



GREENVILLE UTILITIES COMMISSION
of
THE CITY OF GREENVILLE, NORTH CAROLINA

Request for Bids
for
GCP-10104
MEMORIAL DRIVE BRIDGE
REPLACEMENT / RFB 20-62

Request for Bids Issued:

December 21, 2020

Bids Due:

February 02, 2021



TABLE OF CONTENTS

**REQUEST FOR BIDS
TABLE OF CONTENTS**

<u>Section Title</u>	<u>Section</u>
Advertisement for Bids	A
Background Information	B
Contract Documents and Project Specifications	
Instructions to Bidders	C
Bid Form	D
Bid Bond	E
Qualifications Statement	F
Notice of Award	G
Agreement	H
Performance Bond	J
Payment Bond	K
Contractor's Application for Payment	L
Certificate of Substantial Completion	M
General Conditions	N
Supplemental Conditions	O
Work Change Directives	P
Change Orders	Q
Field Orders	R
Technical Specifications	S
Exhibits	T

END OF TABLE OF CONTENTS

Section A

Advertisement for Bids

ADVERTISEMENT FOR BIDS

by

Greenville Utilities Commission of the City of Greenville, NC

for

The Greenville Utilities Commission

GCP10104–Memorial Drive Bridge Replacement/RFB20-62

Pitt County, North Carolina

Sealed Bids for the Construction of a 1.1-mile, 8-inch steel, natural gas main will be received by the Greenville Utilities Commission in the Engineering & Operations Center Conference Room at 3355 NC Hwy 43 North, Greenville, North Carolina 27834 until 3:00 PM on Tuesday, February 02, 2021 and immediately thereafter publicly opened and read.

Bids must be enclosed in a sealed envelope, addressed to the Greenville Utilities Commission and the outside of the envelope must be marked BID FOR GCP10104 – MEMORIAL DRIVE BRIDGE REPLACEMENT / RFB 20-All Bids must include the information specified in the format specified in the Instructions to Bidders, and all Bids must be made on blank forms provided with and included in the bound document. The name, address, and license number of the Bidder must be plainly marked thereon. Oral or faxed Bids are invalid and will be rejected.

Each Bid submitted must be accompanied by cash or a certified check, drawn on a bank or trust company authorized to do business in North Carolina, payable to the Greenville Utilities Commission in an amount at least equal to five percent (5%) of the total amount of the Bid, as a guarantee that a contract will be entered into. In lieu of cash or a certified check, the Bidder may submit a bid bond in the form prescribed in G.S. 143-129 as amended by Chapter 1104 of the Public Laws of 1951.

Contractors are notified that legislative acts relating to licensing of contractors will be observed in receiving bids and awarding contracts. It is the Bidder's responsibility to ensure and to provide proof of compliance with all applicable licensing requirements.

The major items of Work include:

- Constructing, testing, cleaning, drying, purging, and filling with gas a 1.1-mile, 8-inch steel, natural gas pipeline and,
- Tying in the proposed 8-inch steel natural gas pipeline to the existing 8-inch steel natural gas pipeline.

The complete Bid Package will be posted and available at <https://www.guc.com/your-business/doing-business-us/current-bids> for download.

The right is reserved to reject any or all Bids, to waive informalities, and to award Contract or Contracts which, in the opinion of the Owner, appear to be in its best interest. The right is reserved to hold any or all Bids for a period of sixty (60) days from the opening thereof.

COVID-19 Notification

Greenville Utilities Commission is committed to the health and safety of our customers and employees. We are taking the spread of COVID-19 very seriously and continue to monitor the latest Local, State, and Federal guidance.

Our offices are presently closed to the public. We are receiving FedEx, UPS, US Mail.

GREENVILLE UTILITIES COMMISSION
(Owner)

Mr. F. Durward Tyson, Jr., P.E.
(Gas Systems Engineer)

Kimley-Horn and Associates, Inc.
4525 Main Street, Suite 1000
Virginia Beach, Virginia 23462
Phone: (757) 213-8600

Section B

Background Information

INTRODUCTION AND PROJECT DESCRIPTION

The Greenville Utilities Commission (GUC) is requesting Bids for the construction, testing, and gassing-up of the Memorial Drive Bridge Replacement Pipeline. The proposed 8-inch API 5L X-52, 0.322-inch wall thickness, fusion-bonded epoxy (FBE) and/or abrasion resistant overcoat (ARO) coated steel natural gas main is approximately 1.1 miles in length. The route of the proposed gas main ties into an existing gas main near the intersection of West 3rd Street and US-13 (South Memorial Drive) and follows US-13 (South Memorial Drive) to the north across Tar River and US-13 (South Memorial Drive), and ties into an existing gas main in the road median strip between North and South Memorial Drive just south of West Moore Street. Construction will be within existing utility easements. As designed, there is one (1) horizontal directional drill (HDD), one (1) conventional jack and bore without casing, and the remainder of the construction is designed to be performed by a conventional open trench method. The new gas main is to be hydrostatically tested to 90 psig for a maximum allowable operating pressure (MAOP) of 60 psig. The Greenville Utilities Commission intends to operate the main at 60 psig.

The Contractor will be required to deliver a tested, cleaned, purged, and gassed-up pipeline. The Contractor shall make all tie-ins between the proposed Memorial Drive Bridge Replacement Pipeline and the existing 8-inch steel natural gas pipeline. The Contractor shall coordinate the tie-ins of the proposed Memorial Drive Bridge Replacement Pipeline and existing 8-inch steel natural gas pipeline with the Greenville Utilities Commission.

GENERAL REQUIREMENTS

Contractor's bidding on the Work must have a minimum of five (5) years of experience constructing steel natural gas mains and/or pipelines according to the requirements of Title 49, Part 192, and the project Plans and Specification. Contractor must have a minimum of five (5) years of experience in horizontal directional drilling with similar diameter steel pipe, preferable in the geological region of the project.

The Owner shall provide all materials listed in the Bill of Materials contained in the drawings. The Contractor shall provide all other materials and equipment required for construction of the pipeline, fencing and asphalt paving; and for the restoration for the site following Construction.

SITE CONDITIONS

The terrain consists of gently rolling hills and low flat areas. There are wetlands, the Flood Way and the Flood Plain of the Tar River, the Tar River and several smaller streams; predominantly designed to be crossed by horizontal directional drilling. The existing road right-of-way (ROW) is cleared and may require some brush cutting and removal for construction to begin. Some minor clearing of mature growth and secondary growth timber will be required. The land surrounding the pipeline route and existing road ROW is predominantly farmland or wooded. Depending on the season and the rainfall, the site can be expected to be wet with a high-water table.

The site elevation is between approximately 30 feet above sea level (ASL) at the southern end of the gas main to approximately 17 feet below sea level (BSL) at the bottom of the Tar River. The 100-year flood elevation at the site is 26.1 feet ASL.

INTENT TO BID

on the

Greenville Utilities Commission of the City of Greenville, NC

GCP10104 – Memorial Drive Bridge Replacement / RFB 20-62

Please submit the following information to the Greenville Utilities Commission one (1) week prior to the Pre-bid Meeting, scheduled for Tuesday, January 12, 2021 at 3:00 PM. Pre-bid meeting will be conducted virtually.

Submit your response to:

F. Durward Tyson, Jr., P.E.
Greenville Utilities Commission
401 South Greene Street
Greenville, North Carolina 27834
FAX: (252) 551-2048
Email: tysonfd@guc.com

Name:		Title:	
Organization:			
Address:			
City:		State:	Zip:
E-mail Address:		Phone No.: (____) - ____ - _____	
WEB Site:		FAX No.: (____) - ____ - _____	
Authorized Signature:			Date:

Please complete the following:

Indicate the number that will be attending the Pre-Bid Meeting:
--

Section C

Instructions to Bidders

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1— Defined Terms.....	1
Article 2— Bidding Documents.....	1
Article 3— Qualifications of Bidders.....	1
Article 4— Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site.....	2
Article 5— Bidder’s Representations and Certifications.....	4
Article 6— Pre-Bid Conference.....	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.....	6
Article 12— Subcontractors, Suppliers, and Others.....	6
Article 13— Preparation of Bid.....	6
Article 14— Basis of Bid.....	7
Article 15— Submittal of Bid.....	8
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.....	9
Article 20— Bonds and Insurance.....	9
Article 21— Signing of Agreement.....	9
Article 22— Sales and Use Taxes.....	10
Article 23— Contracts to Be Assigned.....	10
Article 24— Retainage.....	10
Article 25— Partnering.....	10
Article 26— Equal Opportunity Employment.....	10

ARTICLE 1—DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

**The Greenville Utilities Commission
Engineering and Operations Center
3355 NC Hwy 43 North
Greenville, North Carolina 27834**

ARTICLE 2—BIDDING DOCUMENTS

- 2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder’s responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.
- 2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder’s qualifications to perform the Work, after submitting its Bid and Bidder must submit the following information:
- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
- B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
- C. Bidder’s state or other contractor license number, if applicable.
- D. Subcontractor and Supplier qualification information.
- E. Other required information regarding qualifications.
- F. Proof of five (5) years of recent and current experience with similar natural gas main or pipeline projects constructed under the requirements of Title 49, Part 192, having similar sized steel pipe, and including horizontal directional drilling length.

- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.
- 3.04 *OPERATOR QUALIFICATIONS*
- A. Successful Bidder will be required to meet the Greenville Utilities Commission Operator Qualification requirements for all covered tasks included in the Work under this Contract.

ARTICLE 4—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

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

4.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

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

- a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (“Baseline Conditions”). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
 - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit, the Bidder must not disturb any ongoing operations at the Site.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner’s authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.
- D. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

4.04 *Owner’s Safety Program*

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

4.05 *Other Work at the Site*

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

ARTICLE 5—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

5.01 *Express Representations and Certifications in Bid Form, Agreement*

- A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder’s examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.
- B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 6—PRE-BID CONFERENCE

- 6.01 A pre-Bid meeting will be held virtually on **January 12, 2021 at 3:00 PM EST**. Engineer will provide the virtual log-in information. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

- 7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.
- 7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

Ryan Clark, P.E.
Kimley-Horn and Associates,
4525 Main Street, Suite 1000
Virginia Beach, Virginia 23462
Email: ryan.clark@kimley-horn.com

And Copied to:

F. Durward Tyson, Jr., P.E.
Greenville Utilities Commission
3355 NC Hwy 43 North
Greenville, North Carolina 27834

Fax: (252) 551-2048
Email: tysonfd@guc.com

- 7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven (7) days prior to the date for opening of Bids may not be answered.
- 7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

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 (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within fifteen (15) days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Contract or sixty-one (61) days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven (7) days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

ARTICLE 10—LIQUIDATED DAMAGES

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

ARTICLE 11—SUBSTITUTE AND “OR EQUAL” ITEMS

- 11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 11.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 12—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 12.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work within five (5) days after Bid opening:
- A. If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.03 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 and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 13—PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 13.02 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.
- 13.03 A Bid by a partnership must 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 must be shown.
- 13.04 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.
- 13.05 A Bid by an individual must show the Bidder’s name and official address.
- 13.06 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.
- 13.07 All names must be printed in ink below the signatures.
- 13.08 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.
- 13.10 The Bid must contain evidence of Bidder’s authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

ARTICLE 14—BASIS OF BID

14.01 *Unit Price*

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

14.02 *Allowances*

- A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if

any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 15—SUBMITTAL OF BID

- 15.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.
- 15.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must 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 must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16—MODIFICATION AND WITHDRAWAL OF BID

- 16.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If within seventy-two (72) 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, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 17—OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the advertisement 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.

