANITARY SEWERS**

- A. Test Options:
  - 1. Test gravity sanitary sewer pipes for leakage by either exfiltration or infiltration methods, as appropriate, or with low pressure air testing.
  - 2. Test new or rehabilitated sanitary sewer manholes with water or low pressure air. Manholes tested with low pressure air shall undergo physical inspection prior to testing.
  - 3. Perform leakage testing after backfilling of line segment, and prior to tie-in of service connections.
  - 4. If no installed piezometer is within 500 feet of sewer segment, provide temporary piezometer for this purpose.
- B. Compensating for Ground Water Pressure:
  - 1. Where ground water exists, install pipe nipple at same time sewer line is placed. Use 1/2-inch capped pipe nipple approximately 10-inches long. Make installation through manhole wall on top of sewer line where line enters manhole.

2. Immediately before performing line acceptance test, remove cap, clear pipe nipple with air pressure, and connect clear plastic tube to nipple. Support tube vertically and allow water to rise in tube. After water stops rising, measure height in feet of water over invert of pipe. Divide this height by 2.3 ft/psi to determine ground water pressure to be used in line testing.
- C. Exfiltration test:
1. Determine ground water elevation.
  2. Plug sewer in downstream manhole.
  3. Plug incoming pipes in upstream manhole.
  4. Install riser pipe in outgoing pipe of upstream manhole when highest point in service lead (house service) is less than 2 feet below bottom of manhole cone.
  5. Fill sewer pipe and manhole or pipe riser, when used, with water to point 2-1/2 feet above highest point in sewer pipe, house lead, or ground water table, whichever is highest.
  6. Allow water to stabilize for one to two hours. Take water level reading to determine drop of water surface, in inches, over one-hour period, and calculate water loss (1 inch of water in 4 feet diameter manhole equals 8.22 gallons) or measure quantity of water required to keep water at same level. Loss shall not exceed that calculated from allowable leakage according to Table 1 at the end of this Section.
- D. Infiltration test: Ground water elevation must be not less than 2 feet above highest point of sewer pipe or service lead (house service).
1. Determine ground water elevation.
  2. Plug incoming pipes in upstream manhole.
  3. Insert calibrated 90 degree V-notch weir in pipe on downstream manhole.
  4. Allow water to rise and flow over weir until it stabilizes.
  5. Take five readings of accumulated volume over period of 2 hours and use average for infiltration. Average must not exceed that calculated for 2 hours from allowable leakage according to Table 1 at the end of this Section.
- E. Low Air Pressure Test: When using this test conform to ASTM C 828, ASTM C 924, or ASTM F1417, as applicable, with holding time not less than that listed in Table 2 below.
1. Air testing for sections of pipe shall be limited to lines less than 36-inch average inside diameter.
  2. Lines 36-inch average inside diameter and larger shall be tested at each joint. Minimum time allowable for pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch during joint test shall be 10 seconds, regardless of pipe size.
  3. For pipe sections less than 36-inch average inside diameter:
    - a. Determine ground water level.
    - b. For concrete pipe, flood pipe and allow 2 hours to saturate concrete. Then drain and plug concrete pipe.
    - c. For each manhole-to-manhole section of sanitary sewer main, plug line at each manhole with pneumatic plugs.
    - d. Pressurize pipe to 4.0 psig. Increase pressure 1.0 psi for each 2.3 feet of ground water over highest point in system. Allow pressure to stabilize for 2 to 4 minutes. Adjust pressure to start at 3.5 psig (plus adjustment for ground water table). See Table 2 at the end of this Section.
    - e. To determine air loss, measure time interval for pressure to drop to 2.5 psig. Time must exceed that listed in Table 2 at the end of this Section for pipe diameter and length. For sliplining, use diameter of carrier pipe.
- F. Retest: Repair and retest any section of pipe which fails to meet requirements.

### 3.04 TEST CRITERIA TABLES

- A. Exfiltration and Infiltration Water Tests: Refer to Table 1 at the end of this Section, for water test allowable leakage.
- B. Low Pressure Air Test:
  - 1. Time in Table 2 at the end of this Section, allowed for pressure loss from 3.5 psig to 2.5 psig, is based on the following data and equation.

		$T = 0.0850(D)(K)/(Q)$
where:	T =	Time for pressure to drop 1.0 pounds per square inch gauge in seconds
	K =	0.000419 DL, but not less than 1.0
	D =	Average inside diameter in inches
	L =	Length of line of same pipe size in feet
	Q =	Rate of loss, 0.0015 ft <sup>3</sup> /min./sq.ft. internal surface

- 2. Since K value of less than 1.0 shall not be used, there are minimum testing times for each pipe diameter as given in Table 3 at the end of this Section for minimum testing times for low pressure air test.

Notes:

- 1. When two sizes of pipe are involved, compute time by ratio of lengths involved.
- 2. Lines with 27-inch average inside diameter and larger may be air tested at each joint.
- 3. Lines with average inside diameter greater than 36 inches must be air tested for leakage at each joint.
- 4. If joint test is used, perform visual inspection of joint immediately after testing.
- 5. For joint test, pipe is to be pressurized to 3.5 psi greater than pressure exerted by groundwater above pipe. Once pressure has stabilized, time allowable for pressure to drop from 3.5 pounds psi gauge to 2.5 psi gauge shall be a minimum of 10 seconds.

### 3.05 LEAKAGE TESTING FOR MANHOLES

- A. After completion of manhole construction, wall sealing, or rehabilitation, but prior to backfilling, test manholes for water tightness using hydrostatic or vacuum testing procedures.
- B. Plug influent and effluent lines, including service lines, with suitably-sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required for test; follow manufacturer's safety and installation recommendations. Place plugs minimum of 6 inches outside of manhole walls. Brace inverts to prevent lines from being dislodged when lines entering manhole have not been backfilled.
- C. Vacuum testing:
  - 1. Install vacuum tester head assembly at top access point of manhole and adjust for proper seal on straight top section of manhole structure. Following manufacturer's instructions and safety precautions, inflate sealing element to recommended maximum inflation pressure; do not over-inflate.
  - 2. Evacuate manhole with vacuum pump to 10 inches mercury (Hg), disconnect pump, and monitor vacuum for time period specified in Table 4, Vacuum Test Time Table.
  - 3. If drop in vacuum exceeds 1 inch Hg over specified time period tabulated in Table 4, locate leaks, complete repairs necessary to seal manhole and repeat

test procedure until satisfactory results are obtained.

- D. Perform hydrostatic exfiltration testing as follows:
1. Seal wastewater lines coming into manhole with internal pipe plug. Then fill manhole with water and maintain it full for at least one hour.
  2. The maximum leakage for hydrostatic testing shall be 0.025 gallons per foot diameter per foot of manhole depth per hour.
  3. If water loss exceeds amount tabulated above, locate leaks, complete repairs necessary to seal manhole and repeat test procedure until satisfactory results are obtained.

### **3.06 SMOKE TEST PROCEDURE FOR POINT REPAIRS (NOT APPLICABLE)**

- A. Application: Perform smoke test to:
1. Locate points of line failure for point repair.
  2. Determine when point repairs are properly made.
  3. Determine when service connections have been reconnected to rehabilitated sewer.
  4. Check integrity of connections to newly replaced service taps to liners and to existing private service connections.
- B. Limitations: Do not backfill service taps until completion of this test. Test only those taps in single manhole section at one time. Keep number of open excavations to minimum.
- C. Preparation: Prior to smoke testing, give written notices to area residents no fewer than 2 days, nor more than 7 days, prior to proposed testing. Also give notice to local police and fire departments 24 hours prior to actual smoke testing.
- D. Isolate Section: Isolate manhole section to be tested from adjacent manhole sections to keep smoke localized. Temporarily seal annular space at manhole for sliplined sections.
- E. Smoke Introduction:
1. Operate equipment according to manufacturer's recommendation and as approved by Alliance Consulting Engineers, Inc.
  2. Conduct test by forcing smoke from smoke generators through sanitary sewer main and service connections. Operate smoke generators for minimum of 5 minutes.
  3. Introduce smoke into upstream and downstream manhole as appropriate. Monitor tap/connection for smoke leaks. Note sources of leaks.
- F. Repair and Retest: Repair and replace taps or connections noted as leaking and then retest. Taps and connections may be left exposed in only one manhole section at time. When repair or replacement, testing or retesting, and backfilling of excavation is not completed within one work day, properly barricade and cover each excavation as approved by Alliance Consulting Engineers, Inc.
- G. Service Connections: On houses where smoke does not issue from plumbing vent stacks to confirm reconnection of sewer service to newly installed liner pipe, perform dye test to confirm reconnection. Introduce dye into service line through plumbing fixture inside structure or sewer cleanout immediately outside structure and flush with water. Observe flow at service reconnection or downstream manhole. Detection of dye confirms reconnection.

### **3.07 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

**TABLE 1****WATER TEST ALLOWABLE LEAKAGE**

<b>DIAMETER OF RISER OR STACK IN INCHES</b>	<b>VOLUME PER INCH OF DEPTH</b>		<b>ALLOWANCE LEAKAGE*</b>	
	<b>INCH</b>	<b>GALLONS</b>	<b>PIPE SIZE IN INCHES</b>	<b>GALLONS/MINUTE PER 100FT.</b>
1	0.7854	.0034	6	0.0039
2	3.1416	.0136	8	0.0053
2.5	4.9087	.0212	13	0.0066
3	7.0686	.0306	12	0.0079
4	12.5664	.0306	15	0.0099
5	19.6350	.0544	18	0.0118
6	28.2743	.1224	21	0.0138
8	50.2655	.2176	24	0.0158
			27	0.0177
			30	0.0197
			36	0.0237
			42	0.0276
For other diameters, multiply square of diameters by value of 1" diameter			Equivalent to 50 gallons per inch of inside diameter per mile per 24 hours	

\* Allowable leakage rate shall be reduced to 10 gallons per inch of inside diameter per mile per 24 hours, when sewer is identified as located within 25-year flood plain

**TABLE 2**  
ACCEPTANCE TESTING FOR SANITARY SEWERS

TIME ALLOWED FOR PRESSURE LOSS FROM 3.5 PSIG TO 2.5 PSIG															
Pipe Diam. (in)	Min. Time (min /sec)	Length for min. time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) shown (min:sec)											
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft	500 ft	550 ft	600 ft	
6	5:40	398	0.854	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:25	7:07	7:50	8:33
8	7:33	298	1.519	7:33	7:33	7:33	7:33	7:36	8:52	10:08	11:24	12:40	13:56	15:12	
10	9:27	239	2.374	9:27	9:27	9:27	9:54	11:52	13:51	15:50	17:48	19:47	21:46	23:45	
12	11:20	199	3.419	11:20	11:20	11:20	14:15	17:06	19:57	22:48	25:39	28:30	31:20	34:11	
15	14:10	159	5.342	14:10	14:10	17:48	22:16	26:43	31:10	35:37	40:04	44:31	48:58	53:25	
18	17:00	133	7.692	17:00	19:14	25:39	32:03	38:28	44:52	51:17	57:42	64:06	70:31	76:56	
21	19:50	114	10.47	19:50	26:11	34:54	43:38	52:21	61:05	69:48	78:32	87:15	95:59	104:42	
24	22:40	99	13.67	22:48	34:11	45:35	56:59	68:23	79:47	91:10	102:34	113:58	125:22	136:46	
27	25:30	88	17.30	28:51	43:16	57:42	72:07	86:33	100:58	115:24	129:49	144:14	158:40	173:05	
30	28:20	80	21.36	35:37	53:25	71:14	89:02	106:51	124:39	142:28	160:16	178:05	195:53	213:41	
33	31:10	72	25.85	43:06	64:38	86:11	107:44	129:17	150:50	172:23	193:55	215:28	237:01	258:34	

**TABLE 3**  
 MINIMUM TESTING TIMES FOR SANITARY SEWERS - LOW PRESSURE AIR TEST

<b>PIPE DIAMETER (inches)</b>	<b>MINIMUM TIME (seconds)</b>	<b>LENGTH FOR MINIMUM TIME (feet)</b>	<b>TIME FOR LONGER LENGTH (seconds)</b>
6	340	398	0.855 (L)
8	454	298	1.520 (L)
10	567	239	2.374 (L)
12	680	199	3.419 (L)
15	850	159	5.342 (L)
18	1020	133	7.693 (L)
21	1190	114	10.471 (L)
24	1360	100	13.676(L)
27	1530	88	17.309 (L)
30	1700	80	21.369 (L)
33	1870	72	25.856 (L)

**TABLE 4**  
 MINIMUM TESTING TIMES FOR SANITARY MANHOLES - LOW PRESSURE AIR TEST

<b>DEPTH IN FEET</b>	<b>TIME IN SECONDS BY PIPE DIAMETER</b>		
	<b>48"</b>	<b>60"</b>	<b>72"</b>
4	10	13	16
8	20	26	32
12	30	39	48
16	40	52	64
20	50	65	80
24	60	78	96
*	5.0	6.5	8.0

**\*Add T times for each additional 2-foot depth.  
 (The values listed above have been extrapolated from ASTM C924-85)**



**TABLE 5**  
**PIPE VS. MANDREL DIAMETER**

<u>Material and Wall Construction</u>	<u>Nominal Size (Inches)</u>	<u>Average I.D (Inches)</u>	<u>Minimum Mandrel Diameter (Inches)</u>	
PVC-Solid (SDR 26)6	6	5.764	5.476	
	8	7.715	7.329	
	10	9.646	9.162	
PVC-Solid (SDR 35)12	12	11.737	11.150	
	15	14.374	13.655	
	18	17.629	16.748	
	21	20.783	19.744	
	24	23.381	22.120	
	27	26.351	25.033	
PVC-Truss	8	7.750	7.363	
	10	9.750	9.263	
	12	11.790	11.201	
	15	14.770	14.032	
PVC-Profile (ASTM F794)	12	11.740	11.153	
	15	14.370	13.652	
	18	17.650	16.768	
	21	20.750	19.713	
	24	23.500	22.325	
	27	26.500	25.175	
	30	29.500	28.025	
	36	35.500	33.725	
	42	41.500	39.425	
	48	47.500	45.125	
HDPE-Profile	18	18.000	17.100	
	21	21.000	19.950	
	24	24.000	22.800	
	27	27.000	25.650	
	30	30.000	28.500	
	36	36.000	34.200	
	42	42.000	39.900	
	48	48.000	45.600	
Fiberglass (Class SN 46)	54	54.000	51.300	
	60	60.000	57.000	
	12	12.85	11.822	
	18	18.66	17.727	
	20	20.68	19.646	
	24	24.72	23.484	
	30	30.68	29.146	
	36	36.74	34.903	
	42	42.70	40.565	
	48	48.76	46.322	
	54	54.82	52.079	
	60	60.38	57.361	

**END OF SECTION**

## SECTION 33 05 13

### MANHOLES AND STRUCTURES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Modular precast concrete manhole sections with tongue-and-groove joints with masonry transition to lid frame, covers, anchorage, and accessories.