ARTICLE 18—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19—EVALUATION OF BIDS AND AWARD OF CONTRACT

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

ARTICLE 20—BONDS AND INSURANCE

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

ARTICLE 21—SIGNING OF AGREEMENT

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within fifteen (15) days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within ten (10) days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22—SALES AND USE TAXES

22.01 The contractor shall prepare and provide to the Owner a sales tax report with all of the Contractor's invoices.

ARTICLE 23—CONTRACTS TO BE ASSIGNED

23.01 No separate contracts for equipment or material procurement will be executed by the Owner. All materials and equipment not specifically mentioned as furnished by Owner shall be furnished by the Contractor awarded the Work.

ARTICLE 24—RETAINAGE

24.01 Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

ARTICLE 25— PARTNERING

25.01 Owner does not intend to participate in a partnering process with Contractor(s).

ARTICLE 26—EQUAL OPPORTUNITY EMPLOYMENT

26.01 The Contractor's employment practices shall be in accordance with North Carolina G.S. 168, and the North Carolina Civil Rights Act of 1964.

26.02 Greenville Utilities Commission has adopted an Affirmative Action and Minority and Women Business Enterprise Plan (M/WBE) Program. Firms submitting a proposal are attesting that they also have taken affirmative action to ensure equality of opportunity in all aspects of employment, and to utilize M/WBE suppliers of materials and/or labor. Greenville Utilities Commission's (Owner's) policy requires its contractors to document that sufficient good faith efforts have been made to provide equal opportunity for Minority and Women's Business Enterprises (M/WBE) to participate in the subcontracting and material supplier opportunities available under this contract.

26.03 The Contractor shall review the requirements and guidelines, and complete the Affidavits set forth in the Special Instructions to Bidders included in SECTION D. The Special Instructions to Bidders must be completed and submitted with the Contractor's Proposal.

Section D

Bid Form

BID FORM FOR CONSTRUCTION CONTRACT

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

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to:

F. Durward Tyson, Jr., P.E.
Greenville Utilities Commission
3355 NC Hwy 43 North
Greenville, North Carolina 27834

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—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security;
- B. List of Proposed Subcontractors;
- C. List of Proposed Suppliers;
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- E. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids; and
- F. Required Bidder Qualification Statement with supporting data.

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

A. Bidder will perform the following Work at the indicated unit prices:

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1001	Mobilization	EA	1	\$	\$
1002	Demobilization	EA	1	\$	\$
2001	Clearing and Grubbing	ACRE	1.85	\$	\$
2002	Install, Maintain & Remove Silt Fence	LF	1,630	\$	\$
2003	Furnish, Install & Remove Stone Check Dam	EA	5	\$	\$
2004	Restoration of LOD to Preconstruction Conditions (seeded, mulched, tacked, restore trees, cleaned, graded, stabilized)	ACRE	1.85	\$	\$
2005	Furnish, Install, Relocate & Remove Construction Matting	SF	17,000	\$	\$
3001	Traffic Control – Provide, Install, Maintain & Remove	LS	1	\$	\$
4001	Sight (Test) Holes in Soil	EA	3	\$	\$
4002	Sight (Test) Holes in Asphalt Pavement	EA	2	\$	\$
5001	Furnish, Install & Remove One (1) #57 Stone Construction Entrance	FT ³	830	\$	\$
5002	Sawcut & Remove Existing Residential Asphalt Driveway Near the Intersection of US-13 (S. Memorial Dr. and W. 3 rd St.	SF	675	\$	\$
5003	Furnish & Install New Residential Asphalt Driveway Near the Intersection of US-13 (S. Memorial Dr.) and W. 3 rd St.	SF	675	\$	\$
6001	Fully Completed and Successful Horizontal Directional Drill	LS	1	\$	\$
6002	Fully Completed and Successful Jack and Bore	LS	1	\$	\$
6003	Install 8", 0.322" W.T., API-5L X-52, Fusion-Bonded Epoxy Coated Pipe by Conventional Trenching at 4' to 6' depth	LF	1,330	\$	\$
6004	Install one (1) 8" Tie-In Tee	EA	2	\$	\$
6005	Cut, Cap & Abandon-in-Place 8" Existing Pipeline at Tie-In Locations	EA	2	\$	\$
6006	Furnish, Install, Maintain & Remove Hydrostatic Test Dewatering Structure	EA	1	\$	\$
6007	Hydrostatic Testing of 5,525 LF of 8" Steel Pipeline	LS	1	\$	\$

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
6008	Pigging, Drying, Purging & Gassing-up of 5,525 LF of 8" Steel Pipeline	LS	1	\$	\$
6009	Pickling 5,525 LF of 8" Steel Pipeline	LS	1	\$	\$
Total of All Unit Price Bid Items					\$

B. 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 Work will be based on actual quantities, determined as provided in the Contract Documents.

3.02 *Total Bid Price (Lump Sum and Unit Prices)*

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	\$
---	----

ARTICLE 4—TIME OF COMPLETION

- 4.01 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.
- 4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. 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.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder’s Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder’s (Contractor’s) safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no 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.
 8. Bidder 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 Bidding Documents.
 9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
 11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

- A. The Bidder certifies the following:
1. 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.
 2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
 3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
 4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. 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.
 - b. 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.
 - c. 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.
 - d. 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.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable)

COMPLETE BELOW FORM

Letter of Compliance to E-Verify for Greenville Utilities Commission

1. I have submitted a bid for contract or desire to enter into a contract with the Greenville Utilities Commission;
2. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
3. ____ After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or
4. ____ I employ less than fifteen (15) employees in the State of North Carolina.
5. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that to the best of my knowledge and subcontractors employed as a part of this bid and/or contract, are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
6. ____ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or
7. ____ Employ less than fifteen (15) employees in the State of North Carolina.

Specify subcontractor: _____

_____ (Company Name)

By: _____ (Typed Name)

_____ (Authorized Signatory)

_____ (Title)

_____ (Date)

Special Instructions to Bidders

City of Greenville/Greenville Utilities Commission Minority and/or Women Business Enterprise (M/WBE) Program

GUC Construction Guidelines and Affidavits \$100,000 and above

These instructions shall be included with each bid solicitation.

City of Greenville/Greenville Utilities Commission Minority and/or Women Business Enterprise Program

\$100,000 and Construction Guidelines for M/WBE Participants

Policy Statement

It is the policy of the City of Greenville and Greenville Utilities Commission to provide minorities and women equal opportunity for participating in all aspects of the City's and Utilities' contracting and procurement programs, including but not limited to, construction projects, supplies and materials purchases, and professional and personal service contracts.

Goals and Good Faith Efforts

Bidders responding to this solicitation shall comply with the M/WBE program by making Good Faith Efforts to achieve the following aspiration goals for participation.

	GUC	
	MBE	WBE
Construction This goal includes Construction Manager at Risk.	7%	4%

Bidders shall submit M/WBE information with their bids on the forms provided. This information will be subject to verification by GUC prior to contract award. **As of July 1, 2009, contractors, subcontractors, suppliers, service providers, or M/WBE members of joint ventures intended to satisfy GUC M/WBE goals shall be certified by the NC Office of Historically Underutilized Businesses (NC HUB) only.** Firms qualifying as "WBE" for GUC's goals must be designated as a "women-owned business" by the HUB Office. Firms qualifying as "MBE" for the GUC's goals must be certified in one of the other categories (i.e.: Black, Hispanic, Asian American, American Indian, Disabled, or Socially and Economically Disadvantaged). Those firms who are certified as both a "WBE" and "MBE" may only satisfy the "MBE" requirement. A complete database of NC HUB certified firms may be found at <http://www.doa.nc.gov/hub/>. An internal database of firms who have expressed interest to do business with the City and GUC is available at www.greenvillencmwbe.org. However, the HUB status of these firms must be verified by the HUB database. GUC shall accept NCDOT certified firms on federally funded projects only. Please note: A contractor may utilize any firm desired. However, for participation purposes, all M/WBE vendors who wish to do business as a minority or a female must be certified by NC HUB.

The Bidder shall make good faith efforts to encourage participation of M/WBEs prior to submission of bids in order to be considered as a responsive bidder. Bidders are cautioned that even though their submittal indicates they will meet the M/WBE goal, they should document their good faith efforts and be prepared to submit this information, if requested.

The M/WBE's listed by the Contractor on the **Identification of Minority/Women Business Participation** which are determined by the GUC to be certified shall perform the work and supply the materials for which they are listed unless the Contractors receive prior authorization from the GUC to perform the work with other forces or to obtain materials from other sources. If a contractor is proposing to perform all elements of the work with his own forces, he must be prepared to document evidence satisfactory to the owner of similar government contracts where he has self-performed.

The Contractor shall enter into and supply copies of fully executed subcontracts with each M/WBE or supply signed Letter(s) of Intent to the Project Manager after award of contract and prior to Notice to Proceed. Any amendments to subcontracts shall be submitted to the Project Manager prior to execution.

Instructions

The Bidder shall provide with the bid the following documentation:

Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

Affidavit A (if subcontracting)

OR

Identification of Minority/Women Business Participation
(if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

Affidavit B (if self-performing; must attest that bidder does not customarily subcontract work on this type of project—includes supplies and materials)

Within 72 hours or 3 business days after notification of being the apparent low bidder who is subcontracting anything must provide the following information:

Affidavit C (if aspirational goals are met or are exceeded)

OR

Affidavit D (if aspirational goals are not met)

After award of contract and prior to issuance of notice to proceed:

Letter(s) of Intent or Executed Contracts

****With each pay request, the prime contractors will submit the Proof of Payment Certification, listing payments made to M/WBE subcontractors.**

*****If a change is needed in M/WBE Participation, submit a Request to Change M/WBE Participation Form. Good Faith Efforts to substitute with another M/WBE contractor must be demonstrated.**

Minimum Compliance Requirements:

All written statements, affidavits, or intentions made by the Bidder shall become a part of the agreement between the Contractor and the GUC for performance of contracts. Failure to comply with any of these statements, affidavits or intentions or with the minority business guidelines shall constitute a breach of the contract. A finding by the GUC that any information submitted (either prior to award of the contract or during the performance of the contract) is inaccurate, false, or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the GUC whether to terminate the contract for breach or not. In determining whether a contractor has made Good Faith Efforts, the GUC will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts.

Identification of Minority/Women Business Participation

I, _____ (Name of Bidder)

do hereby certify that on this project, we will use the following minority/women business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work type	*M/WBE Category

*M/WBE categories: Black, African American (**B**), Hispanic, Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

If you will not be utilizing M/WBE contractors, please certify by entering zero "0"

The total value of MBE business contracting will be (\$) _____.