##### 1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.

##### 1.03 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures; American Concrete Institute International; 2009.
- B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2008).
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.
- D. ASTM C55 - Standard Specification for Concrete Brick; 2009.
- E. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2010.
- F. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections; 2009.
- G. ASTM C478M - Standard Specification for Precast Reinforced Concrete Manhole Sections [Metric]; 2009.
- H. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals; 2008.
- I. ASTM C923M - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals [Metric]; 2008b.
- J. ASTM C1634 - Standard Specification for Concrete Facing Brick; 2009.
- K. ASTM D3753 - Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wetwells; 2005.
- L. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.

##### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of penetrations.

##### 1.05 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

## **1.06 FIELD CONDITIONS**

- A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.
- B. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C478 (ASTM C478M), with resilient connectors complying with ASTM C923 (ASTM C923M).
- B. Concrete: As specified in Section 03 30 00 – Cast-in-Place Concrete.
- C. Reinforcement: Formed steel wire, galvanized finish, wire diameter as indicated on drawings.
- D. Concrete Reinforcement: As specified in Section 03 30 00 – Cast-in-Place Concrete.

### **2.02 COMPONENTS**

- A. Manhole Steps: Formed galvanized steel rungs; 3/4 inch diameter. Formed integral with manhole sections.

### **2.03 CONFIGURATION**

- A. Shaft Construction: Concentric with concentric cone top section; lipped male/female dry joints; sleeved to receive pipe sections.
- B. Shape: Cylindrical.
- C. Clear Inside Dimensions: As indicated.
- D. Clear Inside Dimensions: As indicated.
- E. Design Depth: As indicated.
- F. Clear Lid Opening: As indicated.
- G. Pipe Entry: Provide openings as indicated.
- H. Steps: 12 inches wide, 16 inches on center vertically, set into manhole wall.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify items provided by other sections of Work are properly sized and located.
- B. Verify that built-in items are in proper location, and ready for roughing into Work.
- C. Verify excavation for manholes is correct.

### **3.02 PREPARATION**

- A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

### **3.03 MANHOLES**

- A. Place concrete base pad, trowel top surface level.
- B. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad.
- C. Form and place manhole cylinder plumb and level, to correct dimensions and elevations. As work progresses, build in fabricated metal items.
- D. Cut and fit for pipe.
- E. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required.
- F. Set cover frames and covers level without tipping, to correct elevations.
- G. Coordinate with other sections of work to provide correct size, shape, and location.

### **3.04 SCHEDULES**

- A. Storm Sewer Manholes: Precast concrete sections, galvanized steel steps, 48 inch inside dimension, to depth indicated, with bolted lid.

### **3.05 MEASUREMENT AND PAYMENT**

- A. All costs for manholes and structures shall be included in the lump sum price. No separate measurement or direct payment will be made for the work under this section.

**END OF SECTION**

**SECTION 33 05 23.16  
JACK AND BORE CROSSINGS**

**PART 1 GENERAL**

**1.01 SCOPE**

The work covered in this section consists of furnishing all materials, labor, equipment, and other miscellaneous appurtenances necessary for the proper completion of pipeline crossings under roads, railroads, or creeks.

**1.02 SUBMITTALS**

Complete product data and engineering data, including shop drawings, shall be submitted to the Engineer in accordance with the requirements of Section 01 60 00 of the Contract Documents.

**1.03 RELATED SECTIONS**

- A. Section 33 05 40 Casing Pipes for Utilities

**PART 2 PRODUCTS**

**2.01 MATERIALS:**

Shall conform to requirements of South Carolina Department of Transportation (SCDOT) for crossings of State Highways or to the applicable railroad owner for railroad crossings if more stringent than the requirements specified within this section.

- A. Carrier Pipe:

- 1. Shall be of the size and material as shown on the drawings, and class as detailed in the Specifications.

- B. Casing Pipe:

- 1. Shall be steel pipe conforming to ASTM A-139, Grade B, electric fusion welded pipe having a minimum yield strength of 35,000 psi. The exterior of the casing pipe shall be coated with Kopper "Bitumastic Super Service Black", coal tar epoxy paint or equal. The size and wall thickness of the casing pipe for the indicated carrier pipe shall be as shown below:

<b>Carrier Pipe I.D.- (Nom.) Inches</b>	<b>Casing Pipe I.D.-(Nom.) Inches</b>	<b>Casing Pipe Wall Thickness (Inches)</b>
6	12	0.250
8	16	0.250
10	18	0.250
12	22	0.250
16	30	0.375
18	32	0.375
20	36	0.375
24	42	0.500
30	48	0.500

C. Casing Spacers:

Shall be Model CCS stainless steel casing spacers as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or approved equal.

**PART 3 EXECUTION**

**3.01 GENERAL**

Construction method shall conform to requirements of SCDOT for crossings of State Highways or to the applicable railroad owner for railroad crossings if more stringent than the requirements specified within this section.

**3.02 JACKING PROCEDURES**

- A. The diameter of the excavation shall conform to the outside diameter and circumference of the pipe as closely as practicable. Any voids which develop during the installation operation and which are determined by the Engineer to be detrimental to the roadbed shall be pressure grouted with an approved mix.
- B. The distance that the excavation extends beyond the end of the pipe will depend upon the character of the excavated material, but shall not exceed 2 feet in any case.
- C. The pipe shall be jacked from the low or downstream end. Variation in the final position of the pipe from the line and grade established by the Engineer will be permitted if approved by the Engineer, providing that the final grade of flow line shall be in the direction indicated on the plans. Wood blocking to adjust the grade of the carrier pipe may be required.
- D. When jacking of pipe is once begun, the operation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment.
- E. Any pipe damaged in jacking operations shall be removed and replaced by the Contractor at his expense.
- F. Pressure pipeline carriers shall be adequately blocked with pressure treated wood to prevent movement in the casing pipe.
- G. Casing pipe shall be welded by a certified welder in accordance with AWS and AISC Standards. Welds shall be continuous, watertight and develop a greater strength than the pipe. Welds shall be chipped and wire brushed immediately before applying coal tar coating.
- H. The ends of the casing pipe shall contain end seals as well as brick and mortar to affect a watertight seal.
- I. Bores under Paved Driveways and Surface Obstructions: When driveways and other obstructions are encountered along the proposed waterline, the Contractor shall avoid damaging the area by boring under the driveways or other surface obstruction as called for on the plans.
- J. The type of bore shall be determined by its length and the soil conditions of the bore location. Bore diameter shall not exceed four (4) inches larger than that of the carrier pipe. When bore lengths exceed 25 L.F., a casing pipe shall be carried along with the bore. After the piping has been inserted through the casing, the casing shall be removed from the bore hole. When bore lengths are less than 25 L.F., the casing pipe will not be required to be used unless soil conditions will not permit an uncased bore.

- K. Casing spacers shall be placed not more than three (3) feet from each end of each joint of piping. Spacers shall be installed in strict accordance with manufacturer's recommendations.

### **3.03 BORING PROCEDURES**

- A. Holes are to be bored mechanically.
- B. The boring may be done using a pilot hole approximately 2-inches in diameter which shall be bored the entire length of the installation and shall be checked for line and grade on the opposite end of the bore. This pilot hole shall serve as the centerline of the larger diameter hole to be bored.
- C. The use of water or other fluids in connection with boring will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted.

### **3.04 MEASUREMENT AND PAYMENT**

- A. Measurement for Jack and Bore Crossings shall be based on the distance in linear feet as shown on the plans and/or as shown in the bid form. Payment shall be made to the nearest linear foot.

**END OF SECTION**

## SECTION 33 05 40

### CASING PIPES FOR UTILITIES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Provide and install casing pipes under surface structures, where indicated, as specified herein, and as needed for a complete and proper installation.

##### 1.02 RELATED SECTIONS

- A. Section 33 05 23.16 Jack and Bore Crossings

##### 1.03 REFERENCES

- A. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- B. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2003.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.
- D. SSPC-Paint 15 - Steel Joist Shop Paint; Society for Protective Coatings; 1999 (Ed. 2004).

##### 1.04 SUBMITTALS

- A. Product data: Within fifteen (15) calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- B. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

##### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- C. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

##### 1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver Material to project site.
- B. Store Material under cover and elevated above grade.



## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Cascade Manufacturing, Pipeline Seal and Insulator, Inc. or approved equal.

### 2.02 MATERIALS

A. Casing Pipe for Dry Bores:

1. Steel complying with ASTM A139 for Grade B with minimum yield strength of 35,000 psi.
2. Provide ends suitable for field welding.
3. Minimum wall thickness as follows:

Diameter of Casing (Inches)	Minimum Wall Thickness (Inches)
12 and below	1/4 (0.250)
14, 15	3.75/12 (0.312)
16-20	3/8 (0.375)
24-36	1/2 (0.500)
36-60	5/8 (0.625)

B. Casing Pipe Spacers

1. For piping installed in casing provide pipeline casing spacers.
2. Provide a minimum of 1 spacer per ten linear feet of pipe for ductile iron pipe and a minimum of 1 spacer per six linear feet for PVC pipe. Minimum 2 spacers per joint of pipe.
3. Provide spacer with shell of 14 gauge T-304 stainless steel.
4. Provide shell liner of .090" thick PVC, 85-90 durometer.
5. Runners from 2" wide ultra-high molecular weight polymer with a high resistance to abrasion and a coefficient of friction of 0.11 -0.13 in accordance with ASTM D 1894.
6. Support runners on 14 gauge reinforced T-304 stainless steel risers welded to shell.
7. All metal surfaces to be fully passivated.
8. The diameter as measured over the runners shall exceed the pipeline bell or coupling outside diameter.
9. Provide pipeline casing spacers as manufactured by Cascade Manufacturing, Pipeline Seal and Insulator, Inc. or approved equal.

- C. End Seals
  - 1. Provide 1/8-inch thick rubber end seal at each end of the casing.
  - 2. Secure to casing and carrier pipe with T-304 stainless steel bands.
- D. Vent Pipe
  - 1. Provide 2-Inch steel pipe for venting to the surface where required on plans, welded to the casing and sloped to provide positive drainage back to the casing.
    - a. For casing pipes less than 150-LF, provide vent pipe at end with higher elevation.
    - b. For casing pipes 150-LF and longer, provide vent pipe at both ends.
    - c. For casing pipes with less than 1% positive slope, provide vent pipe at both ends.
- E. Drain Pipe
  - 1. Provide 1-Inch steel pipe for drainage to the surface where required on plans; welded to the casing at the downstream end of the pipe.
    - a. For casing pipes with less than 1% positive slope, provide drain pipe at both ends.

### **PART 3 EXECUTION**

#### **3.01 ENTRY PITS**

- A. Locate to avoid interference with traffic, adjacent structures, etc., to such extent possible.
- B. Excavate to required depth, providing sheeting and shoring necessary for protection of the Work and for safety of personnel.
- C. Maintain in dry condition by use of pumps, drains or other approved method.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install casings by dry-boring through the casing while simultaneously jacking the casing.
- C. Any proposed alternate method shall be approved in writing by the Engineer.
- D. Weld joints to provide a watertight joint.
- E. Casings for gravity sanitary sewer, storm drainage or shown to be installed to grade, shall not vary more than 3/32" per foot of length from the indicated grade.
  - 1. Remove and replace any improperly installed or otherwise defective casing at no additional cost to the Owner.

### 3.03 INSTALLING PIPE IN CASING

#### A. General:

1. Inspect carefully, insuring that all foreign material is removed from the casing and the casing meets alignment criteria for the type of carrier pipe being used.
2. For pressure systems, the casing deflection shall not exceed the maximum deflection recommended by the carrier pipe.
3. Install casing spacers on the carrier pipe per the manufacturer's instructions.
4. For sanitary and storm sewer provide spacer sizing and length necessary to obtain the pipe slope and elevations as shown on the plans.
5. Provide centered or restrained configuration.
6. Install the carrier pipe in the casing ensuring each joint is pushed "home" before the joint is installed into the casing.

### 3.04 INTERFACE WITH OTHER WORK

- #### A.
- Verify that the installation of this part of the construction does not interfere with the pipe installation.

### 3.05 ERECTION TOLERANCES

- #### A.
- Maximum Variation from true position: 4"-6" Deeper only.
- #### B.
- Maximum Offset from true alignment: 18"-24".

### 3.06 CASING ENDS

- #### A.
- Install rubber end seals in accordance with manufacturer's instructions.

### 3.08 MEASUREMENT AND PAYMENT

Measurement for Casings shall be based on the distance in linear feet as shown on the plans and/or as shown in the bid form. Payment shall be made to the nearest linear foot. Payment includes casing, end seals, vents, drains, and or any appurtenances necessary.

**END OF SECTION**

## SECTION 33 11 00.11

### POLYVINYL CHLORIDE (PVC) PIPE

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. PVC pipe and fabricated fittings in nominal sizes 4-inches through 24-inches with cast iron pipe equivalent outside diameters.

##### 1.02 SUBMITTALS

- A. Submit manufacturer's product data, installation instructions and certification for all materials to be furnished in accordance with Specification Section 01 30 00 – Administrative Requirements. Submit classification and gradation test results for embedment and pipe backfill material.

#### PART 2 PRODUCTS

Research has documented that certain pipe materials (such as polyvinyl chloride, polyethylene, and polybutylene) and certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this Section assume that petroleum products or organic solvents will not be encountered. If during the course of pipeline installation, the Contractor identifies, or suspects the presence of petroleum products or any unknown chemical substance, notify Alliance Consulting Engineers, Inc. immediately. Stop installing piping in the area of suspected contamination until direction is provided by Alliance Consulting Engineers, Inc.

PVC Schedule 40 or 80 is not permitted for conveying wastewater or potable water within distribution or collection systems. However, it may be used in other applications, such as conveying chemicals or for drainage.

##### 2.01 WATER DISTRIBUTION (NOT APPLICABLE)

- A. All PVC pipe shall be PVC 1120 pressure pipe made from class 12454 material as defined by ASTM D1784 with outside diameter dimensions of steel or cast iron pipe. The PVC compounds shall be treated or certified suitable for potable water products by the National Sanitation Foundation Testing Laboratory (NSF Standard No. 61). PVC pipe to be used for potable water shall be blue in color.

PVC Pipe 4-inch through 24-inch:

AWWA Standard C900, DR14 and where permitted DR18. DR25 pipe will not be allowed. PVC pipe has recently been upgraded by pressure class, however American Water does not allow pipe in its system to be fully subject to the revised pressures in AWWA C900. DR14 shall not be subjected to pressures exceeding 250 psi. DR18 shall not be subjected to pressures exceeding 200 psi.

##### 2.02 GRAVITY SEWER PIPE

- A. PVC gravity sanitary sewer pipe shall be green in color and in accordance with provisions in following table except where specified differently on the Drawings:

B.

Type of service	Acceptable Materials
Gravity Mains with depth of cover ≥ 3 feet < 15 feet	PVC SDR 35
Gravity Mains with depth of cover ≥ 15 feet	PVC SDR 26 or Ductile Iron Pipe
Gravity Mains with depth of cover < 3 feet	Ductile Iron Pipe

- C. When solid wall PVC pipe 18-inches to 27-inches in diameter is required in SDR 26, provide pipe conforming to ASTM F679, except provide wall thickness as required for SDR 26 and pipe strength of 115 psi.
- D. For sewers up to 12-inch diameter crossing over water lines, or crossing under water lines with less than 2-foot separation, provide minimum 150 psi pressure rated pipe conforming to ASTM D2241 with suitable PVC adapter couplings.
- E. Joints: Spigot and integral wall section bell with solid cross section elastomeric or rubber ring gasket conforming to requirements of ASTM D3212 and ASTM F477, or ASTM D3139 and ASTM F477. Gaskets shall be factory-assembled and securely bonded in place to prevent displacement. Manufacturer shall test sample from each batch conforming to requirements ASTM D2444.
- F. Fittings: Provide PVC gravity sewer sanitary bends, tee, or wye fittings for new sanitary sewer construction. PVC pipe fittings shall be full-bodied, either injection molded or factory fabricated. Saddle-type tee or wye fittings are not acceptable.
- G. Conditioning: Conditioning of samples prior to and during tests is subject to approval by Alliance Consulting Engineers, Inc. When referee tests are required, condition specimens in accordance with Procedure A in ASTM D618 at 73.4° F +/- 3.6° F and 50 percent relative humidity plus or minus 5 percent relative humidity for not less than 40 hours prior to test. Conduct tests under same conditions of temperature and humidity unless otherwise specified.
- H. Pipe Stiffness: Determine pipe stiffness at 5 percent deflection in accordance with Test Method D 2412. Minimum pipe stiffness shall be 46 psi. For diameters 4-inches through 18-inches, test three specimens, each a minimum of 6-inches (150 mm) in length. For diameters 21-inch through 36-inch, test three specimens, each a minimum of 12-inch (300 mm) in length.
- I. Flattening: Flatten three specimens of pipe, prepared in accordance with Paragraph 2.04F, in suitable press until internal diameter has been reduced to 60 percent of original inside diameter of pipe. Rate of loading shall be uniform. Test specimens, when examined under normal light and with unaided eye, shall show no evidence of splitting, cracking, breaking, or separation of pipe walls or bracing profiles. Perform the flattening test in conjunction with pipe stiffness test.
- J. Joint Tightness. Test for joint tightness in accordance with ASTM D3212, except that joint shall remain watertight at minimum deflection of 5 percent. Manufacturer will be required to provide independent third party certification for joint testing each diameter of storm sewer pipe.

- K. Purpose of Tests. Flattening and pipe stiffness tests are intended to be routine quality control tests. Joint tightness test is intended to qualify pipe to specified level of performance.

## **2.03 SANITARY SEWER FORCE MAIN PIPE**

- A. PVC sanitary sewer force main pipe shall be green in color. Provide approved PVC pressure pipe conforming to requirements for water service pipe, and conforming to minimum working pressure rating specified in Section 33 34 00 - Sanitary Sewer Force Mains.
- B. Acceptable pipe joints are integral bell-and-spigot, containing a bonded-in elastomeric sealing ring meeting requirements of ASTM F477. In designated areas requiring restrained joint pipe and fittings, use approved joint restraint device conforming to UNI-B-13, for PVC pipe 12-inch diameter and less.
- C. Fittings: Provide ductile iron fittings as per Section 33 11 00.15 – Ductile Iron Pipe and Fittings, except furnish fittings with one of following approved internal linings:
  - 1. Nominal 40 Mils (35 Mils minimum) virgin polyethylene complying with ASTM D 1248, heat fused to interior surface of fitting
  - 2. Nominal 40 Mils (35 Mils minimum) polyurethane
  - 3. Nominal 40 Mils (35 Mils minimum) ceramic epoxy
  - 4. Nominal 40 Mils (35 Mils minimum) fusion bonded epoxy
- D. Exterior Protection: Provide polyethylene wrapping of ductile-iron fittings as required by Section 33 11 00.17 - Polyethylene Wrap. (Not Applicable)
- E. Hydrostatic Tests: Hydrostatically test pressure rated pipe in accordance with Specifications.

## **2.04 RECEIVING, HANDLING AND STORAGE**

- A. Inspect pipe and appurtenances for defects prior to installation in the trench. Set aside and clearly mark defective, damaged or unsound material and hold material for inspection by Alliance Consulting Engineers, Inc.
- B. Load and unload all materials in accordance with the manufacturer's recommendations and in such a manner as to prevent damage. Do not drop pipe and accessories or handle them in a rough manner.
- C. Provide safe storage for all materials. Cover stored pipe that will be exposed to sunlight for periods longer than 6 months. Cover with canvas or other opaque material with provision for adequate air circulation. PVC pipe shall not be stored close to heat sources, such as heaters, boilers, steam lines, or engine exhaust.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

Follow the provisions of Section 33 11 00 – Piping - General Provisions and Section 33 34 00 – Sanitary Sewer Force Mains in addition to the following requirements:

- A. Remove all dirt and foreign matter from pipe before lowering it into the trench. Do not place debris, hand tools, clothing or other materials in the pipe. Keep pipe clean during and after laying.
- B. Lay pipe with the bell end pointing in the direction of work progress. Do not roll, drop or dump pipe or appurtenances into the trench.

- C. Assemble push-on joints in accordance with the pipe manufacturer's recommendations. Assemble mechanical joints in accordance with the fitting manufacturer's recommendations.
- D. Cut pipe with pipe saws, circular saws, handsaws, or similar equipment. Provide a smooth end at a right angle to the longitudinal axis of the pipe. Deburr, bevel, and re-mark insertion line on spigot ends. Match factory bevel length and angle for field bevels. When connecting to certain shallow depth bells, such as those on some cast iron fittings and valves, cut off the factory bevel and prepare a deburred, square cut end with a slight outer bevel.
- E. Clean the sealing surface of the spigot end, the pipe bell, the coupler or fitting, and the elastomeric gaskets immediately before assembly. Do not remove factory installed gaskets for cleaning. Keep the joint free of dirt, sand, grit, grease or any foreign material. Apply approved lubricant when assembling gasketed joints in accordance with the pipe manufacturer's requirements. The use of improper lubricants can damage gaskets. Excessive lubricant use can make disinfection more difficult and cause taste and odor problems when the line is placed in service.
- F. Good pipe alignment is essential for proper joint assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Do not swing or "stab" the joint; that is, do not suspend the pipe and swing it into the bell. The spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion. Avoid metal to plastic contact with the pushing the pipe home (use wood or other material to cushion moving the pipe).
- G. Assemble pipe using the following types of joints:
  1. Gasketed bell joint – Integral with the pipe or fitting
  2. Gasketed coupling – A double gasketed coupling
  3. Mechanical joint – Any of the several joint designs that have gaskets and bolts manufactured in accordance with AWWA standards.
- H. All pressure and leakage testing shall be done in accordance with Specification Section 33 01 30.13 – Acceptance Testing for Sanitary Sewers.
- I. PVC pipe fittings shall employ ductile iron pipe fittings when used in forcemain construction or installation of Ductile Iron Gravity Line per Specification Section 33 11 00.15 – Ductile Iron Pipe & Fittings. See detail drawings for transitions between different pipe materials.
- J. Gaskets - Gaskets shall be as provided or recommended by the manufacturer and satisfy AWWA standard C111 in all respects. Where ductile iron pipe and PVC pipe are directly connected, the appropriate gasket material for this purpose shall be employed. As noted in the products section of this specification, some gasket materials are prone to permeation of certain hydrocarbons which may exist in the soil (see Part 2). Under these conditions and at the discretion of Alliance Consulting Engineers, Inc., Contractor shall require supplier to provide FKM (Viton, Flourel) gasket material or approved equal in areas of concern.

### **3.02 SERVICE CONNECTIONS - WATER DISTRIBUTION (NOT APPLICABLE)**

- A. Install service connections in accordance with AWWA Standard C605 and the manufacturer's recommendations using the following methods:
  1. Tapping is only permitted through the use of service clamps or saddles.
  2. Using injection molded couplings with threaded outlets.

3. Tapping with large service connections through appropriately sized tapping sleeves and valves.
4. Direct tapping of 1-inch and smaller service connections is not permitted. Use service saddles only for AWWA Standard C900 pipe, for nominal pipe sizes 6-inch through 12-inch. Corporation stops shall be threaded and conform to AWWA Standard C800.
5. The distance between the PVC pipe joint and a service tap (2-inches and smaller) shall be a minimum of 3 feet. The distance between the PVC pipe joint and a service tap (4-inches and larger) shall be a minimum of 4 feet. Where necessary, excavate along the pipe to confirm the acceptable distance before starting the tap.

### **3.03 MEASUREMENT AND PAYMENT**

- A. PVC piping will be measured and payment will be made at the unit price per "linear foot" as stated in the Bid Form and shall include cost of excavation, bedding, backfilling, cleanup, and testing.

**END OF SECTION**



## SECTION 33 11 00.15

### DUCTILE IRON PIPE AND FITTINGS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Ductile iron pipe and fabricated fittings in nominal sizes 4-inches through 30-inches.

##### 1.02 RELATED WORK

- A. Section 33 11 00 Piping - General Provisions.

##### 1.03 SUBMITTALS

- A. Submit shop drawings and manufacturer's literature for all Contractor supplied materials promptly to Alliance Consulting Engineers, Inc. for approval in accordance with Specification Section 01 30 00 - Administrative Requirements.

#### PART 2 PRODUCTS

Research has documented that certain elastomers (such as those used in gasket material) may be subject to permeation by lower-molecular weight organic solvents or petroleum products. Products supplied under this Section assume that petroleum products or organic solvents will not be encountered. If during the course of pipeline installation, the Contractor identifies, or suspects the presence of petroleum products or any unknown chemical substance, notify Alliance Consulting Engineers, Inc. immediately. Stop installing piping in the area of suspected contamination until direction is provided by Alliance Consulting Engineers, Inc.

##### 2.01 PIPE MATERIAL

###### A. General

1. Ductile iron pipe shall conform to the latest specifications as adopted by the ANSI and AWWA. Specifically, ductile iron pipe shall conform to AWWA Standard C151.
2. The pipe or fitting exterior shall be coated with a bituminous coating in accordance with AWWA Standard C151. The pipe or fitting interior shall be cement mortar lined and seal coated in compliance with the latest revision of AWWA Standard C104.
3. For wastewater systems, the pipe or fitting interior shall be lined with fusion coated ceramic epoxy in accordance with AWWA Standard C116.

###### B. Quality

1. Pipe and fittings shall meet the following minimum quality requirements by conforming to the following:
  - a. AWWA C104 / ANSI A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
  - b. AWWA C110 / ANSI A21.10 Ductile Iron and Gray Iron Fittings, 3 NPS through 48 NPS for Water
  - c. AWWA C111 / ANSI A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

- d. AWWA C115 / ANSI A21.15 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
  - e. AWWA C116 / ANSI A21.16 Protective Fusion-Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service
  - f. AWWA C150 / ANSI A21.50 Thickness Design of Ductile-Iron Pipe
  - g. AWWA C151 / ANSI A21.51 Ductile-Iron Pipe, Centrifugally Cast, for Water
  - h. AWWA C153 / ANSI A21.53 Ductile-Iron Compact Fittings, 3 NPS through 24 NPS and 54 NPS through 64 NPS, for Water Service
2. Ductile iron pipe and fittings will be accepted on the basis of the Manufacturer's certification that the material conforms to this specification. The certification for iron fittings shall list a fitting description, quantity, bare fitting weight and source, (AWWA Standard C110, C153 or Manufacturer, if fitting is not listed in either standard). The certification shall accompany the material delivered to the project site. Alliance Consulting Engineers, Inc. reserves the right to sample and test this material subsequent to delivery at the project site. If foreign manufactured fittings are provided, then the Contractor is obligated to notify Alliance Consulting Engineers, Inc. with a submittal and provide the necessary documentation to satisfy Alliance Consulting Engineers, Inc. that the materials provided meet the specified AWWA standards and, among other documentation that may be required, provide certificates of compliance on the component supplied.