The total value of WBE business contracting will be (\$) _____.

Greenville Utilities Commission **AFFIDAVIT A – Listing of Good Faith Efforts**

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority/Women Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority/women business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

Greenville Utilities Commission --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20__

Notary Public _____

My commission expires _____

Greenville Utilities Commission - AFFIDAVIT C - Portion of the Work to be Performed by M/WBE Firms

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by M/WBE businesses as defined in GS143-128.2(g) and the COG/GUC M/WBE Plan sec. III is equal to or greater than 11% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

_____ (Project Name)
Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of _____% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*M/WBE Category	Work description	Dollar Value

*Minority categories: Black, African American (B), Hispanic or Latino (L), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____
Subscribed and sworn to before me this _____ day of _____ 20____
Notary Public _____
My commission expires _____

Greenville Utilities Commission **AFFIDAVIT D – Good Faith Efforts**

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 11% participation by minority/women business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify
that on the _____

(Name of Bidder)

Project ID# _____ (Project Name) _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises and a minimum of _____% of the total dollar amount of the contract with women business enterprises. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*M/WBE Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic or Latino (**L**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**S**) Disabled (**D**)

Examples of documentation required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster.
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

LETTER OF INTENT M/WBE Subcontractor Performance

Please submit this form or executed subcontracts with M/WBE firms after award of contract and prior to issuance of notice to proceed.

PROJECT: _____
(Project Name)

TO: _____
(Name of Prime Bidder/Architect)

The undersigned intends to perform work in connection with the above project as a:

___ Minority Business Enterprise ___ Women Business Enterprise

The M/WBE status of the undersigned is certified the NC Office of Historically Underutilized Businesses (required). ___ Yes ___ No

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project at the following dollar amount:

Work/Materials/Service Provided	Dollar Amount of Contract	Projected Start Date	Projected End Date

(Date)

(Address)

(Name & Phone No. of M/WBE Firm)

(Name & Title of Authorized Representative of M/WBE)

(Signature of Authorized Representative of M/WBE)

REQUEST TO CHANGE M/WBE PARTICIPATION

(Submit changes only if notified as apparent lowest bidder, continuing through project completion)

Project: _____

Bidder or Prime Contractor: _____

Name & Title of Authorized Representative: _____

Address: _____ **Phone #:** _____

_____ **Email Address:** _____

Total Contract Amount (including approved change orders or amendments): \$ _____

Name of subcontractor: _____

Good or service provided: _____

Proposed Action:

Replace subcontractor

Perform work with own forces

For the above actions, you must provide one of the following reasons (Please check applicable reason):

The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract.

The listed MBE/WBE is bankrupt or insolvent.

The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

If replacing subcontractor:

Name of replacement subcontractor: _____

The M/WBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). Yes No

Dollar amount of original contract \$ _____

Dollar amount of amended contract \$ _____

Other Proposed Action:

Increase total dollar amount of work

Add additional subcontractor

Decrease total dollar amount of work

Other

Please describe reason for requested action: _____

If adding additional subcontractor:*

The M/WBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). Yes No

**Please attach Letter of Intent or executed contract document*

Dollar amount of original contract \$ _____

Dollar amount of amended contract \$ _____

Interoffice Use Only:

Approval Y N

Date _____

Signature _____

Do not submit with the bid Do not submit with the bid Do not submit with the bid Do not submit with the bid

Pay Application No. _____
Purchase Order No. _____

Proof of Payment Certification

M/WBE Contractors, Suppliers, Service Providers

Project Name: _____

Prime Contractor: _____

Current Contract Amount (including change orders): \$ _____

Requested Payment Amount for this Period: \$ _____

Is this the final payment? ___ Yes ___ No

Firm Name	M/WBE Category*	Total Amount Paid from this Pay Request	Total Contract Amount (including changes)	Total Amount Remaining

*Minority categories: Black, African American (B), Hispanic or Latino (L), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

Date: _____

Certified By: _____
Name

_____ Title

_____ Signature

Section E

Bid Bond

BID BOND (PENAL SUM FORM)

Bidder Name: [Full formal name of Bidder] Address <i>(principal place of business)</i> : [Address of Bidder's principal place of business]	Surety Name: [Full formal name of Surety] Address <i>(principal place of business)</i> : [Address of Surety's principal place of business]
Owner Name: Greenville Utilities Commission Address: 401 South Greene Street Greenville, North Carolina 27834-1977	Bid Project <i>(name and location)</i> : GCP-10104 – Memorial Drive Bridge Replacement / RFB 20-62, Pitt County, North Carolina Bid Due Date: 02/02/2021
Bond Penal Sum: [Amount] Date of Bond: [Date]	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder _____ <i>(Full formal name of Bidder)</i> By: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____	Surety _____ <i>(Full formal name of Surety) (corporate seal)</i> By: _____ <i>(Signature) (Attach Power of Attorney)</i> Name: _____ <i>(Printed or typed)</i> Title: _____ Attest: _____ <i>(Signature)</i> Name: _____ <i>(Printed or typed)</i> Title: _____
<i>Notes: (1) Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

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 will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 of Bidder and within thirty (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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to thirty (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 (1) year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

Section F

Qualifications Statement

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business’s organizational structure:

Form of Business:	<input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation		
<input type="checkbox"/> Limited Liability Company <input type="checkbox"/> Joint Venture comprised of the following companies:			
1.			
2.			
3.			
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Pending	

1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

1.04 Provide information regarding the Business’s officers, partners, and limits of authority.

Name:		Title:	
Authorized to sign contracts:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limit of Authority:	\$
Name:		Title:	
Authorized to sign contracts:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Limit of Authority:	\$
Name:		Title:	

ARTICLE 2—LICENSING

2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

3.01 Provide information regarding Business’s Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
<input type="checkbox"/> Disadvantaged Business Enterprise		
<input type="checkbox"/> Minority Business Enterprise		
<input type="checkbox"/> Woman-Owned Business Enterprise		
<input type="checkbox"/> Small Business Enterprise		
<input type="checkbox"/> Disabled Business Enterprise		
<input type="checkbox"/> Veteran-Owned Business Enterprise		
<input type="checkbox"/> Service-Disabled Veteran-Owned Business		
<input type="checkbox"/> HUBZone Business (Historically Underutilized) Business		
<input type="checkbox"/> Other		
<input type="checkbox"/> None		

ARTICLE 4—SAFETY

4.01 Provide information regarding Business’s safety organization and safety performance.

Name of Business’s Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

4.02 Provide Worker’s Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

5.01 Provide information regarding the Business’s financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:		
Business address:		
Date of Business’s most recent financial statement:		<input type="checkbox"/> Attached
Date of Business’s most recent audited financial statement:		<input type="checkbox"/> Attached
Financial indicators from the most recent financial statement		
Contractor’s Current Ratio (Current Assets ÷ Current Liabilities)		
Contractor’s Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)		

ARTICLE 6—SURETY INFORMATION

6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

7.01 Provide information regarding Business’s insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Does provider have an A.M. Best Rating of A-VII or better?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

8.02 Provide information regarding the Business’s previous contracting experience.

Years of experience with projects like the proposed project:		
As a general contractor:		As a joint venturer:
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:		
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Provide full details in a separate attachment if the response to any of these questions is Yes.		

8.03 List all projects currently under contract in Schedule A and provide indicated information.

8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business’s experience with projects similar in type and cost of construction.

8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business’s key leaders as well.

ARTICLE 9—REQUIRED ATTACHMENTS

9.01 Provide the following information with the Statement of Qualifications:

- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
- B. Diverse Business Certifications if required by Paragraph 3.01.
- C. Certification of Business’s safety performance if required by Paragraph 4.02.
- D. Financial statements as required by Paragraph 5.01.

- E. Attachments providing additional information as required by Paragraph 8.02.
- F. Schedule A (Current Projects) as required by Paragraph 8.03.
- G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
- H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
- I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business: _____
(typed or printed name of organization)

By: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Date: _____
(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address: _____

Phone: _____

Email: _____

Schedule A—Current Projects

Name of Organization					
Project Owner		Project Name			
General Description of Project					
Project Cost		Date Project			
Key Project Personnel		Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
Name		Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name			
General Description of Project					
Project Cost		Date Project			
Key Project Personnel		Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
Name		Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner		Project Name			
General Description of Project					
Project Cost		Date Project			
Key Project Personnel		Project Manager	Project Superintendent	Safety Manager	Quality Control Manager
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
Name		Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B—Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule C—Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

Section G

Notice of Award

NOTICE OF AWARD

Date of Issuance:

Owner: Greenville Utilities Commission Owner’s Project No.: GCP-10104

Engineer: Kimley-Horn and Associates Engineer’s Project No.: 116780000

Project: Memorial Drive Bridge Replacement

Contract Name: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62

Bidder:

Bidder’s Address:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

GCP-10104 - Memorial Drive Bridge Replacement / RFB 20-62

The Contract Price of the awarded Contract is \$ _____ **(Subject to unit prices)**. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

Two (2) unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within fifteen (15) days of the date of receipt of this Notice of Award:

1. Deliver to Owner **Two (2)** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.

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 fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: **Greenville Utilities Commission**

By (signature): _____

Name (printed): _____

Title:

Copy: Engineer

Section H

Agreement

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between **Greenville Utilities Commission** (“Owner”) and _____ (“Contractor”).

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

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: **GCP-10104 - Memorial Drive Bridge Replacement / RFB 20-62**

ARTICLE 2—THE PROJECT

2.01 The project, of which the Work under the Contract Documents is a part, is generally described as follows:

- A. Construct, test, purge, and gas-up of the Memorial Drive Bridge Replacement. The proposed 8-inch NPS API-5L GR X-52, 0.322-inch wall thickness, fusion-bonded epoxy (FBE) and/or abrasion resistant overcoat (ARO) coated, steel natural gas main is approximately 1.1 miles in length. The route of the proposed gas main ties into an existing gas main near the intersection of West 3rd Street and US-13 (South Memorial Drive) and follows US-13 (South Memorial Drive) to the north across Tar River and US-13 (South Memorial Drive), and ties into an existing gas main in the road median strip between North and South Memorial Drive just south of West Moore Street. Construction will be within existing utility easements. As designed, there is one (1) horizontal directional drill (HDD), one (1) conventional jack and bore without casing, and the remainder of the construction is designed to be performed by a conventional open trench method. The new gas main is to be hydrostatically tested to 90 psig for a maximum allowable operating pressure (MAOP) of 60 psig. The Greenville Utilities Commission intends to operate the main at 60 psig.