C. Pipe Class

1. The pressure class of pipe to be furnished shall be in accordance with Table 1 and the notes listed below.

<b>Table 1</b>	
<b>MINIMUM RATED WORKING PRESSURE FOR DUCTILE IRON PIPE MANUFACTURED IN ACCORDANCE WITH AWWA Standard C151</b>	
Pipe Size (Inch)	Pressure Class
4	350
6	350
8	350
12	350
16	300
20	300
24	250
30	250

NOTES:

1. Larger pipe sizes up to 54-inch can be installed as pressure Class 200 with cover up to 9 feet and an operating pressure of 200 psi, where approved by Alliance Consulting Engineers, Inc. When trench depths exceed 15 feet for pipe sizes of 16-inch or larger, Alliance Consulting Engineers, Inc. shall direct the Contractor on the proper class pipe to use.

2. The noted pressure class is adequate to support 3/4 and 1-inch corporation stops. Use a full saddle for larger taps (e.g., air relief valves or larger corporations) due to limited wall thickness.
3. There are special conditions where a larger wall thickness is required. Alliance Consulting Engineers, Inc. shall direct the Contractor on the proper pressure class pipe to use in specific instances; e.g. at treatment plant or booster station sites where frequent excavation can be anticipated in the vicinity of pipe, where the pipeline is laid on a river channel bottom to prevent external damage to the pipe and minimize the potential for costly pipe replacement, etc.

D. Testing

1. Perform a hydrostatic test of all pipe and appurtenances as required by AWWA Standard C151 and Section 33 01 30.13 – Acceptance Testing for Sanitary Sewers.

E. Joints

1. Mechanical and Push-On

- a. Mechanical and push-on joints including accessories shall conform to AWWA Standard C111.

2. Flanged

- a. Flanged joints shall conform to AWWA Standard C110 or ANSI B16.1 for fittings and AWWA Standard C115 for pipe. Do not use flanged joints in underground installations except within structures.
- b. Furnish all flanged joints with 1/8-inch thick, red rubber or styrene butadiene rubber gaskets. The bolts shall have American Standard heavy unfinished hexagonal head and nut dimensions all as specified in American Standard for Wrench Head Bolts and Nuts and Wrench Openings (ANSI B18.2). For bolts of 1-3/4-inches in diameter and larger, bolt studs with a nut on each end are recommended. The high-strength, low-alloy steel for bolts and nuts shall have the characteristics listed in Table 6 of AWWA Standard C111.
- c. Stainless steel nuts and bolts are required on piping within wastewater treatment plants and pump stations.

3. Restrained Joint Pipe

- a. Restrained joints for pipes shall be of the boltless push-on type which provides joint restraint independent of the joint seal. Restrained push-on joints allowed for pipe only shall have accessories conforming to AWWA Standard C111. Restrained system shall be suitable for the following minimum working pressures:

<u>Size</u>	<u>Pressure</u>
<u>(Inch)</u>	<u>(psi)</u>
Less than 20	300
20	300
24	250
30 - 64	200

## 2.02 FITTINGS

### A. Ductile Iron Fittings

1. Standard fittings shall be ductile iron conforming to AWWA Standard C110. Compact ductile iron fittings shall meet the requirements of AWWA Standard C153.

- a. Working Pressures

Fittings shall be suitable for the following working pressures unless otherwise noted in AWWA Standard C110 or C153:

<b>Working Pressure</b>		
<u>Size</u>	Compact Fittings	Standard Fittings
<u>(Inch)</u>	Ductile Iron (psi)	
3 - 24	300	250, 300 (with special gaskets)
30 - 48	250	250
54 - 64	150	N/A

The use of standard ductile iron fittings having a 250 psi pressure rating with ductile iron pipe (having a rating of 350 psi) is not permitted except by the express written approval of Alliance Consulting Engineers, Inc.

2. Coating and Lining

The fittings shall be coated on the outside with a petroleum asphaltic coating in accordance with AWWA Standard C110 or fusion-coated epoxy in accordance with AWWA Standard C116 and lined inside with cement-mortar and seal coated in accordance with AWWA Standard C104 or fusion coated epoxy in accordance with AWWA Standard C116.

**Sewer lines shall be lined inside with fusion-coated epoxy. No exceptions.**

### B. Joints

1. Mechanical and Push-On

- a. Mechanical and push-on joints including accessories shall conform to AWWA Standard C111. Anti-Rotation T-Bolts shall be used on mechanical joints shall be of domestic origin, high strength, low alloy steel bolts only, meeting the current provisions of ANSI/AWWA C111/A21.1 for rubber gasket joints for cast iron or ductile iron pipe and fittings. Bolt manufacturer's certification of compliance must accompany each shipment. T-bolts shall be corrosion resistant to handle corrosive conditions on any buried bolts.

## 2. Flanged

- a. Flanged joints shall meet the requirements of AWWA Standard C115 or ANSI B16.1. Do not use flanged joints in underground installations except within structures. Furnish all flanged joints with minimum 1/8-inch, thick red rubber or styrene butadiene rubber full-face gaskets. The bolts shall have heavy unfinished hexagonal head and nut dimensions all as specified in ANSI B18.2. Corrosion resistant hex bolts to handle corrosive conditions shall be used on any buried flanged bolts.
- b. Bolts and nuts shall be threaded in accordance with ASME/ANSI B1.1, Unified Inch Screw Threads (UN and UNR Thread Form) class 2A external and class 2B internal. For bolts of 1-3/4-inches in diameter and larger, stud bolts with a nut on each end are recommended. Material for bolts and nuts shall conform to ASTM A307, 60,000 PSI Tensile Strength, Grade B, unless otherwise specified. Bolt manufacturer's certification of compliance must accompany each shipment.

## 3. Restrained

- a. Restrained joints for valves and fittings shall be of the boltless push-on type which provides joint restraint independent of the joint seal. Field Lok gaskets are not permitted on valves or fittings. Restrained push-on joints allowed for pipe only shall have accessories conforming to AWWA Standard C111. Restrained system shall be suitable for the following minimum working pressures:

<u>Size</u> <u>(Inch)</u>	<u>Pressure</u> <u>(psi)</u>
Less than 20	300
20	300
24	250
30 - 64	250

Where adjacent fittings are to be placed (as in a mechanical joint hydrant tee and a mechanical joint hydrant valve), the use of a suitably sized Foster adaptor is permitted to facilitate restraint between the fittings.

## PART 3 EXECUTION

### 3.01 INSTALLATION

Follow the provisions of Section 33 11 00 – Piping - General Provisions in addition to the following requirements:

#### A. Push-On Joints

Clean the surfaces that the gasket will contact thoroughly, just prior to assembly using a bacteria free solution (bleach, potable water or NSF approved material). Insert the gasket into the groove in the bell. Apply a liberal coating of special lubricant to the gasket and the spigot end of the pipe before assembling the joint. Center the spigot end in the bell and push home the spigot end.

#### B. Mechanical Joints

Clean and lubricate all components with soapy water prior to assembly. Slip the follower gland and gasket over the pipe plain end making sure that the small side of the gasket

and lip of the gland face the bell socket. Insert the plain end into socket. Push gasket into position with fingers. Seat gasket evenly. Slide gland into position, insert bolts, and tighten nuts by hand. Tighten bolts alternately (across from one another) to the recommended manufacturing rating or if not provided, to the following normal torques:

<u>Bolt Size</u>	<u>Range of Torque In Foot-Pounds</u>
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1-1/4	90 - 120

After field installation, all bolts shall receive petrolatum tape or petroleum wax protection or other approved coating material.

C. Restrained Joints

1. Ball and Socket

Assemble and install the ball and socket joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Check the retainer ring fastener.

2. Push-On

Assemble and install the push-on joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Check the retainer ring fastener.

Protect pipe from damage from the jacking device (backhoe bucket, pipe jack, etc.) when "pushing home" any pipe by using wood or other suitable (non metallic) material.

3. Mechanical Joint

Assemble and install the mechanical joint according to the manufacturer's recommendations. Thoroughly clean and lubricate the joint. Use approved restrained joint device on fittings and valves where required and approved for use by Alliance Consulting Engineers, Inc.

D. Pipe Protection

Protect pipe from damage from the jacking device (backhoe bucket, pipe jack, etc.) when "pushing home" any pipe. Wood or other suitable material (non-metallic) shall be used to push home the pipe.

E. Gaskets

Gaskets shall be as provided or recommended by the manufacturer and satisfy AWWA Standard C111 in all respects with the exception of requirements noted in Part 2.

### **3.02 MEASUREMENT AND PAYMENT**

- A. Ductile Iron Pipe will be measured and payment will be made at the unit price per “linear foot” as stated in the Bid Form and shall include cost of excavation, bedding, backfilling, cleanup, and testing.
- B. Fittings: No measurement will be made and cost for these fittings shall be included in the price bid per linear foot of the pipe with which they are used. No extra payment will be made for fittings.

**END OF SECTION**

## SECTION 33 31 00.11

### GRAVITY SANITARY SEWERS

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. Gravity sanitary sewers and appurtenances.

##### 1.02 SUBMITTALS

- A. Conform to requirements of Section 01 30 00 – Administrative Requirements.
- B. Submit proposed methods, equipment, materials and sequence of operations for sewer construction. Plan operations to minimize disruption of utilities to occupied facilities or adjacent property.
- C. Test Reports: Submit test reports as specified in Part 3 of this Section.

##### 1.03 QUALITY ASSURANCE

- A. Qualifications: Install sanitary sewer that is watertight both in pipe-to-pipe joints and in pipe-to-manhole connections. Perform testing in accordance with Section 33 01 30.13 - Acceptance Testing for Sanitary Sewers.
- B. Regulatory Requirements.
  - 1. Install sewer lines to meet minimum SCDHEC mandated separation distance from potable water lines. Separation distance is defined as distance between outside of water pipe and outside of sewer pipe. Install new sanitary sewers no closer to water lines than 10 feet in all horizontal directions. Where water and sanitary sewer lines cross, a minimum vertical separation in accordance with SCDHEC and/or local standards is required when the water line passes above the sanitary sewer main. Where separation distance cannot be achieved, sanitary sewers shall be constructed of ductile iron sanitary sewer piping (as detailed on the Construction Drawings) with a full stick of ductile iron sanitary sewer piping centered on the crossing.
  - 2. Notify Alliance Consulting Engineers, Inc. immediately when water lines are uncovered during sanitary sewer installation where minimum separation distance cannot be maintained.
  - 3. Lay gravity sewer lines in straight alignment and grade.

##### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Inspect pipe and fittings upon arrival of materials at job site.
- B. Handle and store pipe materials and fittings to protect them from damage due to impact, shock, shear or free fall. Do not drag pipe and fittings along ground. Do not roll pipe unrestrained from delivery trucks.
- C. Use mechanical means to move or handle pipe. Employ acceptable clamps, rope or slings around outside barrel of pipe and fittings. Do not use hooks, bars, or other devices in contact with interior surface of pipe to lift or move lined pipe.



## **PART 2 PRODUCTS**

### **2.01 PIPE**

- A. Provide piping materials for gravity sanitary sewers of sizes and types indicated on the Construction Drawings or as specified.
- B. Unlined reinforced concrete pipe is not acceptable.

### **2.02 PIPE MATERIAL SCHEDULE**

- A. Unless otherwise shown on the Construction Drawings, use pipe materials that conform to requirements specified in one or more of following Sections:
  - 1. Section 33 11 00.15 - Ductile Iron Pipe and Fittings.
  - 2. Section 33 11 00.11 - Polyvinyl Chloride Pipe.
- B. Where shown on Drawings, provide pipe meeting minimum class, dimension ratio, or other criteria indicated.
- C. Pipe materials other than those listed above shall not be used for gravity sanitary sewers.

### **2.03 APPURTENANCES**

- A. Laterals: Conform to requirements of Section 33 31 00.15 - Sanitary Sewer Service Laterals. (Not Applicable)
- B. Service Connections: Conform to requirements of Section 33 31 00.15 - Sanitary Sewer Service Laterals. (Not Applicable)
- C. Roof, street or other type of surface water drains shall not be connected or reconnected into sanitary sewer lines.

### **2.04 BEDDING AND BACKFILL MATERIAL**

- A. Bedding and Backfill: Conform to requirements of Section 31 23 16.13 – Trenching for Site Utilities and Section 31 23 23.13 – Backfill and Compaction.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Prepare traffic control plans and set up street detours and barricades in preparation for excavation when construction will affect traffic. Conform to requirements of Manual on Uniform Traffic Control Devices (MUTCD), and/or local standards where applicable.
- B. Provide barricades, flashing warning lights, and warning signs for excavations. Conform to requirements MUTCD and/or local standards where applicable. Maintain barricades and warning lights where work is in progress or where traffic is affected.
- C. Perform work in accordance with OSHA standards. Employ trench safety system for excavations over 5 feet deep.
- D. Immediately notify agency or company owning utility line which is damaged, broken or disturbed. Obtain approval from Alliance Consulting Engineers, Inc. and agency or utility company for repairs or relocations, either temporary or permanent.
- E. Remove, repair and or replace old pavements and structures including sidewalks and driveways in accordance with installation and local and state requirements.

- F. Install and operate dewatering and surface water control measures in accordance with Contract Document requirements.
- G. Do not allow sand, debris or runoff to enter sewer system.

### **3.02 DIVERSION PUMPING (NOT APPLICABLE)**

- A. All diversion and bypass pumping shall be performed in accordance with Section 33 01 30.73 – Sewer Bypass Pumping.