ARTICLE 3—ENGINEER

3.01 The owner has retained Kimley-Horn and Associates (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the project that pertains to the Work has been designed by Kimley-Horn and Associates.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Days*

- A. The Work will be substantially complete within **120** days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **120** 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 and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. 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):
 1. *Substantial Completion:* Contractor shall pay Owner \$1000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.
 2. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.
- B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

- A. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item).
- B. The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 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 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 Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in 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 elsewhere in the Contract.
 - 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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. **95** percent of the value of the Work completed (with the balance being retainage). If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
 - b. **95** percent 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** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **200** percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *CONSENT OF SURETY*

- A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

ARTICLE 7—INTEREST

7.01 All amounts not paid when due will bear interest at the rate of maximum legal rate of percent.

ARTICLE 8—CONTRACT DOCUMENTS

8.01 *Contents*

- A. The Contract Documents consist of all of the following:
1. This Agreement.
 2. Bonds:
 - a. Performance bond (together with power of attorney).
 - b. Payment bond (together with power of attorney).
 3. General Conditions.
 4. Supplementary Conditions.
 5. Specifications as listed in the table of contents of the project manual (copy of list attached).
 6. Drawings (not attached but incorporated by reference) consisting of **18** sheets with each sheet bearing the following general title: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
 7. Drawings listed on the attached sheet index.
 8. Addenda (numbers ____ to _____, inclusive).
 9. Exhibits to this Agreement (enumerated as follows):
 - a. **Contractor's Bid**
 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
 - e. Warranty Bond, if any.
- B. The Contract Documents listed in Paragraph 7.01.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 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 9—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

9.01 *Contractor's Representations*

- A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:
1. Contractor has examined and carefully studied the Contract Documents, including Addenda.
 2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Contractor has considered the information known to Contractor itself; 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no 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.
 8. 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.
 9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

9.02 *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 8.02:
 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 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.

9.03 *Standard General Conditions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

Owner:

Contractor:

(typed or printed name of organization)

(typed or printed name of organization)

By: _____
(individual's signature)

By: _____
(individual's signature)

Date: _____
(date signed)

Date: _____
(date signed)

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)
(If [Type of Entity] is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____
(individual's signature)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address for giving notices:

Address for giving notices:

Designated Representative:

Designated Representative:

Name: _____
(typed or printed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Address:

Phone: _____

Phone: _____

Email: _____

Email: _____

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

License No.: _____
(where applicable)

State: _____

Section J

Performance Bond

PERFORMANCE BOND

<p>Contractor</p> <p>Name: [Full formal name of Contractor]</p> <p>Address <i>(principal place of business)</i>: [Address of Contractor's principal place of business]</p>	<p>Surety</p> <p>Name: [Full formal name of Surety]</p> <p>Address <i>(principal place of business)</i>: [Address of Surety's principal place of business]</p>
<p>Owner</p> <p>Name: Greenville Utilities Commission</p> <p>Mailing address <i>(principal place of business)</i>: 401 South Greene Street Greenville, North Carolina 27834-1977</p>	<p>Contract</p> <p>Description <i>(name and location)</i>: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62, Pitt County, North Carolina</p> <p>Contract Price: [Amount from Contract]</p> <p>Effective Date of Contract: [Date from Contract]</p>
<p>Bond</p> <p>Bond Amount: [Amount]</p> <p>Date of Bond: [Date]</p> <p><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p> <p>Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 16</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

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 will 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 may 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 will 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 does 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 does 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 will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will 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 will not be reduced or set off on account of any such unrelated obligations. No right of action will 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.
11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must 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 will be applicable.
12. Notice to the Surety, the Owner, or the Contractor must 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 will be deemed deleted therefrom and provisions conforming to such

statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will 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 will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
16. Modifications to this Bond are as follows: None

Section K

Payment Bond

PAYMENT BOND

<p>Contractor</p> <p>Name: [Full formal name of Contractor]</p> <p>Address <i>(principal place of business)</i>: [Address of Contractor's principal place of business]</p>	<p>Surety</p> <p>Name: [Full formal name of Surety]</p> <p>Address <i>(principal place of business)</i>: [Address of Surety's principal place of business]</p>
<p>Owner</p> <p>Name: Greenville Utilities Commission</p> <p>Mailing address <i>(principal place of business)</i>: 401 South Greene Street Greenville, North Carolina 27834-1977</p>	<p>Contract</p> <p>Description <i>(name and location)</i>: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62, Pitt County, North Carolina</p> <p>Contract Price: [Amount, from Contract]</p> <p>Effective Date of Contract: [Date, from Contract]</p>
<p>Bond</p> <p>Bond Amount: [Amount]</p> <p>Date of Bond: [Date]</p> <p><i>(Date of Bond cannot be earlier than Effective Date of Contract)</i></p> <p>Modifications to this Bond form: <input type="checkbox"/> None <input type="checkbox"/> See Paragraph 18</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.</p>	
Contractor as Principal	Surety
<i>(Full formal name of Contractor)</i>	<i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<p><i>Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.</i></p>	

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 will 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 will 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 will 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 will 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 will 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 will 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 satisfying 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.
12. No suit or action will 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 will be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will 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 will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will 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:
 - 16.1.1. The name of the Claimant;
 - 16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;
 - 16.1.3. 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;
 - 16.1.4. A brief description of the labor, materials, or equipment furnished;

- 16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 - 16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 - 16.1.7. The total amount of previous payments received by the Claimant; and
 - 16.1.8. 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 is 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 will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.
 18. Modifications to this Bond are as follows: None

Section L

Contractor's Application for Payment

Contractor's Application for Payment

Owner: <u>Greenville Utilities Commission</u>	Owner's Project No.: <u>GCP-10104</u>
Engineer: <u>Kimley-Horn and Associates</u>	Engineer's Project No.: <u>116780000</u>
Contractor: _____	Contractor's Project No.: _____
Project: <u>Memorial Drive Bridge Replacement</u>	
Contract: <u>GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62</u>	

Application No.: _____ **Application Date:** _____

Application Period: From _____ to _____

1. Original Contract Price	\$	-
2. Net change by Change Orders	\$	-
3. Current Contract Price (Line 1 + Line 2)	\$	-
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)	\$	-
5. Retainage		
a. _____ X \$ _____ Work Completed	\$	-
b. _____ X \$ _____ Stored Materials	\$	-
c. Total Retainage (Line 5.a + Line 5.b)	\$	-
6. Amount eligible to date (Line 4 - Line 5.c)	\$	-
7. Less previous payments (Line 6 from prior application)		
8. Amount due this application	\$	-
9. Balance to finish, including retainage (Line 3 - Line 4)	\$	-

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

(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 the Work covered by prior Applications for Payment;

(2) Title to 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 the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor: _____

Signature: _____ **Date:** _____

Recommended by Engineer	Approved by Owner
By: _____	By: _____
Title: _____	Title: _____
Date: _____	Date: _____
Approved by Funding Agency	
By: _____	By: _____
Title: _____	Title: _____
Date: _____	Date: _____

Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: Greenville Utilities Commission
Engineer: Kimley-Horn and Associates
Contractor: _____
Project: Memorial Drive Bridge Replacement
Contract: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62

Owner's Project No.: GCP-10104
Engineer's Project No.: 116780000
Contractor's Project No.: _____

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I	J	K	L
Bid Item No.	Description	Contract Information				Work Completed		Materials Currently Stored (not in G) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)				
Original Contract											
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
Original Contract Totals					\$ -		\$ -	\$ -	\$ -		\$ -

Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: Greenville Utilities Commission
Engineer: Kimley-Horn and Associates
Contractor: _____
Project: Memorial Drive Bridge Replacement
Contract: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62

Owner's Project No.: GCP-10104
Engineer's Project No.: 116780000
Contractor's Project No.: _____

Application No.: _____ **Application Period:** From _____ to _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I	J	K	L
Bid Item No.	Description	Contract Information				Work Completed		Materials Currently Stored (not in G) (\$)	Work Completed and Materials Stored to Date (H + I) (\$)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) (\$)
		Item Quantity	Units	Unit Price (\$)	Value of Bid Item (C X E) (\$)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) (\$)				
Change Orders											
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
					-		-		-		-
Change Order Totals					\$ -		\$ -	\$ -	\$ -		\$ -
Original Contract and Change Orders											
Project Totals					\$ -		\$ -	\$ -	\$ -		\$ -

Stored Materials Summary

Contractor's Application for Payment

Owner:	Greenville Utilities Commission	Owner's Project No.:	GCP-10104
Engineer:	Kimley-Horn and Associates	Engineer's Project No.:	116780000
Contractor:		Contractor's Project No.:	
Project:	Memorial Drive Bridge Replacement		
Contract:	GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62		

Application No.: _____ Application Period: From _____ to _____ Application Date: _____

A	B	C	D	E	F	Materials Stored			Incorporated in Work		L	M
						G	H	I	J	K		
Item No. (Lump Sum Tab or Bid Item No. (Unit Price Tab)	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Description of Materials or Equipment Stored	Storage Location	Application No. When Materials Placed in Storage	Previous Amount Stored (\$)	Amount Stored this Period (\$)	Amount Stored to Date (G+H) (\$)	Amount Previously Incorporated in the Work (\$)	Amount Incorporated in the Work this Period (\$)	Total Amount Incorporated in the Work (J+K) (\$)	Materials Remaining in Storage (I-L) (\$)
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
								-			-	-
Totals						\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Section M

Certificate of Substantial Completion

Section N

General Conditions

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1—Definitions and Terminology.....	1
1.01 Defined Terms.....	1
1.02 Terminology	6
Article 2—Preliminary Matters.....	7
2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance.....	7
2.02 Copies of Documents	7
2.03 Before Starting Construction	7
2.04 Preconstruction Conference; Designation of Authorized Representatives.....	8
2.05 Acceptance of Schedules	8
2.06 Electronic Transmittals	8
Article 3—Contract Documents: Intent, Requirements, Reuse.....	9
3.01 Intent.....	9
3.02 Reference Standards.....	9
3.03 Reporting and Resolving Discrepancies	10
3.04 Requirements of the Contract Documents.....	10
3.05 Reuse of Documents	11
Article 4—Commencement and Progress of the Work	11
4.01 Commencement of Contract Times; Notice to Proceed.....	11
4.02 Starting the Work.....	11
4.03 Reference Points	11
4.04 Progress Schedule.....	12
4.05 Delays in Contractor’s Progress	12
Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions	13
5.01 Availability of Lands	13
5.02 Use of Site and Other Areas.....	14
5.03 Subsurface and Physical Conditions.....	15
5.04 Differing Subsurface or Physical Conditions	16

5.05	Underground Facilities.....	17
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.....	22
6.03	Contractor’s Insurance.....	24
6.04	Builder’s Risk and Other Property Insurance.....	25
6.05	Property Losses; Subrogation	25
6.06	Receipt and Application of Property Insurance Proceeds	27
Article 7—Contractor’s Responsibilities		27
7.01	Contractor’s Means and Methods of Construction	27
7.02	Supervision and Superintendence	27
7.03	Labor; Working Hours	27
7.04	Services, Materials, and Equipment	28
7.05	“Or Equals”.....	28
7.06	Substitutes	29
7.07	Concerning Subcontractors and Suppliers.....	31
7.08	Patent Fees and Royalties.....	32
7.09	Permits	33
7.10	Taxes	33
7.11	Laws and Regulations.....	33
7.12	Record Documents.....	33
7.13	Safety and Protection	34
7.14	Hazard Communication Programs	35
7.15	Emergencies.....	35
7.16	Submittals	35
7.17	Contractor’s General Warranty and Guarantee	38
7.18	Indemnification	39
7.19	Delegation of Professional Design Services	39
Article 8—Other Work at the Site.....		40
8.01	Other Work	40
8.02	Coordination	41
8.03	Legal Relationships.....	41

Article 9—Owner’s Responsibilities	42
9.01 Communications to Contractor	42
9.02 Replacement of Engineer	42
9.03 Furnish Data	42
9.04 Pay When Due.....	42
9.05 Lands and Easements; Reports, Tests, and Drawings.....	43
9.06 Insurance.....	43
9.07 Change Orders	43
9.08 Inspections, Tests, and Approvals.....	43
9.09 Limitations on Owner’s Responsibilities	43
9.10 Undisclosed Hazardous Environmental Condition.....	43
9.11 Evidence of Financial Arrangements.....	43
9.12 Safety Programs	43
Article 10—Engineer’s Status During Construction	44
10.01 Owner’s Representative.....	44
10.02 Visits to Site.....	44
10.03 Resident Project Representative.....	44
10.04 Engineer’s Authority	44
10.05 Determinations for Unit Price Work	45
10.06 Decisions on Requirements of Contract Documents and Acceptability of Work	45
10.07 Limitations on Engineer’s Authority and Responsibilities	45
10.08 Compliance with Safety Program.....	45
Article 11—Changes to the Contract	46
11.01 Amending and Supplementing the Contract	46
11.02 Change Orders	46
11.03 Work Change Directives.....	46
11.04 Field Orders.....	47
11.05 Owner-Authorized Changes in the Work.....	47
11.06 Unauthorized Changes in the Work.....	47
11.07 Change of Contract Price	47
11.08 Change of Contract Times.....	49
11.09 Change Proposals.....	49
11.10 Notification to Surety.....	50

Article 12—Claims.....	50
12.01 Claims.....	50
Article 13—Cost of the Work; Allowances; Unit Price Work	51
13.01 Cost of the Work	51
13.02 Allowances	55
13.03 Unit Price Work.....	55
Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work	56
14.01 Access to Work.....	56
14.02 Tests, Inspections, and Approvals.....	56
14.03 Defective Work	57
14.04 Acceptance of Defective Work.....	58
14.05 Uncovering Work	58
14.06 Owner May Stop the Work	58
14.07 Owner May Correct Defective Work.....	59
Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period	59
15.01 Progress Payments.....	59
15.02 Contractor’s Warranty of Title	62
15.03 Substantial Completion.....	62
15.04 Partial Use or Occupancy	63
15.05 Final Inspection	64
15.06 Final Payment.....	64
15.07 Waiver of Claims	65
15.08 Correction Period	66
Article 16—Suspension of Work and Termination	67
16.01 Owner May Suspend Work	67
16.02 Owner May Terminate for Cause.....	67
16.03 Owner May Terminate for Convenience.....	68
16.04 Contractor May Stop Work or Terminate	68
Article 17—Final Resolution of Disputes	69
17.01 Methods and Procedures.....	69
Article 18—Miscellaneous	69
18.01 Giving Notice	69
18.02 Computation of Times.....	69

18.03	Cumulative Remedies	70
18.04	Limitation of Damages	70
18.05	No Waiver	70
18.06	Survival of Obligations	70
18.07	Controlling Law	70
18.08	Assignment of Contract.....	70
18.09	Successors and Assigns	70
18.10	Headings.....	70

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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 document prepared by Contractor, in a form acceptable to Engineer, to request 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; 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; 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.
- 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.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. 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), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations 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 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. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *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.
24. *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.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *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.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *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.
30. *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.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *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.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *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.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *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.
37. *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.
38. *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 or areas furnished by Owner which are designated for the use of Contractor.
39. *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.
40. *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.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *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 of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, 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.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *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.
50. *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 Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
1. does not conform to the Contract Documents;
 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 3. 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 Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
1. The word “furnish,” when used in connection with services, materials, or equipment, means 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, means 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, means 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. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. 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 Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor one (1) fully signed counterpart of the Agreement and one (1) 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 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 *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 the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents 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 Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document 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 versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will 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.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will 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.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. 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.

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, means 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, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer 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 or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

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

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing 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 versions, 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 precludes 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 30th 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 60th day after the day of Bid opening or the 30th 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 may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must 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 will 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 Contract Price or 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. Such an adjustment will 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 third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price 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. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. 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, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses 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.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing 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, or to improvements, structures, utilities, or similar facilities located at such adjacent lands 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 7.13, 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 in a court of competent jurisdiction; 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 will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

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

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

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* 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 Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* 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;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. 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:
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;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain 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; 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, 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 subject to the provisions of Paragraphs 4.05.D and 4.05.E.
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;
 - 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 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, then any such adjustment will 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, 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.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. 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 on the Drawings, or was not shown or indicated on the Drawings 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), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary, issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; 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
 4. 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. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. 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;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. 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, then any such adjustment will 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, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; 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 on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. 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;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, 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. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- 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, 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.I obligates 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 obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must 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 terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, 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 must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. 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.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages 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, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. 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, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. 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.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain 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.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) 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 will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, 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 and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, 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;
 - 4. apply with respect to the performance of the Work, whether such performance is 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; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other 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 Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- 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 advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. 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 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer 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.

1. 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, risks, 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 individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater 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.
 2. None of the above waivers extends 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. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, 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, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. 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 all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights 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 insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract 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 fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 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 6.04 shall maintain such proceeds in a segregated account, and 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, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *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 maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. 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 will 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.

7.04 *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 must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will 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 must 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.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, 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 equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) 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) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item 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 will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

- A. *Contractor's Request; Governing Criteria:* Unless the specification or description of an item of equipment or material 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 equipment or material under the circumstances described below. To the extent possible such requests must 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 equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.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 equipment or material that Contractor seeks to furnish or use. The application:
 - a. will 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 the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will 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 will be final and binding and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers 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 or Supplier 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 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. 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 or Suppliers 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 or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, 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 or Supplier, whether initially or as a replacement, will 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 solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *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 an 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 will be disclosed 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.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. 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.

7.10 *Taxes*

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

7.11 *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. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written 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 written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *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.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. 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.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. 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.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that 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.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. 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.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will 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.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as 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 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 by an emergency or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) 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
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must 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.C.
 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.C.
 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. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. 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, comply with the requirements of 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 will 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 or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 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, will 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 or Sample will 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.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

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 Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

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 is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, or improper modification, 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.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
1. Observations by Engineer;
 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. Use or occupancy of the Work or any part thereof by Owner;
 5. Any review and approval of a Shop Drawing or Sample submittal;
 6. The issuance of a notice of acceptability by Engineer;
 7. The end of the correction period established in Paragraph 15.08;
 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. 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 will 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 losses, damages, costs, and judgments (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 from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage 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 will 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.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

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 third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. 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.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, 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.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

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

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, 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. 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 will 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, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will 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 or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- 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.
 - 1. 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 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 8.03.B.
 - 2. 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 Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will 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 (including obligations under proposed changes in the Work).
- 9.12 *Safety Programs*
- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. 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 *Resident 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 the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *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.

10.06 *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.

10.07 *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, will 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 Contractor under 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 10.07 also apply to the Resident Project Representative, if any.

10.08 *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 of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that 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, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in 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 11.05, (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 that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. 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 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. 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.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *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. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work 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 must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates 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.

11.06 *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.C.2.

11.07 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 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 11.07.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 11.07.C).
- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will 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 will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 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 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.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 5 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 will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will 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 of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *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 must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

B. *Change Proposal Procedures*

1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
2. *Supporting Data:* 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.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must 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.

3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must 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.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *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 in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *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 are subject 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;
 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; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- 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 rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, 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 will 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 will 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 will 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 will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will 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 will 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 will be incorporated in a Change Order or other written document 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. When needed 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 will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will 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 in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, 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, will 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 accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will 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, which 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 will 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 or retained for services specifically related to the Work.
 5. Other costs consisting of 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, 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.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
- 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed 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 builder's risk or other property insurance established in accordance with Paragraph 6.04), 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 include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general 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. The cost of purchasing, renting, or furnishing small tools and hand tools.
- 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 5. 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.
- 6. Expenses incurred in preparing and advancing Claims.
- 7. 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*

- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
- 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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 for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's 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 for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

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 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 with such procedures and programs 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 will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will 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 will 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 written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will 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 additional 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, 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 will 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 defective Work as required by Engineer, then Owner may, after 7 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 for 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.
 - 2. 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 must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) 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.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from 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 has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other 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; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will 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 will be treated as an amount due as determined by Paragraph 15.01.D.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 7 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 will 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 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.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 6.04 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 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must 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 duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* 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 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will 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. 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. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *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 and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- 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 as a Claim, 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 Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect 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 adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, 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 from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, 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 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). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. 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.
- E. 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.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to 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 directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 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) written 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 7 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 will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, 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 7 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, 7 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, pursuant to Article 12; and
 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise 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;
 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 requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

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 will not constitute a waiver of that provision, nor will 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 of the Contract or 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 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is 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.

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

Section O

Supplemental Conditions

SUPPLEMENTARY CONDITIONS

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

SC-1.01 *Defined Terms*

- A. **Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:**

Geotechnical Data Report (GDR) — The factual report that collects and presents data regarding actual subsurface conditions at or adjacent to the Site, including Technical Data and other geotechnical data, prepared by or for Owner in support of the Geotechnical Baseline Report. The GDR's content may include logs of borings, trenches, and other site investigations, recorded measurements of subsurface water levels, the results of field and laboratory testing, and descriptions of the investigative and testing programs. The GDR does not include an interpretation of the data. If opinions, or interpretive or speculative non-factual comments or statements appear in a document that is labeled a GDR, such opinions, comments, or statements are not operative parts of the GDR and do not have contractual standing. Subject to that exception, the GDR is a Contract Document.

Operator Qualifications (OQ) — Each operator of a natural gas system must prepare a written Operator Qualification Plan in accordance with the criteria set forth in Title 49, CFR Part 192, Subpart N. The Greenville Utilities Commission Gas Department (Owner) requires contractors that perform covered tasks on its system that are identified in the Gas Department's Operator Qualification Plan to provide their own Operator Qualification Plan and qualification records of individuals that will perform covered tasks on the Work included under this Contract. The Owner will review the Contractor's OQ plan for compliance with the requirements of §192.805, and review the Contractor's OQ records for compliance with §192.807.

ARTICLE 2—PRELIMINARY MATTERS

SC-NONE

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-NONE

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

SC-NONE

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.01 *Availability of Lands*

- A. **Add as Paragraph 5.01.D by inserting the following:**

Owner's rights to install the Memorial Drive Bridge Gas Main Relocations are provided through Grants of Easement from the property owners and encroachment agreements with jurisdictional

authorities. Owner shall furnish the site for the pipeline to the Contractor along with such conditions and requirements for carrying out the Work on the site. The Contractor shall honor all conditions imposed on the Owner for use of site.