### **3.03 EXCAVATION**

- A. Earthwork: Conform to requirements of Section 31 23 16.13 – Trenching for Site Utilities. Use bedding as indicated on Drawings.
- B. Line and Grade: Establish required uniform line and grade in trench from benchmarks identified by Alliance Consulting Engineers, Inc. Maintain this control for minimum of 100 feet behind and ahead of pipe-laying operation. Use laser beam equipment to establish and maintain proper line and grade of work. Use of appropriately sized grade boards which are substantially supported is also acceptable. Protect boards and location stakes from damage or dislocation.
- C. Trench Excavation. Excavate pipe trenches to depths shown on Drawings and as specified in Section 31 23 16.13 – Trenching for Site Utilities.

### **3.04 PIPE INSTALLATION BY OPEN CUT**

- A. Install pipe in accordance with pipe manufacturer's recommendations and as specified in following paragraphs.
- B. Install pipe only after excavation is completed, bottom of trench fine graded, bedding material is installed, and trench has been approved by Alliance Consulting Engineers, Inc.
- C. Install pipe to line and grade indicated. Place pipe so that it has continuous bearing of barrel on bedding material and is laid in trench so interior surfaces of pipe follow grades and alignment indicated. Provide bell holes where necessary.
- D. Install pipe with spigot ends toward downstream end of flow such that water flows into bell and out the spigot.
- E. Form concentric joint with each section of adjoining pipe so as to prevent offsets.
- F. Keep interior of pipe clean as installation progresses. Remove foreign material and debris from pipe
- G. Provide lubricant, place and drive home newly laid sections with come-a-long winches so as to eliminate damage to sections. Install pipe to "home" mark where provided. Use of back hoes or similar powered equipment will not be allowed unless protective measures are provided and approved in advance by Alliance Consulting Engineers, Inc.
- H. Keep excavations free of water during construction and until final inspection.
- I. When work is not in progress, cover exposed ends of pipes with approved plug to prevent foreign material from entering pipe.
- J. Where gravity sanitary sewer is to be installed under existing water line with separation distance of less than 2 feet, construct new sewer pipe so that a full stick of ductile iron pipe is centered on water line crossing as detailed on the plans. If gravity sanitary sewer is to be installed above existing water line, construct new sewer pipe so that a full stick of ductile iron pipe is centered on water line crossing.

- K. Where gravity sanitary sewer is to be installed under existing water line, install new sewer using ductile iron or encased in reinforced concrete encasement as shown on the Construction Drawings. Maintain a minimum of 2-foot separation distance.
- L. Where the length of the stub is not indicated, install the stub to the right-of-way line and seal the free end with an approved plug.

### **3.05 PIPE INSTALLATION OTHER THAN OPEN CUT**

- A. For installation of pipe by directional drilling, conform to requirements of specification sections on directional drilling as appropriate.

### **3.06 INSTALLATION OF APPURTENANCES**

- A. Service Connections. Install service connections to conform to requirements of Section 33 31 00.15- Sanitary Sewer Laterals. (Not Applicable)
- B. Construct manholes to conform to requirements of Section 03 48 10 - Precast Concrete Manholes.

### **3.07 INSPECTION AND TESTING**

- A. Visual Inspection: Check pipe alignment in accordance with Section 33 01 30.13 - Acceptance Testing for Sanitary Sewers.
- B. Mandrel Testing. Use Mandrel Test to test flexible pipe for deflection. Refer to Section 33 01 30.13 - Acceptance Testing for Sanitary Sewers.
- C. Pipe Leakage Test. After backfilling line segment and prior to tie-in of service connections, visually inspect gravity sanitary sewers where feasible, and test for leakage in accordance with Section 33 01 30.13 - Acceptance Testing for Sanitary Sewers.

### **3.08 BACKFILL AND SITE CLEANUP**

- A. Backfill and compact soil in accordance with Section 31 23 16.13 – Trenching for Site Utilities.
- B. Backfill trench in specified lifts only after pipe installation is approved by Alliance Consulting Engineers, Inc.
- C. Repair and replace removed or damaged pavement, curbs, gutters, and sidewalks as specified by local base regulations.

### **3.09 MEASUREMENT AND PAYMENT**

- A. Gravity sanitary sewers will be measured and payment will be made at the unit price per "linear foot" as stated in the Bid Form and shall include cost of excavation, bedding, backfilling, cleanup, and testing.

**END OF SECTION**

## SECTION 33 32 19

### WASTEWATER PUMP STATION

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Work under this section includes, but is not limited to, furnishing and installing a duplex submersible pump station as indicated on the project drawings, herein specified, as necessary for proper and complete performance.

##### 1.02 REFERENCES

- A. Publications listed below form part of this specification to extent referenced in the text by basic designation only. Consult latest edition of publication unless otherwise noted.
  - 1. American National Std. Institute (ANSI) / American Water Works Assoc. (AWWA)
    - a. ANSI B16.1 Cast iron pipe flanges and flanged fittings.
    - b. ANSI/AWWA C115/A21.51 Cast/ductile iron pipe with threaded flanges.
    - c. ANSI 253.1 Safety Color Code for Marking Physical Hazards.
    - d. ANSI B40.1 Gages, Pressure and Vacuum.
    - e. AWWA C508 Single Swing Check Valves.
  - 2. American Society for Testing and Materials (ASTM)
    - a. ASTM A48 Gray Iron Castings.
    - b. ASTM A126 Valves, Flanges, and Pipe Fittings.
    - c. ASTM A307 Carbon Steel Bolts and Studs.
    - d. ASTM A36 Structural Steel.
  - 3. Institute of Electrical and Electronics Engineers (IEEE)
    - a. ANSI/IEEE Std 100 Standard Dictionary of Electrical Terms.
    - b. ANSI/IEEE Std 112 Test Procedure for Polyphase Induction Motors.
    - c. IEEE Std 242 Protection of Industrial and Control Power Systems.
  - 4. National Electric Code (NEC) / National Electrical Manufacturers Assoc. (NEMA)
    - a. NEC National Electric Code.
    - b. NEC 701 National Electric Code article 701.
    - c. NEMA Std MG1 Motors and Generators.

5. Miscellaneous References
  - a. Ten-State Standards Recommended Standards for Sewage Works.
  - b. Hydraulic Institute Std for Centrifugal, Rotary and Reciprocating Pumps.
  - c. NMTBA and JIC Std. National Machine Tool Builders Association and Joint Industrial Council Standards
  - d. ISO 9001 International Organization for Standardization.

### 1.03 SUBMITTALS

- A. Product Data
  1. Prior to fabrication, pump station manufacturer shall submit six (6) copies of submittal data for review and approval.
  2. Submittal shall include shop drawings, electrical ladder logic drawings, and support data as follows: Catalog cuts sheets reflecting characteristics for major items of equipment, materials of construction, major dimensions, motor and shaft drive data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), and hydraulic brake horsepower (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.
- B. Shop drawings shall provide layout of mechanical equipment and anchor bolt locations for equipment base plate. The electrical ladder logic drawings shall illustrate motor branch and liquid level control circuits to extent necessary to validate function and integration of circuits to form a complete working system.
- C. Operations Maintenance Manuals
  1. Installation shall be in accordance with written instructions provided by the pump station manufacturer. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.
  2. Documentation shall be specific to the pump station supplied and collated in functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied by the station manufacturer. Support data for any equipment supplied by others, even if mounted or included in overall station design, shall be provided by those supplying the equipment. Instructions shall include the following as a minimum:
    - a. Functional description of each major component, complete with operating instructions.
    - b. Instructions for operating pumps and pump controls in all modes of operation.
    - c. Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routine maintenance.
    - d. Support data for commercially available components not produced by the station manufacturer, but supplied in accordance with the specifications,

shall be supported by literature from the prime manufacturer and incorporated as appendices.

- e. Electrical schematic diagram of the pump station circuits shall be in accordance with NFPA70. Schematics shall illustrate, to the extent of authorized repair, pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individual components, not normally repairable by the station operator, need not be included. Details for such parts shall not be substituted for an overall system schematic. Partial schematics, block diagrams, and simplified schematics shall not be provided in lieu of an overall system diagram.
  - f. Mechanical layout drawing of the pump station and components, prepared in accordance with good commercial practice, shall provide installation dimensions and location of all pumps, motors, valves and piping.
3. Operation and maintenance instructions which rely on vendor cut-sheets and literature which include general configurations, or require operating personnel to selectively read portions of the manual shall not be acceptable. Operation and maintenance instructions must be specific to equipment supplied in accordance with these specifications.

#### **1.04 QUALITY ASSURANCE**

- A. The pump manufacturer must be ISO 9001:2000 revision certified, with scope of registration including design control and service after sales activities.
- B. Components including the pumps, motors, and controls will be tested as a complete working system at the manufacturer's facility. Tests shall be conducted in accordance with Hydraulic Institute Standards at the specified head, capacity, rated speed and horsepower. Factory operational test shall duplicate actual performance anticipated for the complete pumps.
- C. The manufacturer's technical representative shall inspect the completed installation, correct or supervise the correction of any defect or malfunction, and instruct operating personnel in the proper operation and maintenance of the equipment as described in Part 3 of this section.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver equipment in manufacturer's packaging and store per manufacturer's instructions.

#### **1.06 PROJECT/SITE CONDITIONS**

- A. These pumps will be installed in a circular concrete wet well as shown on the drawings.

#### **1.07 MANUFACTURER'S WARRANTY**

- A. The pump manufacturer shall warrant all equipment to be of quality construction, free of defects in material and workmanship. Pumps and other equipment, apparatus, and parts furnished by the pump manufacturer shall be warranted for five years or 10,000 hours of normal use, operation and service. The warranty shall be in printed form and apply to all similar units.
- B. Components failing to perform as specified by the engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer.

## PART 2 - PRODUCT

### 2.01 SYSTEM DESCRIPTION

- A. Contractor shall furnish and install a submersible duplex pump station within Clarendon County's existing Easement at the Willow Oaks Hunting, LLC Property (TMS #062-00-00-014-00) including pre-cast concrete wet well and valve vaults per the construction drawings. The wastewater pump station shall include all necessary ductile iron piping, fitting, valves, and appurtenances. The installed system station includes two (2) submersible wastewater pumps, float control system, pump control panel, generator, electrical power feed per riser diagram, and necessary conduit, wiring, etc. as detailed on the construction drawings.
- B. Wet well
1. The wet well shall be precast reinforced concrete sections conforming to ASTM C-478 or cast-in-place Portland cement conforming to ASTM C150, type II 4,000 psi and absorption shall not exceed 6%. Additional information is detailed within Division 3 of these specifications. The footing shall be concrete placed on a dry, compacted subgrade. The footing shall be designed to prevent flotation of the empty wet-well structure. The wet well shall be constructed to the dimensions shown on the drawings. The access hatch in the top slab of the wet well shall have a minimum 30" x 56" (inch) clear opening, with a live load capacity of 300 pounds per square foot as detailed within Section 05 53 10 – Aluminum Hatches. The frame shall be complete with hinged and hasp-equipped cover, upper guide holders, chain holders and stainless steel cable holder. Frame shall be securely mounted directly above the pumps. The door shall be torsion bar loaded for ease of lifting and shall have safety locking handle in open position. Fastening hardware used inside the wet well shall be stainless steel.
  2. The concrete mix design shall include a XyPex or approved equal admixture for waterproofing the wet well from exterior groundwater present. All wet-well sections shall be jointed with "Ram-Nek" joint sealer, or approved equivalent, with primer. The primer shall be applied to all contact surfaces of the concrete wall joint as recommended by the manufacturer.
  3. The Contractor shall furnish and install guide rails for each pump, to permit the raising and lowering of the pump. Guide bars shall be 316 stainless steel and of adequate length and strength to extend from the lower guide holders on the pump discharge connection to the upper guide holder mounted on the access frame. Guide rails shall be installed plumb with stainless steel intermediate supports as required by the Engineer.
  4. All conduit entering pump station should be sealed air tight at the wet well and at the control panel. Once above grade, these conduits shall also have an air gap immediately below the control panel. Conduit shall be sealed air tight on either side of the air gap.
  5. All piping and fittings within a wet well from the pump base to the valve pit shall have an epoxy prime exterior.
  6. All exposed metal piping and fittings shall receive TNEMEC, or approved equal, protective coatings with a minimum of 4.0 to 6.0 mils of Series 1028 coating system. The finish coat shall be resistant to oil mist exposure, solvent contact, and salt spray. The factory finish shall allow for over-coating and touch up after final installation.

### C. Valve Vault

1. Valve Pit shall be precast reinforced concrete sections conforming this to ASTM C-478 or cast-in-place Portland cement conforming to ASTM C150, type II 4,000 psi and absorption shall not exceed 6%. Additional information is detailed within Division 3 of these specifications. The footing shall be concrete placed on a dry, compacted sub grade. The footing shall be designed to prevent flotation of the empty wet-well structure. The valve vaults shall be constructed to the dimensions shown on the drawings. The access hatch in the top slab of the valve vault shall have a minimum 36" x 48" (inch) clear opening, with a live load capacity of 300 pounds per square foot as detailed within Section 05 53 10 – Aluminum Hatches. The hatch shall include 1/4" (inch) tread plate, flush type lock with inside spoon handle. The frame shall be complete with hinged and hasp-equipped cover, upper guide holders, chain holders and stainless steel cable holder. Frame shall be securely mounted directly above the valves. The door shall be torsion bar loaded for ease of lifting and shall have safety locking handle in open position. Fastening hardware used inside the valve pit shall be stainless steel.
2. The concrete mix design shall include a XyPex or approved equal admixture for waterproofing the valve pit from exterior groundwater present. All valve pit sections shall be jointed with "Ram-Nek" joint sealer, or approved equivalent, with primer. The primer shall be applied to all contact surfaces of the concrete wall joint as recommended by the manufacturer.
3. All piping and fittings within a wet well from the pump base to the valve pit shall have an epoxy prime exterior.
4. All exposed metal piping and fittings shall receive TNEMEC, or approved equal, protective coatings with a minimum of 4.0 to 6.0 mils of Series 1028 coating system. The finish coat shall be resistant to oil mist exposure, solvent contact, and salt spray. The factory finish shall allow for over-coating and touch up after final installation.
5. Drains from the valve pits shall discharge back to the wet well and include drain line flapping valve.