SC-5.03 Subsurface and Physical Conditions

B. Delete Paragraphs 5.03 of the General Conditions in its entirety and replace with the following provisions:

SC/GBR-5.03 Subsurface and Physical Conditions

C. Geotechnical Data Report:

1. This Contract contains a Geotechnical Data Report (GDR), identified as follows: *“Report of Subsurface Investigation and Geotechnical Engineering Services, Greenville Utilities Memorial Bridge Pipeline Relocation, Greenville, North Carolina, GET Project No. EC19-277G”*, July 9, 2020 prepared by GET Solutions, Inc., Elizabeth City, North Carolina.
2. The GDR is incorporated as a Contract Document. The GDR is to be used in conjunction with other Contract Documents, including the Drawings and Specifications.
3. The GDR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations. These may include ground, geological, groundwater, and other subsurface geotechnical conditions.
4. The GDR conditions shall be used to assist in the administration of the Contract’s differing site conditions clause at locations where subsurface conditions were determined in the GDR.
5. The GDR conditions shall not be used to make differing site conditions determinations at locations that have not been evaluated in the GDR.
6. The descriptions of subsurface conditions provided in the GDR are based on geotechnical investigations, laboratory tests, interpretation, interpolation, extrapolation, and analyses. Neither Owner, Engineer, nor any geotechnical or other consultant warrants or guarantees that actual subsurface conditions will be as described in the GDR, nor is the GDR intended to warrant or guarantee the use of specific means or methods of construction.
7. The behavior of the ground during construction depends substantially upon the Contractor’s selected means, methods, techniques, sequences, and procedures of construction.
8. The GDR shall not reduce or relieve Contractor of its responsibility for the planning, selection, and implementation of safety precautions and programs incident to Contractor’s means, methods, techniques, sequences, and procedures of construction, or to the Work.

SC-5.04 Differing Subsurface and Physical Conditions

A. Delete Paragraphs 5.04 of the General Conditions in its entirety and replace with the following provisions:

SC/GBR-5.04 Differing Subsurface or Physical Conditions

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

1. differs materially from conditions shown or indicated in the GDR, to the extent the GDR is inapplicable; or

2. differs materially from conditions shown or indicated in Contract Documents other than the GDR, to the extent the GDR are inapplicable; or
3. to the extent the GDR are inapplicable, 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
4. to the extent the GDR is inapplicable, is of such a nature as to require a change in the Drawings or Specifications; or
5. to the extent the GDR is inapplicable, 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 conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. Engineer's Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC/GBR 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption or continuation 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 or continuation 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 SC/GBR 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 of the General Conditions; 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 SC/GBR 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.

SC-5.06 Hazardous Environmental Conditions

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

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

ARTICLE 6—BONDS AND INSURANCE

SC-6.02 Insurance—General Provisions

A. SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.03 Contractor's Liability Insurance

- A. **This is a mandatory Supplementary Condition**, because it is the location for specifying the limits of the coverages for the insurance required in Paragraph 6.03 of the General Conditions.

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

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

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

State: Statutory

Federal, if applicable (e.g., Longshoreman’s): Statutory

Employer’s Liability:

Bodily injury, each accident \$ 1,000,000

Bodily injury by disease, each employee \$ 1,000,000

Bodily injury/disease aggregate \$ 1,000,000

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

General Aggregate \$ 1,000,000

Products – Completed Operations Aggregate \$ 1,000,000

Personal and Advertising Injury \$ 1,000,000

Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person \$ 1,000,000

Each accident \$ 1,000,000

Property Damage:

Each accident \$ 1,000,000

[or]

Combined Single Limit of \$ 1,000,000

4. Excess or Umbrella Liability:

Per Occurrence \$ 1,000,000

General Aggregate \$ 1,000,000

5. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: None

SC-6.05 Property Insurance

A. Builder’s Risk Deductible: *Not applicable.*

B. Builder’s Risk – Supplemental Insureds: *Not applicable.*

C. Builder's Risk – Supplemental Requirements: *Not applicable.*

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

Paragraph 7.02.B of the General Conditions restricts Contractor to working during "regular hours" Monday through Friday, and no work is permitted on "legal holidays."

A. SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Regular working hours for work outside of the NCDOT right-of-way limits of the Memorial Highway will be 8:00 am to 5:00 pm.
2. Regular working hours for work inside of the NCDOT right-of-way limits of the Memorial Highway will be 9:00 am to 3:30 pm.
3. Owner's holidays are:
 - a. Christmas – December 24 and 25, 2020.
 - b. New Year's Day – January 1, 2021
 - c. Martin Luther King's Jr. Day – January 18, 2021
 - d. Good Friday – April 2, 2021
 - e. Memorial Day – May 31, 2021
 - f. Independence Day – July 5, 2021
 - g. Labor Day – September 6, 2021
 - h. Veteran's Day – November 11, 2021
 - i. Thanksgiving – November 25 and 26, 2021
 - j. Christmas – December 24 and 25, 2021.

B. SC-7.02.B. Amend the first and second sentences of Paragraph 7.02.B to state "...all Work at the Site must be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday and Sunday, or any legal holiday."

C. SC-7.02.C. Add the following new paragraph immediately after Paragraph 7.02.B:

Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

D. SC-7.02.C. Add the following new subparagraph immediately after Paragraph SC-7.02.C:

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as all time in excess of 40 hours per week or time worked on scheduled holidays or weekends that occur as a result of Contractor's request and not the Owner's request.

SC-7.09 Taxes

A. SC-7.09 Add a new paragraph immediately after Paragraph 7.09.A:

- A. Owner is exempt from payment of sales and compensating use taxes of the State of North Carolina and of cities and counties thereof on all materials to be incorporated into the Work.

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

ARTICLE 8—OTHER WORK AT THE SITE

SC-8.02 Coordination

- A. Paragraph 8.02 of the General Conditions requires that if in addition to retaining Contractor, Owner will arrange to have others perform work at the Site. Owner does not intend to have other's work on the Construction site unless they are Owner's crews performing routine maintenance functions.

ARTICLE 9—OWNER'S RESPONSIBILITIES

SC-9.13 Owner's Site Representative

- A. No modifications to this section of the General Conditions.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

- A. **SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:**
 - B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.
 1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
 2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
 3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.
 4. Liaison
 - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

- c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.
5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
6. Shop Drawings and Samples:
 - a. Record date of receipt of Samples and Contractor-approved Shop Drawings.
 - b. Receive Samples which are furnished at the Site by Contractor and notify Engineer of availability of Samples for examination.
 - c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.
7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
8. Review of Work and Rejection of Defective Work
 - a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
9. Inspections, Tests, and System Start-ups:
 - a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
 - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
10. Records:
 - a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

- b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- c. Maintain records for use in preparing Project documentation.

11. Reports:

- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
- b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
- c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

14. Completion:

- a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
- b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.
- c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR will not:

- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
- 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
- 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.
5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

No suggested Supplementary Conditions in this Article.

ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

SC-13.01 Cost of the Work

- A. Equipment rental charges, particularly with respect to Contractor-owned equipment, can sometimes lead to disagreements. To reduce the possibility of such disagreements, the following Supplementary Condition may be used. Note that it requires a published reference or method for determining the costs.

SC 13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:

- a. Construction Equipment and Machinery:
 - 1) Costs of construction equipment and machinery shall be included by the Contractor in the Unit Prices bid for the Work.

SC-13.03 Unit Price Work

A. SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place.

- B. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
 1. if the extended price of a particular item of Unit Price Work amounts to 5% percent or more over the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 20% percent from the estimated quantity of such item indicated in the Agreement; and
 2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.
 - a. Tests and Inspections; Correction, Removal, or Acceptance of Defective Work

No suggested Supplementary Conditions in this Article.

ARTICLE 14—PAYMENTS TO CONTRACTOR, SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.03 Substantial Completion

- A. Paragraph 15.03.A of the General Conditions requires Contractor to give notice that the Work is substantially complete; Paragraph 15.03.B requires an inspection of the Work to determine whether Engineer agrees that the Work is substantially complete. If the Work is not substantially complete, and must be inspected again at a later point, then the following Supplementary Condition, if included in the Contract, would allow Owner to recover the cost of the re-inspection.

SC-15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

No suggested Supplementary Conditions in this Article.

ARTICLE 16—FINAL RESOLUTIONS OF DISPUTES

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 Mediation/Binding Arbitration

- A. *Mediation/Binding Arbitration:* In the event of a dispute between the Parties which the Parties are unable to resolve, the Parties shall submit their dispute to non-binding mediation before a mutually agreeable mediator prior to initiating litigation. If the Parties are unable to agree upon a mediator within thirty (30) days after failing to resolve the dispute, either Party may petition a Court of competent jurisdiction for the designation of a qualified mediator for these purposes. Each Party shall bear its own costs and expenses of participating in the mediation (including, without limitation, reasonable attorneys' fees), and each Party shall bear one-half (½) of the costs and expenses of the mediator. Unless otherwise agreed, the Parties will hold mediation in Greenville, North Carolina. The matters discussed or revealed in the mediation session shall not be revealed in any subsequent litigation.
- B. In the event the matter is not resolved in mediation, either Party may request arbitration. The Parties shall jointly select an Arbitrator, and shall be bound by the decision of the

Arbitrator with respect to any dispute between the parties with respect to this Agreement. If the parties are unable to mutually agree upon an Arbitrator, the Parties shall each select an Arbitrator, and the two Arbitrators so selected shall select a third Arbitrator, and the decision of the majority of the Arbitrators shall be conclusive and binding upon the Parties. The Parties at all times agree to equally split the costs of any Arbitrator(s) selected in an effort to resolve the dispute between the Parties. Any party desiring to resolve a dispute under the terms of this Agreement shall notify the other Party in writing, and the Parties shall seek to agree upon a mutually agreed-upon Arbitrator within a period of ten (10) days from the date of such written demand. If the Parties are unable to agree within such ten (10) day period, the Parties shall each select an Arbitrator, and the two (2) Arbitrators so selected shall select a third Arbitrator within fifteen (15) days from the date of the written demand for arbitration, and a decision shall be rendered by the Arbitrator(s) so selected within five (5) days after such Arbitrator(s) is selected.

- C. Arbitration shall be conducted in accordance with the American Arbitration Association construction industry rules.

SC-17.03 Attorneys' Fees

- A. No Modifications to this Section of the General Conditions.

Section P

Work Change Directives

Section Q

Change Orders

CHANGE ORDER NO.: [Number of Change Order]

Owner:	Greenville Utilities Commission	Owner's Project No.:	GCP-10104
Engineer:	Kimley-Horn and Associates	Engineer's Project No.:	116780000
Contractor:		Contractor's Project No.:	
Project:	Memorial Drive Bridge Replacement		
Contract Name:	GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62		
Date Issued:		Effective Date of Change Order:	

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

Description:

[Description of the change]

Attachments:

[List documents related to the change]

Change in Contract Price	Change in Contract Times [State Contract Times as either a specific date or a number of days]
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. 1 to No. [Number of previous Change Order] : \$ _____	[Increase] [Decrease] from previously approved Change Orders No.1 to No. [Number of previous Change Order] : Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: \$ _____	[Increase] [Decrease] this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

Recommended by Engineer (if required)

Accepted by Contractor

By: _____

Title: _____

Date: _____

Authorized by Owner

Approved by Funding Agency (if applicable)

By: _____

Title: _____

Date: _____

Section R

Field Orders

FIELD ORDER NO.: [Number of Field Order]

Owner: Greenville Utilities Commission Owner's Project No.: GCP-10104
Engineer: Kimley-Horn and Associates Engineer's Project No.: 116780000
Contractor: Contractor's Project No.:
Project: Memorial Drive Bridge Replacement
Contract Name: GCP10104 - Memorial Drive Bridge Replacement / RFB 20-62
Date Issued: Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference:

Specification Section(s):

Drawing(s) / Details (s):

Description:

[Description of the change to the Work]

Attachments:

[List documents supporting change]

Issued by Engineer

By: _____

Title: _____

Date: _____

Section S

Technical Specifications

SECTION 011000 –TECHNICAL SPECIFICATIONS TABLE OF CONTENTS

SPECIFICATION	DESCRIPTION	DATED
DIVISION 00	Procurement and Contracting Requirements	
000100	Technical Specifications Table of Contents	14 Dec. 2020
000115	List of Drawing Sheets	14 Dec. 2020
DIVISION 01	General Requirements	
011000	Summary of Work	14 Dec. 2020
013100	Project Management and Coordination	14 Dec. 2020
013200	Construction Progress Documentation	14 Dec. 2020
013300	Submittal Procedures	14 Dec. 2020
015100	Environmental Protection	14 Dec. 2020
015200	Erosion and Sediment Control	14 Dec. 2020
017419	Construction Waste Management and Disposal	14 Dec. 2020
017839	Project Record Documents	14 Dec. 2020
019115	Pipeline Cleaning, Testing, Drying, Tie-In, Purging, and Gas-Up	14 Dec. 2020
DIVISION 05	Metals	
055101	Natural Gas Pipeline Welding	14 Dec. 2020
055110	Steel Natural Gas Pipeline Construction	14 Dec. 2020
DIVISION 31	Earthwork	
315001	Excavation, Trenching and Backfilling for Pipeline	14 Dec. 2020
315010	Horizontal Directional Drilling	14 Dec. 2020
315050	Jacking and Boring	14 Dec. 2020
DIVISION 32	Exterior Improvements	
321216	Asphalt Paving	14 Dec. 2020
329100	ROW Restoration	14 Dec. 2020

END OF SECTION 000100

SECTION 000115 – LIST OF CONTRACT DRAWING SHEETS

1.1 LIST OF DRAWINGS

- A. Drawings: Drawings consist of the Contract Plans and Details listed in the Table of Contents on the cover page of the separately bound drawing sets titled:
1. **GCP10104 – Memorial Drive Bridge Replacement**, dated December 14, 2020, as modified by subsequent Addenda and Contract modifications.
- B. List of Contract Plan Sheets according to the drawing set:
1. **GCP10104 – Memorial Drive Bridge Replacement**, dated December 14, 2020

SHEET NUMBER	SHEET DESCRIPTION	DATE
000-000	COVER SHEET	14 Dec. 2020
000-001	GENERAL NOTES	14 Dec. 2020
600-001	PLAN & PROFILE	14 Dec. 2020
600-002	PLAN & PROFILE	14 Dec. 2020
600-003	PLAN & PROFILE	14 Dec. 2020
600-004	PLAN & PROFILE	14 Dec. 2020
600-005	PLAN & PROFILE	14 Dec. 2020
800-001	DETAILS	14 Dec. 2020
800-002	E&SC DETAILS	14 Dec. 2020
800-003	E&SC DETAILS CONT.	14 Dec. 2020
800-004	NCG01 GROUND STABILIZATION AND MATERIALS HANDLING	14 Dec. 2020
800-005	NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING	14 Dec. 2020
900-001	WORK ZONE ADVANCE WARNING	14 Dec. 2020
900-002	TEMPORARY LANE CLOSURE	14 Dec. 2020
900-003	TRAFFIC CONTROL DESIGN LENGTHS	14 Dec. 2020
900-004	TRAFFIC CONTROL BUFFER & SIGHT DISTANCE	14 Dec. 2020
900-005	TRAFFIC CONTROL BARRIER FLARE RATES	14 Dec. 2020
900-006	TRAFFIC CONTROL SIGN SPACING	14 Dec. 2020

END OF SECTION 000115

SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project description.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Owner-furnished products.
5. Contractor-furnished products.
6. Access to site.
7. Coordination with land owners and/or tenants
8. Work restrictions.
9. Specification and drawing conventions.
10. Miscellaneous provisions.

B. Related Requirements:

1. Requirements resulting from permitting, easement and land acquisition
2. The WORK covered by these Specifications consists of the performance of all operations and the furnishing of all labor, equipment, supplies, incidental materials, and other facilities as required for the construction of the natural gas pipeline complete, tested, and accepted.
3. All WORK on the natural gas system shall be performed in accordance with:
 - a. Title 49 of the Code of Federal Regulations, Chapter I, Part 192 (49 CFR 192), "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards," and any other applicable standards which are hereby incorporated into these Specifications by reference.
 - b. The Greenville Utilities Commission Gas Department Natural Gas Operations and Maintenance Plan.
 - c. The pipeline is designed to meet the requirements for a natural gas main to be operated at less than 20% SMYS.

4. Safety
 - a. Suitable barricades, lights, applicable signs, flagmen, and watchmen shall be provided when required by the Engineer and/or the North Carolina Department of Transportation in all areas in which Work is performed. All safety related equipment specified herein shall be in full compliance with the minimum governing regulation subject to approval of the Engineer and shall be included in the Contract price.
 - b. General construction operations applicable to gas facilities installation shall be performed in accordance with Title 29 of the Code of Federal Regulations, Chapter I (29 CFR 1926), "Occupational Safety and Health Standards for the Construction Industry"; and any other applicable standards, which are hereby incorporated into these Specifications by reference.

1.3 PROJECT INFORMATION

- A. Project Identification: GCP-10104 - Memorial Drive Bridge Replacement / RFB 20-62
 1. Project Location: Pitt County, North Carolina.
- B. Owner: Greenville Utilities Commission of the City of Greenville, North Carolina.
 1. Owner's Representative: F. Durward Tyson, Jr., P.E.
- C. Engineer: Kimley-Horn and Associates (Kimley-Horn).
- D. Engineer's Consultants: The Engineer has retained the following design professionals who have prepared designated portions of the Contract Documents:
 1. KCI – Project Surveying.
 2. GET – Project Geotechnical Services.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 1. Fabricate, install, clean, test, purge, gas-up, tie-in, and commission:
 - a. Approximately 1.1 mile of 8-inch API-5L X-52, 0.322-inch wall thickness, coated steel line pipe by conventional direct burial, horizontal directional drilling, and jack and bore methods;
- B. Type of Contract:
 1. Project will be constructed under a single prime contract.
 - a. GCP-10104 - Memorial Drive Bridge Replacement \ RFB 20-62

- b. Contract will be awarded as a Unit Price Contract.

1.5 PHASED CONSTRUCTION

- A. The Work shall be conducted in one (1) phase.
- B. Before commencing Work, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates for the Work.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
 - 1. All Work will be confined to the public street right-of-way and no temporary construction easements are anticipated. Owner will provide space at 801 Mumford Road for workspace, staging or material storage, if needed.
 - 2. Acquire all highway encroachment agreements identified as needed during design.

1.7 WORK UNDER SEPARATE CONTRACTS

- A. There are no planned separate contracts.

1.8 FUTURE WORK

- 1. Not used.

1.9 PURCHASE CONTRACTS

- 1. Not used.

1.10 OWNER-FURNISHED MATERIALS

- A. Owner will furnish products and materials indicated on the Bills of Materials in the Project Drawings. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products, testing, and tying-in to the existing natural gas distribution system. The Contractor shall regulate supplies so that at all times there will be a sufficient quantity of material on site to prevent delaying the Work.

1.11 CONTRACTOR-FURNISHED PRODUCTS

- A. Contractor shall furnish all products, materials, equipment not listed as Owner-Furnished in these Specifications.

B. Contractor-Furnished, Owner-Installed Products:

1. None

1.12 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.13 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
2. Comply with NCDOT Highway Encroachment requirements for limited access and specific work hours along US-13 (North Memorial Drive).

- B. On-Site Work Hours: During normal business working hours of 7:00 a.m. to 5:30 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: As approved by Owner.
2. Early Morning Hours: As approved by Owner.
3. Hours for Utility Shutdowns: Not applicable.
4. The following general conditions apply to work involving access to the site from US-13 (North Memorial Drive), and work within the US-13 right-of-way unless modified by NCDOT or otherwise directed by Owner/Engineer:
 - a. Do not close or narrow lanes as follows:
 - 1) 3:30 PM to 9:00 AM Monday through Saturday
 - 2) Lane closures will be allowed on Sunday during daylight hours
 - b. Do not close or narrow travel lanes during holidays and special events as follows:
 - 1) Holiday
 - a) For any unexpected occurrence that creates unusually high traffic volumes, as directed by the Engineer;
 - b) For New Years between the hours of 3:30 PM December 31st to 9:00 AM January 2nd. If New Year's Day is on a Friday, Saturday, Sunday, or Monday, then until 9:00AM the following Tuesday;
 - c) For Easter, between the hours of 3:30 PM Thursday and 8:00 AM Monday;
 - d) For Memorial Day, between the hours of 3:30 PM Friday and 8:00 AM Tuesday; and
 - e) For Independence Day, between the hours of 3:30 PM the day before Independence Day and 8:00 AM the day after Independence Day. If Independence Day is on a Friday, Saturday, Sunday, or Monday, then between the hours of 3:30 PM the Thursday before Independence Day and 8:00 AM the Tuesday after Independence Day.

- C. Employee Screening: Comply with Owner's requirements for drug, alcohol and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

1.14 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 - 3. In addition to the Specifications, the project Drawings (Plans) include notes, details, conditions, and special provisions that supplement and clarify the project Specification, Plans and Permit requirements. The requirements of these notes, details, conditions, and special provisions are to be performed by the Contractor.
 - 4. The Steel Alignment Sheets were developed from digital files obtained from the NCDOT. All features shown on these drawings, such as the trees, roads, edge of pavement, and buildings are located on these sheets as seen from the aerial photography and not a site survey. A planimetric site survey was performed within the existing utility easements to verify and correct the drawings where needed. The contour lines are developed from LIDAR at a 10-foot contour interval with 2-foot interpolated contour lines. Additional topographic surveys were performed at the crossing locations to provide more accurate vertical detail for design. The pipe was positioned from a field investigation of the pipeline route and is located on the alignment sheets in reference to existing rights of way, structures, fence lines, or edge of pavement (EP) as determine in the field. The location of existing structures and pavement edges on the alignment sheets may be distorted slightly in some areas, however the dimensional call outs of the pipe location are accurate to true physical conditions. Underground utilities are shown on the plans as located by Greenville Utilities and locating services provided through North Carolina 811. Utility locations were verified with existing mapping and surface features, and test holes where indicated on the plans.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

1.15 MISCELLANEOUS PROVISIONS

- A. None.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 1. General coordination procedures.
 2. Coordination drawings.
 3. Requests for Information (RFIs).