### D. Plug Valves

1. All plug valves shall be of the non-lubricated, eccentric type conforming to AWWA C517 with resilient faced plugs, and Class 125 ANSI flanges. Valves to 20" size shall be round port or have a port area equivalent to 100% of full pipe area and all valves 24" and larger shall be 100% port area. Valve body and bonnet shall be made from ASTM A536 Grade 65-45-12 ductile iron or ASTM A126 Class B cast iron, internally and externally coated with 6-mil epoxy. Valve seats shall have a welded-in overlay of high nickel content on all surfaces contacting the plug face. Valves shall have permanently lubricated, stainless steel bearings in the upper and lower plug stem journals. All valves shall have bolted bonnets and adjustable compression packing or self-adjusting U-cup packing that can be replaced without removing the bonnet. All exposed nuts, bolts, springs, and washers shall be zinc plated. O-ring seals are not acceptable.
2. All valves larger than eight (8) inches shall be equipped with a gear actuator with handwheel. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant, with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve



position and an adjustable stop shall be provided to set closing torque. All exposed nuts, bolts, and washers shall be zinc plated.

E. Check Valves

1. Check valves shall be of swing type and shall meet the materials requirements of AWWA specification C508. Check valves, 4-inch and larger, shall be cast iron body, resilient seat, swing check type suitable for use with sewage at pressures up to 200 psi minimum. Valves shall have outside lever and spring or lever and weight operation to provide full seating during low back pressure operation. Flanges shall be faced and drilled to ANSI 125 lb standard.

F. Pressure Gauge

1. Pressure gauge shall be 0 to 150 psi unless otherwise indicated on the drawings. Gauge accuracy shall be within 0.5% of the total scale range. Provide diaphragm isolators on all gauges so that their materials of construction are resistant to wastewater. Pressure shall be transmitted to the gauge by a locked in and sealed fluid such as ethylene glycol or silicone oil. Elastomer shall be Butyl or Neoprene. The pressure gauge shall be equivalent to Series 40 as manufactured by Red Valve Co. The pressure gauge will be installed in the valve pit upstream of the plug valves. The installation shall include a 3/4" (inch) tap with a stainless-steel nipple and ball valve for isolation. The ball valve shall be stainless steel.

## 2.02 PUMP DESCRIPTION

- A. The pumps and accessories shall be supplied by the pump manufacturer.
- B. Equipment acceptance shall be contingent upon the pumps ability to run continuously at full speed for periods up to twenty-four hours. A demonstration may be required by the engineer.
- C. The pump offered shall be the manufacturer's standard production model.

## 2.03 DESIGN REQUIREMENTS

- A. Furnish and install ABS submersible wastewater pump(s). Each pump shall be equipped with submersible electric motor connected for operation on 460 volts, 3-phase, 60 hertz service, with sufficient length of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and have P-MSHA Approval. The pumps shall be supplied with a mating cast iron four (4) inch discharge connection and be capable of delivering at the operating points noted below. Each pump shall be fitted with sufficient length of lifting chain or stainless-steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.
  1. Oaks Road Pump Station (XFP 101G-CB1)
    - a. 40 HP, 460 V / 3 Phase / 60 Hz, 290 GPM at 253 feet TDH

## 2.04 PUMP DESIGN

- A. The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor.

## **2.05 GUIDE RAIL BASE ASSEMBLY**

- A. There shall be no need for personnel to enter the wet well to remove or reinstall the pumps. In a wet pit installation, the discharge base & elbow assembly shall be permanently installed in the wet well and connected to the discharge piping. In order to prevent binding or separation of the pump from the guide rail system, the pumps shall connect to the guide rail base automatically and firmly, guided by two 2-inch guide pipes extending from the base elbow to the top of the station. Systems using guide cable in lieu of rigid guide bars or pipes shall not be considered acceptable. The sliding guide bracket shall be a separate part of the pumping unit, capable of being attached to standard 4 inch ANSI class 125 or metric DN100 pump flanges, so that the pump mounting is non-proprietary, and any pump with a standard discharge flange can be mounted on the base assembly. Base or bracket assemblies with proprietary or non-standard flange dimensions shall not be considered acceptable.
- B. Positive sealing of the pump flange/guide rail bracket to the discharge elbow shall be by metal to metal contact. No portion of the pump shall bear directly on the floor of the sump. The guide rail system shall be available in an optional non-sparking version.

## **2.06 PUMP CONSTRUCTION**

- A. Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle shall be of stainless steel. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
- B. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
- C. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

## **2.07 COOLING SYSTEM**

- A. Motors are sufficiently cooled by the surrounding environment or pumped media. A water jacket is not required.

## **2.08 IMPELLER**

- A. The impeller shall be of ASTM A-532 (Alloy III A), 25% chrome cast iron, dynamically balanced, semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation as they pass across a spiral groove located on the volute suction. The screw-shaped leading edges of the impeller shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 6% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. A brass sleeve shall act as a friction clutch allowing for safe motor stoppage in the event of a solid object entering the cutting area without damaging the motor shaft. The Impeller shall be held by an impeller bolt.

## 2.09 PUMP VOLUTE/SUCTION COVER

- A. The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable volute cutting ring containing five spiral-shaped, sharp-edged grooves, five shearing pockets and five sets of cutting teeth. The spiral groove shall provide the relief path and sharp edges across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The internal volute bottom shall provide effective sealing between the multi-vane semi-open impeller and the volute. The cutting ring shall be cast of ASTM A-532 (Alloy III A), 25% chrome cast iron.

## 2.10 MOTOR

- A. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.
- B. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
- C. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
- D. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

## 2.11 MECHANICAL SEALS

- A. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and

the motor housing, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide seal ring.

- B. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.
- C. The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.
- D. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load.
- E. Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.
- F. Seal lubricant shall be non-hazardous.

## 2.12 PUMP SHAFT

- A. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T.
- B. If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the oil housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

## 2.13 BEARINGS

- A. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. **Single row lower bearings are not acceptable.** The minimum  $L_{10}$  bearing life shall be 50,000 hours at any usable portion of the pump curve.

## 2.14 CABLE ENTRY SEAL

- A. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall

provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

## 2.15 VALVES AND PIPING

- A. Each pump shall be provided with a full flow type check valve with flanged ends and fitted with an external lever and spring. Each valve shall be capable of passing a three (3) inch diameter spherical solid. The valve seat shall be constructed of stainless steel, secured to the body to ensure concentricity, sealed by an O-ring, and shall be replaceable. The valve body shall be cast iron and incorporate a cleanout port large enough to allow removal and/or replacement of the valve clapper without removing valve or piping from the line. Valve clapper shall have a molded neoprene seating surface incorporating low pressure sealing rings. Valve hinge pin and internal hinge arm shall be stainless steel supported on each end in brass bushings. Shaft nut shall have double O-rings which shall be easily replaceable without requiring access to interior of valve body. Valve shall be rated at 175 PSI water working pressure, 350 PSI hydrostatic test pressure.
- B. The discharge header shall include a check valve and plug valve for each pump to permit pumps to be isolated from the common discharge header. Valves shall have ports designed to pass spherical solids equal to the pumps capability.
- C. The valve vault shall house a service tap with pressure gauge reading between 0 and 100 psi on each discharge piping to confirm pump operating point.
- D. Valves shall provide visual indication of valve closure, and shall operate solely on discharge pressure. Valves which require connection to the suction line shall not be acceptable. All valve parts exposed to sewage shall be constructed of cast iron, stainless steel, or similar corrosion resistant materials. Diaphragms, if used, shall be of fabric reinforced neoprene or similar inert material. A cleanout port, three (3) inches in diameter, shall be provided for ease of inspection, cleanout, and service. Valves shall be field adjustable for varying discharge heads.
- E. Each pump shall be equipped with a glycerin-filled compound gauge to monitor suction pressures, and a glycerin-filled pressure gauge to monitor discharge pressures. Gauges shall be a minimum of four (4) inches in diameter, and shall be graduated in feet water column. Rated accuracy shall be one (1) percent of full scale reading. Pressure gauges shall be graduated 0 to 150 psi minimum. Gauges shall be mounted and tapped on discharge piping with service saddle ball valve and pressure gauge. They shall be housed within the valve vault on a discharge piping from each pump to confirm pump operating point. Gauge installations shall be complete with all hoses and stainless steel fittings, and shall include a shutoff valve installed in each gauge inlet at the point of connection to suction and discharge pipes.
- F. Piping
  1. Flanged header pipe shall be centrifugally cast, ductile iron, complying with ANSI/AWWA A21.51/C115 and class 53 thickness.
  2. Flanges shall be cast iron class 125 and Comply with ANSI B16.1.
  3. Pipe and flanges shall be threaded and suitable thread sealant applied before assembling flange to pipe.
  4. Bolt holes shall be in angular alignment within 1/2° between flanges. Flanges shall be faced with a gasket finish.

- G. Contractor must insure all pipes connected to the pump station are supported to prevent piping loads from being transmitted to pumps or station piping. Pump station discharge force main piping shall be anchored with thrust blocks where shown on the contract drawings.

## 2.16 FINISH

- A. Pumps, piping, and exposed steel framework shall be cleaned prior to painting. Exposed surfaces to be coated with one coat gray wide range non-lift primer and one coat white acrylic alkyd wide range enamel. Paint shall be low VOC, alkyd based, high solids, semi-gloss white enamel for optimum illumination enhancement, incorporating rust inhibitive additives. The finish coat shall be 1.0 to 1.2 MIL dry film thickness (minimum), resistant to oil mist exposure, solvent contact, and salt spray. The factory finish shall allow for over-coating and touch up after final installation.

## 2.17 ELECTRICAL CONTROL COMPONENTS

- A. The pump control panel will be tested as an integral unit by the pump manufacturer. The control panel shall also be tested with the pump system as a complete working system at the pump station manufacturer's facility.
- B. Panel Enclosure
  - 1. Electrical control equipment shall be mounted within a NEMA 4X stainless steel control enclosure with a single three-point stainless steel padlockable latch. Door shall be hinged and sealed with a neoprene gasket and equipped with captive closing hardware. Control components shall be mounted on a removable steel back panel secured to enclosure with collar studs.
  - 2. All control devices and instruments shall be secured to the sub-plate with machine screws and lock washers. Mounting holes shall be drilled and tapped; self-tapping screws shall not be used to mount and component. All control devices shall be clearly labeled to indicate function.
  - 3. Pump station controls shall conform to third party safety certification. The panel shall bear a serialized UL label listed for "Enclosed Industrial Control Panels". The enclosure, and all components mounted on the sub-panel or control cover shall conform to UL descriptions and procedures. All installation requiring penetration of the control panel shall be made in such a manner and with approved devices that will maintain the panels' NEMA 4X rating. All conduits entering the control panels or other enclosures from the wet well shall be sealed with gas-tight fittings (Myers type hubs).
- B. Sub-Panel
  - 1. Control sub-panel shall be 12-gauge steel with white enamel finish. Sub-panel shall have flanges on at least two sides. All mounting holes shall be drilled and tapped at the least 8/32" and parts mounted with stainless steel machine screws. Self-tapping screws will not be accepted
- C. Inner Door
  - 1. Provide a removable inner swing door for each door of the enclosure. Inner swing doors must be 5052 brushed marine grade aluminum having a minimum thickness of 0.090 inches. The door shall have 0.5 inch flanges on three (3) sides for increased strength. The door shall be adequately sized to enclose all panel-mounted components while having a vertical swing of a minimum of 90 degrees.

Inner doors shall be held closed with a durable ¼-turn latch. The doors shall have a brushed high gloss luster. All inner door mounted components will be labeled with phenolic engraved nameplates.

D. Panel Components

1. Pump Circuit Breakers

- a. Heavy-duty, thermal-magnetic molded case pump motor circuit breakers to be manufactured by Square D Company or approved equal.
- b. Pump breakers shall be accessible through inner door.

2. Control Transformer

- a. A control circuit transformer shall be included to provide 115 VAC power to control components.
- b. Fuses selected according to NEC requirements shall protect transformer primary and secondary. Fuse blocks shall be provided with lights for indication of a blown fuse.
- c. Provide two 20 amp, 120v, 1P breakers to feed lights and remote monitoring system.

3. Surge Protective Device (SPD)

- a. SPD with a minimum surge current rating of 40,000A shall be provided. The SPD shall have LED status indicator lights. It shall be manufactured by Square D Company or approved equal.

4. Three Phase Voltage Monitor

- a. A three phase voltage monitor shall be plug-in pin type as manufactured by Diversified Corporation or approved equal. It shall monitor:
  - 1) Phase failure
  - 2) Phase reversal
  - 3) Low voltage (Brown outs)

5. Pump Protection

- a. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. At 125°C (260°F) the thermal switches shall open, stop the motor and activate an alarm.
- b. A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. Use of voltage sensitive solid state sensors and trip temperature above 125°C (260°F) shall not be allowed.
- c. The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

6. Automatic electrical alternator shall be ATC Diversified ARA120ABA or approved equal.
7. Control relays shall be plug-in blade type with indicator light. They shall be Idec type RR3B or approved equal.
8. A time delay relay shall be provided to ensure that both pumps do not restart simultaneously in the event of a power loss. Timer shall be Idec type RTE or approved equal.
9. Power terminals and control terminals shall have minimum 1/4" flat head set screws. Terminals shall be mounted on raised angled din rail for easy field access.

E. Indication and Operator Interface (mounted on panel inner doors)

1. Each pump will have a three-position switch to select 'Manual-Off-Automatic' position.
2. Each pump shall have elapsed time meter mounted on the inner door. Meters shall be wired to each starter, six-digit, non-resettable, to indicate total run time in hours and tenths.
3. The following indicating lamps shall be provided:
  - a. Pump Running per pump (green)
  - b. Pump Overtemp per pump (red)
  - c. Pump Overload per pump (red)
  - d. Pump Seal Failure per pump (red)
4. Pushbuttons shall be provided for:
  - a. Alarm Horn Silence (externally mounted)
  - b. Reset Motor Overload per pump
5. All lights and switches shall be SKS type manufactured by Square D Company or approved equal.
6. All door-mounted components shall have engraved nameplates (Two-ply laminated plastic; black letters, white background).

F. Alarm System

1. A flashing alarm light with a minimum 40 watt light bulb shall be installed at the panel and located as to be readily visible from the main road. Alarm light shall be approved for vapor tight top installation and shall have a red lexan globe.
2. A weatherproof alarm horn with back box shall be mounted on the side of the enclosure. Horn shall have a minimum 87 DBA output. The horn silencer shall be mounted on the front enclosure door.
3. Alarm horn and light shall be on at high level.
4. SCADA connections shall be provided for all run and alarm signals.



## G. Wiring and Labeling

1. Power wiring shall be properly sized MTW rated 90 degrees C. Control wiring shall be red #14 AWG, MTW, rated 90 degrees C. All panel wiring shall have polyester or vinyl-cloth numerically identified labels on each end to indicate wire number. Labels will be manufactured by Brady or approved equal. Wire will be neatly routed in the panel through polyester wire duct except from the backplate to the inner door, which shall be wrapped in a separate bundled harness for control.
2. A laminated "As-Built" wiring schematic shall be posted on the inside of the inner door. A data tag with panel and manufacturer information shall be provided on inside of enclosure door.
3. All panel mounted components including control and power terminal strips will be clearly labeled according to provided wiring diagram.
4. All UL labels shall be posted where required by 508A standards.

## H. Rating

1. The control panel shall be UL listed and labeled as an industrial control panel under UL 508 procedures.
2. The pump control panels shall be N Series as manufactured by Control Interface or approved equal.

### 2.18 LIQUID LEVEL CONTROL

- A. The manufacturer of the liquid level control system shall be Sulzer, and the liquid level control system will be tied to the pump control panel detailed on Construction Drawings. The liquid level control system shall be four (4) mechanical float type switches (primary control) as noted on the drawings at the Pump Off, Lead Pump On, Lag Pump On, and High Level Alarm elevations.
- B. The high-water level alarm system shall be tied to existing communication system for Owner operating staff via cell phone.
- C. When flow in the wet well reaches the 'lead float' level, the lead pump starts. If fluid recedes to the off level, the pump shuts off, if not, fluid will continue to rise until it reaches the 'lag float' level where the lag pump will begin to operate. Both pumps will operate until the fluid in the wet well returns to the off level where both pumps shut off. At each instance when the off float is activated, the alternator automatically reverses the sequence of pump operation allowing for equal usage of the pumps.
- D. If level continues to rise to high level, alarm light will flash and horn will sound until alarm silence is pressed.
- E. Control sequence shall be designed so that panel functions automatically again after a power failure and manual reset is not necessary. The control sequence shall also be designed to allow operation of the lead float as off and the lag float as lead in the event of off float failure.

### 2.19 CELLULAR MONITOR

- A. Furnish a cellular monitor capable of transmitting alarms and data over a cellular network. The monitor shall be enclosed within the control panel in a NEMA 1 enclosure. The monitor shall be powered by 120 volts AC and have a built-in battery backup capable of keeping

the RTU powered for 40 hours in case of primary AC failure. The monitor shall be capable of monitoring up to six (6) digital inputs.

- B. The cellular monitor shall be a Mission M110 Series RTU or latest equivalent current model as provided by Mission and shall monitor the following inputs:
  - 1. Pump 1 Run
  - 2. Pump 2 Run
  - 3. Pump 1 Alarm
  - 4. Pump 2 Alarm
  - 5. High Level Alarm
  - 6. Power failure Alarm (Generated internally)
- C. Include omnidirectional antenna with 6' cable.
- D. Include one year of prepaid cellular service.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Pump system manufacturer shall provide written instruction for proper handling. Immediately after off-loading, contractor shall inspect complete pump station and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all station serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

#### **3.02 PREPARATION**

- A. Construct precast wet well, valve vault with lid/hatch, etc. as shown on drawings.

#### **3.03 INSTALLATION**

- A. Install, level, align, and lubricate pump station as indicated on project drawings. Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery.
- B. Suction pipe connections are vacuum tight. Fasteners at all pipe connections must be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump station piping. Install and secure all service lines (level control, air release valve or pump drain lines) as required in wet well.
- C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to station control panel.
- D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.

#### **3.04 FIELD QUALITY CONTROL**

- A. Operational Test

1. Prior to acceptance by owner, an operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.
  2. After construction debris and foreign material has been removed from the wet well, contractor shall supply clear water volume adequate to operate station through several pumping cycles. Observe and record operation of pumps, suction and discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems.
- B. Manufacturer's Start-up Services
1. Coordinate station start-up with manufacturer's technical representative. The representative or factory service technician will inspect the completed installation. The services of a qualified service engineer to check the installation, supervise start-up, operation, adjust all controls for optimum equipment operation, and instruct and train owners personnel in the proper and most efficient operation and maintenance of the screening system be provided by the manufacturer for minimum 1 Man-Day or as required for complete installation and start-up.

### **3.05 CLEANING**

- A. Prior to acceptance, inspect interior and exterior of pump station for dirt, splashed material or damaged paint. Clean or repair accordingly. Remove from the job site all tools, surplus materials, scrap and debris.
- B. Remove dirt, grime, marks, etc., from pumps.

### **3.06 PROTECTION**

- A. The pumps should be placed into service immediately. If operation is delayed. Pump and its components shall be stored and maintained per manufacturer's written instructions.

### **3.07 MEASUREMENT AND PAYMENT**

- A. No separate measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the price bid for the item to which it pertains.

**END OF SECTION**

**SECTION 33 34 00**

**SANITARY UTILITY SEWERAGE FORCE MAINS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

**1.02 DESCRIPTION OF WORK:**

Extent of sewer force main work is indicated on drawings and schedules, and by requirements of this section.

**1.03 QUALITY ASSURANCE:**

A. 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.

Reference	Title
ASTM A126-93	Gray Iron Castings for Valves, Flanges and Pipe Fittings
ASTM A197-87	Cupola Malleable Iron
ASTM A307-94	Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A506-93	Steel, Sheet and Strip, Alloy, Hot rolled and Cold Rolled, Regular Quality and Structural Quality
ASTM A575-89	Steel Bars, Merchant Quality, M- Grades
ASTM-C296-88	Asbestos-Cement Pressure Pipe
ASTM C564-88	Rubber Gaskets for Cast Iron Soil Pipe and Fittings
ASTM D1248-84	Polyethylene Plastics Molding and Extrusion Materials
ASTM C478-95	Precast Reinforced Concrete Manhole Sections
ASTM D1751-83	Prefomed Expansion Joint Filler
ASTM D1752-84	Prefomed Sponge Rubber and Cork Expansion Joint Fillers
ASTM D2241-94	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2412-93	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading
ASTM D3754-91	Glass-Fiber Reinforced Thermosetting Resin Sewer and Industrial Pressure Pipe

ASTM D4161-91	Glass-Fiber Reinforced Thermosetting Resin Pipe Joints Using Flexible Elastomeric Seals
AWWA C105-93	Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids
AWWA C110-87	Ductile-Iron and Gray-Iron Fittings, 3 Inch through 48 Inch, for Water and Other Liquids
AWWA C111-85	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
AWWA C151-91	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
AWWA C200-86	Steel Water Pipe 6 Inches and Larger
AWWA C203-86	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines--Enamel and Tape--Hot-Applied
AWWA C205-89	Cement-Mortar Protective Lining and Coating for Steel Water Pipe--4 Inches and Larger--Shop Applied
AWWA C206-88	Field Welding of Steel Water Pipe
AWWA C207-86	Steel Pipe Flanges for Waterworks Services--Sizes 4 Inches through 144 Inches
AWWA C210-84	Coal-Tar Epoxy Coating System for the Interior and Exterior of Steel Water Pipe
AWWA C214-83	Tape Coating Systems for the Exterior of Steel Water Pipelines
AWWA C301-84	Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids
AWWA C303-87	Reinforced Concrete Pressure Pipe--Steel Cylinder Type, Pretensioned, for Water and Other Liquids
AWWA C600-87	Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C900-89	Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inches through 12 Inches, for Water
AWWA C905-88	Polyvinyl Chloride (PVC) Water Transmission Pipe, 14 Inches through 36 Inches
AWWA M11-85	Steel Pipe--A Guide for Design and Installation

**1.04 SUBMITTALS:**

A. Affidavit of Compliance:

Submit manufacturer's affidavit that all materials delivered comply with this specification and the cited standard specifications.

B. Shop Drawings:

Submit shop drawings for sewer force main system components, showing piping materials, size, locations, and elevations. Include details of underground structures, connections, thrust blocks, and anchors in accordance with the requirements of Section 01 30 00 – Administrative Requirements.

## PART 2 PRODUCTS

### 2.01 IDENTIFICATION:

A. Underground-Type Plastic Line Markers:

Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black printing reading "CAUTION FORCE MAIN BURIED BELOW".

B. Manufacturers:

Subject to compliance with requirements, provide plastic line markers of one of the following:

Allen Systems Inc.  
Seton Name Plate Corp.  
Or approved equal.

### 2.02 PIPES AND PIPE FITTINGS:

A. General:

Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in sewer force mains. Where more than one type of materials or products are indicated, selection is Installer's option.

B. Piping:

Provide pipes of one of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

1. Ductile-Iron Pipe:

- a) AWWA C151, with 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy or approved equal within 8 hours of surface preparation; thickness according to AWWA C150, Laying Condition 2, Class 50 minimum unless otherwise indicated. Joints conforming to AWWA C111, push-on-type unless otherwise indicated.
- b) Fittings: Ductile-iron, exterior one mil petroleum asphaltic seal coat AWWA C110; mechanical joint type, 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy or approved equal within 8 hours of surface preparation.
- c) Restrained Joints and Fittings: Restrained joints and fittings shall be located where shown on the Plans and/or specified. Restraints shall be incorporated

in the design of the joint follower gland or be incorporated in the push-on-joint pipe.

- 1) Joint Follower Gland Type: The restraint mechanism shall consist of a plurality or individually activated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to AWWA C111 and AWWA C153 of latest revision. Twist-off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices. The mechanical joint restraint shall have a working pressure of at least 150 psi with a minimum safety factor of 2:1 and shall be EBBA Iron MEGALUG or approved equal.
- 2) Push-on Joint Type: The restraint shall be an integral cast spigot retainer ring or spigot retainer bar welded to the pipe with a follower retainer ring. Push-on-joint type restraint shall be capable of resisting a thrust due an internal test pressure of 150 psi minimum.
- 3) Polyethylene Tube: Polyethylene Tube for encasement of ductile iron pipe shall conform to the requirements of AWWA C105, Type I, Class C, Grade E-1, black, with a minimum, thickness of 8 mils. Polyethylene tube shall be installed at locations shown on the Plans.

2. Polyvinyl Chloride (PVC) Pipe:

- a) Pipe: AWWA C900 for sizes 4" through 12"; Class 150, DR 18 or lower. Pipe less than 4", Class 200, SDR 21 or lower; ASTM D2241. The following supplemental conditions apply:
- b) Hydrostatic Proof Test: Each joint of pipe shall be tested at four times the rated pressure class.
- c) Joints: Pipe shall have elastomeric gasketed integral bell end. Bell section shall have thickened wall. Gasket groove wall thickness shall meet or exceed pipe barrel wall thickness.
- d) Outside Diameter: Outside diameter shall match cast or ductile iron O.D.
- e) Fittings: Ductile-iron, exterior one mil petroleum asphaltic seal coat AWWA C110; mechanical joint type, 40 mils nominal dry film thickness of Protecto 401 Ceramic Epoxy or approved equal within 8 hours of surface preparation. Restrained joints shall be provided as shown on the plans as a means of anchorage for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants.

C. Sewage Combination Air Valves:

Two-inch size unless noted otherwise. Body shall be close grained cast iron with all internal parts and float of stainless steel. The valves shall be capable of venting air from the pipeline while the pipeline is pressurized. The sewage combination air valve shall be single body, double orifice design.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering combination air valves which may be incorporated in the work include, but are not limited to, the following:

APCO Model 440 SCAV.

Empire Figure No. 942.  
Or approved equal.

D. Valve Manholes and Vaults:

Combination air valves shall be installed in manholes where indicated on the Plans. All manholes shall be precast reinforced concrete conforming to ASTM C478 except where otherwise called for on the Plans or Specifications. Points between precast concrete risers and tops shall be fully bedded in cement mortar and shall be smoothed to a uniform surface on both exterior and interior of the structure. Joints may be made with flexible rubber-type gaskets. The cover shall be stamped "Sewer."

**2.03 CONCRETE AND ACCESSORIES:**

Concrete and reinforced concrete shall conform to the requirements for concrete with a compressive strength not less than 2,500 psi. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 3 to 6 percent when maximum size of coarse aggregates exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C231. Maximum slump shall be 4 inches.

Reinforcing shall conform to ASTM 615, grades 40 or 60, free of excess rust, scale or other harmful substances.

Expansion joint filler material shall conform to ASTM D1751, D1752 or shall be resin impregnated fiberboard conforming to the physical requirements of ASTM D1752.

**PART 3 EXECUTION**

**3.01 INSPECTION:**

A. General:

Examine areas and conditions under which sewer force main materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

Pipe, fittings and accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Installer. They shall at all times be handled with care to avoid damage. In loading and unloading, they shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Coated pipe shall be handled in such a manner that a minimum of damage to the coating will result. Damaged coating shall be repaired. Pipe shall be placed on the site of work parallel with the trench alignment and with bell ends facing the direction in which the work will proceed unless otherwise directed. The interior of all pipe, fittings, and other accessories shall be kept free from dirt and foreign matter at all times. Valves shall be drained and stored in a manner that will protect them from damage by freezing.

All pipe, fittings and accessories shall be carefully lowered into the trench piece by piece by means of derrick, ropes or other suitable tools or equipment in such a manner as to prevent damage to the pipe or pipe coating. Under no circumstances shall pipe or accessories be dropped into the trench. Before lowering and while suspended, cast iron pipe shall be inspected for defects and rung with a light hammer to detect cracks. Any defective, damaged or unsound pipe shall be rejected. All foreign matter or dirt shall be removed from the inside



of the pipe before it is lowered into its position in the trench and it shall be kept clean by approved means during and after laying. Care shall be taken to prevent dirt from entering the joint space. At all times when pipe laying is not in progress, the open ends of the pipe shall be closed by approved means and no trench water shall be permitted to enter the pipe.

### **3.02 INSTALLATION OF IDENTIFICATION:**

#### **A. General:**

All sewer force mains located within public easements/rights-of-way shall have a #14 gauge insulated single strain copper wire installed directly on top of the wastewater line. The wire shall be secured to the pipe with tape or other approved method. Where wastewater service laterals connect to wastewater mains, the wire coating shall be stripped so that the bare wires can be and shall be joined together wrapped with a rubberized insulation tape. The insulation tape shall cover all areas of the exposed wire. The insulated wire must maintain electrical continuity. This tracing wire system shall be checked and tested by the Contractor, prior to acceptance of the wastewater line installation. Install continuous underground-type plastic line markers, located directly over buried lines at 12" above the pipeline.

### **3.03 INSTALLATION OF PIPE AND PIPE FITTINGS:**

#### **A. General:**

Cutting pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise directed, pipe shall be laid with the bell ends facing the direction of laying. For lines on an appreciable slope, bells shall, at the direction of the Engineer, face upgrade. Wherever necessary to deflect the pipe from straight line, whether in the vertical or horizontal plane to avoid obstructions, to plumb stems or other reasons, the degree of deflection shall be approved by the Engineer. No pipe shall be laid in water or when the trench condition or the weather is unsuitable for such work.

#### **B. Ductile-Iron Pipe:**

Install in accordance with DIPRA "Guide for the Installation of Ductile Iron Pipe".

#### **C. Steel Pipe:**

Install in accordance with AWWA M11 "Steel Pipe -Design and Installation".

#### **D. Concrete Pipe:**

Install in accordance with ACPA "Concrete Pipe Handbook".

#### **E. Glass-Fiber-Reinforced Thermosetting-Resin Pipe:**

Install in accordance with manufacturer's installation instructions.

#### **F. Polyvinyl Chloride Pipe:**

Install in accordance with manufacturer's installation instructions.

#### **G. Depth of Cover:**

A minimum cover over the top of the pipe of three (3) feet, or as shown on the plans, from the proposed paving subgrade, shoulder or finished grade shall be provided.

### **3.04 INSTALLATION OF ACCESSORIES:**

#### **A. Thrust Blocking:**

All plugs, caps, bends 11-1/4 degrees or greater and tees shall be provided with thrust blocking in accordance with the Thrust Blocking Schedule shown on the drawings. Thrust blocking shall bear directly against the undisturbed trench wall, and shall be made with concrete having a compressive strength of at least 2,500 psi. Thrust blocking should be so arranged that it will not interfere with reworking joints should such work become necessary. If the area for thrust blocking is over excavated beyond the dimensions required by the Schedule, additional concrete shall be provided to extend the thrust blocking to undisturbed earth at no additional cost to the Owner.

#### **B. Combination Air Valves:**

Shall be installed in accordance with the manufacturer's instructions in manholes as shown.

### **3.05 CONCRETE AND ACCESSORIES:**

- A. The concrete cover over steel reinforcing shall be not less than 2 inches for covers, wall and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Place and tie reinforcing securely in proper location using standard accessories. Support bars in footing and slabs on earth by means of concrete brick. Place and properly vibrate concrete in forms or excavations in a manner that will assure complete filling or spaces without voids or honeycomb. Finish concrete surfaces exposed to view by floating, troweling and rubbing as required for a neat appearance.

### **3.06 FIELD QUALITY CONTROL:**

#### **A. Piping Tests:**

Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing, and apply test pressure to stabilize system.

#### **B. Hydrostatic Tests:**

The Contractor shall provide all necessary equipment and shall perform all work required in connection with the tests. Each section shall be tested by hydrostatic pressure of 100 pounds per square inch. Each section shall be slowly filled with water, care being taken to expel all air from the pipes. If necessary, the pipe shall be tapped at high points to vent the air. The required pressure as measured at the point of lowest elevation shall be applied for not less than 2 hours and all pipe, fittings, valves, hydrants and joints shall be carefully examined for defects. All defective joints shall be repaired or replaced to the satisfaction of the Engineer.

#### **C. Leakage Test:**

A leakage test shall be conducted after the pressure test has been satisfactorily completed. The duration of the leakage test shall be 2 hours and during the test the main or section of main under test shall be subjected to a pressure of 100 psi based on the lowest point in the line or section under test, and connected to the elevation of the test gauge. Leakage is defined as the quantity of water to be supplied into the newly laid pipe or any valved section thereof, necessary to maintain the specified leakage test pressure after the air has been expelled and the pipe has been filled with water at the test pressure. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

$$L = \frac{S \times D \times (P)^{1/2}}{133,200}$$

L = allowable leakage in gallons per hour

S = length of pipe tested in feet.

D = the nominal diameter of the pipe in inches

P = the average test pressure during the leakage test in pounds per square inch gauge.

Should any test of pipe laid disclose leakage greater than the above specified. The Contractor shall at his own expense locate and repair the defective joints until leakage is within the specified allowance. This test shall be made after the installation of the base course and prior to the installation of bituminous concrete if pavement is to be placed over the water main.

### **3.07 MEASUREMENT AND PAYMENT:**

- A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the lump sum bid.

**END OF SECTION**

## SECTION 33 39 13

### SANITARY UTILITY SEWERAGE MANHOLES, FRAMES AND GRATES

#### PART 1 GENERAL

##### 1.01 DESCRIPTION

- A. The work required under this section consists of all materials, accessories, equipment, tools, and labor required to construct and/or place precast concrete manholes, where shown on the drawings.
- B. Manholes shall be constructed of specified materials to the sizes, shapes and dimensions, and at the locations shown on the plans or as otherwise directed by the Engineer. Generally, the height of manholes shall be such that the top of the manhole frame will be at the finished grade of the pavement or ground surface for manholes located in pavement, in road or street rights-of-ways or in maintained grounds. In areas other than above, the top of the manhole shall be 24 to 30 inches above the finish ground level.

##### 1.02 RELATED SECTIONS

- A. Section 03 30 00 - Cast-In-Place Concrete.
- B. Section 03 40 00 – Precast Concrete.
- C. Section 09 93 21.11 – Manhole Lining

##### 1.03 REFERENCES

- A. ASTM A 48 - Standard Specification for Gray Iron Castings.
- B. ASTM C 55 - Standard Specification for Concrete Brick.
- C. ASTM C 62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
- D. ASTM C 144 - Standard Specification for Aggregate for Masonry.
- E. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.
- F. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
- G. ASTM C 923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals.
- H. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council. ASTM C 1244 - Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

##### 1.04 SUBMITTALS

- A. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of penetrations.
- B. Product Data: Provide manhole covers, component construction, features, configuration and dimensions.

## **1.05 QUALITY ASSURANCE**

Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

## **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain materials and surrounding air temperature to minimum 50 degrees F (10 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Manhole Sections: Reinforced precast concrete in accordance with ASTM C 478, with resilient connectors complying with ASTM C 923.
- B. Manhole Sections and Joints: Water tight joints for precast manhole sections, using rubber gaskets for sealing the joints shall be in accordance with ASTM C 443.
- C. Manhole Boots: Shall be NPC Kor-N-Seal connectors or approved equal.
- D. Integral Steps: Fiber reinforced plastic in accordance with ASTM D 3753 (Not required).
- E. Concrete: As specified in Section 03 30 00 or 03 40 00.
- F. Concrete Reinforcement: As specified in Section 03 30 00 or 03 40 00.
- G. Brick: Shall conform to applicable requirements of ASTM C62 Grade NW.
- H. Mortar: Shall be a 3:1 sand-cement mix.

### **2.02 COMPONENTS**

- A. Ring and Cover: ASTM A 48, Class 30B cast iron construction, machined flat bearing surface, removable lockable cover (Bolted Watertight Cover) or removable non-lockable cover (non-bolted), closed cover design; sealing gasket; cover molded with identifying name provided by the owner. Use USF 367 for (Bolted Watertight Standard) Cover or approved equal. Or use U.S. Foundry (USF) 360-E Ring and Cover Series or approved equal for (non-bolted) covers. See plans for frame and cover requirements.
- B. Manhole Steps: Polypropylene safety steps meet to ASTM A-615 and ASTM C-478, AASHTO M-199 and all OSHA specifications. The 1/2-inch grade 60 steel reinforcing bar meets ASTM A-615. Polypropylene rungs shall be 1 inch diameter or approved equal. (Not required).
- C. Manhole Boots: Rubber boots shall be designed and manufactured to meet or exceed the requirements of ASTM C-923 "Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals". The rubber seal shall be made from a resilient rubber compound, which conforms to ASTM C923. The pipe clamp shall be manufactured from 304 series non-magnetic stainless steel, which conforms to ASTM C923 and ASTM A167.

## **2.03 CONFIGURATION**

- A. Construction: Cylindrical base, vertical sections with eccentric cone top section with tongue and groove joints.
- B. Shape: Cylindrical unless otherwise noted on the plans.
- C. Clear Inside Dimensions: 48 inch diameter or as indicated on the plans.
- D. Design Depth: As indicated on the plans.
- E. Clear Cover Opening: Shall be 20-5/8" to 22-1/2".
- F. Pipe Entry: Provide openings as indicated on the plans.
- G. Steps: Set every 15 inches as indicated on the plans. (Not required)

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify items provided by other sections of work are properly sized and located.
- B. Verify that built-in items are in proper location, and ready for roughing into work.
- C. Verify excavation for manholes is correct.

### **3.02 MANHOLES**

- A. All manhole sections shall be manufactured in accordance to ASTM C-478.
- B. Place manhole sections plumb and level, trim to correct elevations.
- C. Form and place manhole cylinder plumb and level, to correct dimensions and elevations.
- D. All manholes base sections shall have preformed inverts cast per the plans.
- E. The manhole base shall be set on an 8 inch (minimum thickness) mat of No. 57 stone or as shown on the construction drawings.
- F. Set frames and covers to correct elevations and properly anchor to the masonry. Where manholes are constructed in paved areas, the top surface of the frame and cover shall be tilted to conform to the exact slope, crown and grade of the existing or proposed pavement.
- G. Installation for the step can be cast in place or driven into pre-formed or drilled hole. The step will resist pullout forces of over 1500 lbs.

### **3.03 MASONRY WORK**

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Lay masonry units in running bond. Course one unit and one mortar joint to equal 8 inches.
- C. Form concave mortar joints.
- D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

- E. Install joint reinforcement 16 inches on center.
- F. Place joint reinforcement in first and second horizontal joints above base pad and below cover frame opening.

### 3.04 TESTING

- A. Leakage Testing: Testing shall be conducted for each precast structure or manhole in accordance with ASTM C 1244 - Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.:

Vacuum Testing: Manholes shall be tested after assembly and prior to backfilling. Stub outs, manhole boots and pipe plugs shall be secured to prevent movement while the vacuum is drawn. Installation and operation of vacuum equipment and indicating devices shall be in accordance with equipment specifications for which performance information has been provided by the manufacturer and approved by the Engineer. A measured vacuum of 10 inches of mercury (-4.91 psi) shall be established in the manhole. The time for the vacuum to drop to nine inches of mercury (-4.42 psi) shall be recorded. Acceptance standards for leakage shall be established from the elapsed time for negative pressure change from 10 inches to 9 inches of mercury. The maximum allowable leakage rate and instructions for a four foot diameter manhole shall be in accordance with the following:

- B. Testing Instructions:

1. Testing is done after complete assembly of the manhole.
2. The manhole to pipe connection should be a flexible connector, such as Kor-N-Seal or equivalent
3. All lift holes need to be plugged with a non-shrinking mortar, or equivalent.
4. The seal between the manhole sections shall be in accordance with ASTM-C 923.
5. The contractor must plug the pipe openings, taking care to securely brace the plugs and pipe.
6. With the vacuum tester in place:
7. Inflate the compression band to 40 psi to effect a seal between the vacuum base and the structure.
8. Connect the vacuum pump to the outlet port with the value open.
9. Draw a vacuum to 10" of Hg. (-4.91 psi) and close the value.
10. The test is considered passing if the vacuum remains between 9" Hg. and 10" Hg. in a time greater than one minute. If the initial test fails, the contractor can locate the leak, and the appropriate repairs made.

4' dia. Manhole Depth Minimum

Elapsed Time for a  
Pressure Change of 1 inch Hg

10 ft. or less	60 seconds
>10 ft. but < 15 ft.	75 seconds
>15 ft. but < 25 ft.	90 Seconds

For manholes five feet in diameter, add an additional 15 seconds and for manholes six feet in diameter, add an additional 30 seconds to the time requirements for four-foot diameter manholes. If the manholes fails the test, necessary repairs shall be made and the vacuum test and repairs shall be repeated until the manhole passes the test. If a manhole joint sealer is completely pulled out during the vacuum test, the manhole shall be disassembled and the sealer replaced.

**END OF SECTION**