1.3 DEFINITIONS

- A. RFI: Request from Owner, Construction Manager, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work. Include the following information in tabular form:
 1. Name, address, and telephone number of entities performing subcontract or supplying products.
 2. Services subcontractor will perform.
- B. Key Personnel Names: Within ten (10) working days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 1. Submit the list to the Owner's Project Manager, Engineer and key Contractor and Subcontractor staff.

1. The Gas Department requires contractors that perform covered tasks on its system that are identified in the Gas Department's Operator Qualification Plan to **provide their own Operator Qualification Plan and individual qualifications**.
 - a. Owner will review the Contractor's Operator Qualification Plan, including their defined covered tasks. The review shall determine:
 - 1) If the plan meets the requirements of §192.805, and
 - 2) If the identified covered tasks meet the requirements of the work to be performed on the GUC's natural gas system.
 - b. Owner will review the Contractor's individual employee qualifications to determine if all anticipated tasks to be performed during the work have qualified individuals to perform or to supervise the work.
2. As applicable, post copies of list in project meeting room and in temporary field offices.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and Owner's construction crews to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Not used.

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Engineer and Construction Manager.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, survey station(s), and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Engineer.
 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Engineer's and Construction Manager's Action: Engineer and Construction Manager will review each RFI, determine action required, and respond. Allow five (5) working days for Engineer's

response for each RFI. RFIs received by Engineer or Construction Manager after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
3. ENGINEER's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within five (5) days of receipt of the RFI response.
- E. On receipt of Engineer's and Construction Manager's action, immediately distribute the RFI response to affected parties. Review response and notify Engineer within five (5) days if Contractor disagrees with response.
 1. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT WEB SITE

- A. Not used.

1.9 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
- B. Preconstruction Conference: Owner will schedule and conduct a preconstruction conference with the Contractor and Engineer before starting construction and after execution of the Agreement. The preconstruction conference will be conducted virtually at a date and time that will be determined at a later time by the Owner.
 1. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

- C. Pre-Commissioning Cleaning, Testing, Drying, Purging, Tying-in, and Gas-up Conference: Construction Manager will schedule a conference a minimum of ten (10) working days prior to the commencement of facility commissioning.
1. A minimum of five working days prior to the conference, Contractor shall deliver his written plan for Cleaning, Testing, Drying, Purging, Tying-in, and Gas-up of the pipeline and facilities.
 2. Contractor will review his commissioning procedure with Owner, Engineer and Construction Manager and all personal critical to the success of the commissioning.
 3. Contractor shall present and discuss his commissioning safety plan.
 4. Requirements apply to pipeline.
- D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Engineer, but no later than ten (10) days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Construction Manager, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Preparation of Contractor's punch list.
 - e. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - f. Submittal procedures.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals.
1. Attendees: In addition to representatives of Owner, Construction Manager, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Deliveries.
 - 4) Off-site fabrication.
 - 5) Access.
 - 6) Site utilization.
 - 7) Temporary facilities and controls.
 - 8) Progress cleaning.
 - 9) Quality and work standards.
 - 10) Status of correction of deficient items.
 - 11) Field observations.
 - 12) Status of RFIs.
 - 13) Status of proposal requests.
 - 14) Pending changes.
 - 15) Status of Change Orders.
 - 16) Pending claims and disputes.
 - 17) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Special reports.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting schedules and reports.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file, or
 - 2. Two paper copies.
- B. Startup construction schedule.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of schedule in PDF format and labeled to comply with requirements for submittals. Submit to all parties that need to know the schedule. Include type of schedule (initial or updated) and date on label, or
 - 2. Submit paper copies to all parties involved with the work that need to know the schedule.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including work stages and interim milestones.
 - 4. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 5. Review time required for Project closeout and startup procedures, including commissioning activities.

6. Review and finalize list of construction activities to be included in schedule.
7. Review procedures for updating schedule.

1.6 COORDINATION

1. Coordinate Contractor's schedule with Owner's service date requirements.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
- B. Activities: Include activities such as installation of erosion and sediment control measures, clearing and grubbing, constructing construction entrances, stringing pipe, welding, x-raying, hydrotesting, etc. on the schedule.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and show how the sequence of the Work is affected.
 1. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Uninterruptible services.
 - b. Use of premises restrictions.
 - c. NCDOT work restrictions US-13
 - d. Seasonal variations.
 - e. Environmental control.
 2. Other Constraints: As imposed by permit, encroachment and easement requirements.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
 1. Mobilization.
 2. Start and finish dates for each spread or portion of work.
 3. NDT (x-ray) test dates.
 4. Start of drilling and proposed completion of each horizontal directional drill (HDD) or crossing.
 5. All cleaning (pigging) dates.
 6. All testing dates.
 7. All drying dates.
 8. All tie-in dates.
 9. All gas-up dates.

- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Pending modifications affecting the Work and Contract Time.

- F. Recovery Schedule: When periodic update indicates the Work is ten (10) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance; and date by which recovery will be accomplished.

2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven (7) days of date established for commencement of the Work.

- B. Contract Modifications: For each proposed contract modification and concurrent with its submission, address the time-impact of the proposed change on the overall project schedule.

- C. Schedule Updating: Maintain an up to date construction schedule during construction.

- D. Value Summaries:
 - 1. Prepare list for ease of comparison with payment requests; coordinate timing with invoice submittals.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary reports with each regularly scheduled monthly invoice submittal.
 - c. Submit value summaries on form included in Section O of the Contract Documents.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. Material delivered to job site.
 - 3. Materials installed.
 - 4. List of personnel and equipment utilized, and number of hours utilized.
 - 5. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 6. Accidents.

7. Meetings and significant decisions.
 8. Unusual events (see special reports).
 9. Stoppages, delays, shortages, and losses.
 10. Emergency procedures.
 11. Orders and requests of authorities having jurisdiction.
 12. Change Orders received and implemented.
 13. Change Directives received and implemented.
 14. Tie-ins made.
 15. Equipment or system tests and startups.
 16. Partial completions and occupancies.
 17. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Engineer within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Engineer in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one day before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. As the Work progresses, indicate final completion percentage for each activity.

- B. Distribution: Distribute copies of approved schedule to Engineer, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in temporary field offices if applicable.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
 - 3. Digital distribution of PDF schedules is acceptable as long as receiving parties have capability of receiving and reading on a timely basis.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 013100 "Project Management and Coordination" for submitting Operator Qualification Plan and employee qualifications.
 - 2. Section 013100 "Project Management and Coordination" for submitting proof of participating in a DOT approved Drug and Alcohol Screening Program.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 013200 "Construction Progress Documentation" for submitting Applications for Payment and the schedule of values.
 - 5. Section O "Contractor's Application for Payment" for payment application form.
 - 6. Section 015200 "Welding Natural Gas Pipeline" for welders' qualifications and for submitting x-ray test results and records.
 - 7. Section 017839 "Project Record Documents" for submitting pipeline record Drawings, horizontal directional drill bore plots, and regulator station record drawings.
 - 8. Section 019113 "Pipeline Cleaning, Testing, drying, Tie-in, Purging, and Gas-up" for submitting hydrostatic test records.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's and Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- E. SharePoint Site: A dedicated site on a server that contains project files and is accessible by the project team and Owner and others given permission by the site owner.

1.4 SUBMITTALS

- A. The Contractor shall transmit submittals on the Contractor's letterhead and transmittal form.
- B. Submittal Description (SD): Drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials to be furnished by the Contractor explaining in detail specific portions of the WORK required by the contract.
- C. The following items, SD-01, SD-03, SD-06, SD-07, SD-08, and SD-11, are descriptions of data to be submitted for the project. The requirements to actually furnish the applicable items will be called out in each specification.
 - 1. SD-01 Preconstruction Submittals
 - a. Submittals which are required prior to a notice to proceed on a new contract. Submittals required prior to the start of the next major phase of the construction on a multi-phase contract. Schedules or tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the WORK, submitted prior to contract notice to proceed or next major phase of construction.
 - 2. SD-03 Product Data
 - a. Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents.
 - 3. SD-06 Test Reports
 - a. Include: written reports of a manufacturer's findings of his product during shop tests; written reports by Contractor or his subcontractors including final test reports and daily logs reporting on the progress of daily activities or attesting that the Work has been installed in accordance with the contract plans and specifications.

4. SD-07 Certificates
 - a. A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier subcontractor, the purpose of which is to further the quality or orderly progression of a portion of the Work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality.
5. SD-08 Manufacturer's Instructions
 - a. Preprinted material describing installation of a product, system, or material, including special notices and material safety data sheets, if any concerning impedances, hazards, and safety precautions.
6. SD-11 Closeout Submittals
 - a. Include special requirements necessary to properly close out a construction contract; for example: as-built data, manufacturer's help and product lines necessary to maintain equipment.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Marking

1. Permanent marking shall be provided on each submittal to identify it by contract number; transmittal date; Contractor's, subcontractor's, and supplier's name, address(es) and telephone number(s); submittal name; specification and/or drawing reference; and similar information to distinguish it from other submittals. Submittal identification shall include space to receive the review action by Engineer.

1.6 SUBMISSION REQUIREMENTS

A. Schedules

1. Within ten (10) days of notice to proceed, the Contractor shall provide, for approval by Engineer, the following schedule of submittals:
 - a. A schedule of technical submittals required by the specifications and drawings. Schedule shall indicate the specification or drawing reference requiring the submittal; the material, item, or process for which the submittal is required; the "SD" number and identifying title of the submittal; the Contractor's anticipated submission date and the approval need date. Alternatively, the Contractor may utilize the submittal schedule provided by the Engineer.
 - b. Submittals called for by the contract documents will be listed on the above schedule.
 - c. Copies of schedule shall be re-submitted monthly annotated by the Contractor with actual submission and approval dates. When all items on a schedule have been fully approved, no further re-submittal of the schedule is required.

B. Data Submittals

1. As applicable, four [4] complete sets of indexed and bound product data shall be submitted. One [1] set, marked with review notations by Engineer, will be returned to the Contractor.

- a. Very few product data submittals by Contractor are anticipated for this Project.

1.7 ENGINEER'S REVIEW

A. Review Notations

1. Engineer will review submittals and provide pertinent notation within 10 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" authorize the Contractor to proceed with the WORK covered.
- b. Submittals marked "approved as noted" authorize the Contractor to proceed with the WORK covered provided he takes no exception to the corrections. Notes shall be incorporated prior to submission of the final submittal.
- c. Submittals marked "return for correction" require the Contractor to make the necessary corrections and revisions and to re-submit them for approval in the same routine as before, prior to proceeding with any of the Work depicted by the submittal.
- d. Submittals marked "not approved" or "disapproved" indicate noncompliance with the contract requirements and shall be re-submitted with appropriate changes. No item of requiring a submittal shall be accomplished until the submittals are approved or approved as noted.
- e. Contractor shall make corrections required by Engineer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "Changes" shall be given to Engineer.
- f. If changes are necessary to approved submittals, the Contractor shall make such revisions and submission of the submittals in accordance with the procedures above. No item of Work requiring a submittal change shall be accomplished until the changed submittals are approved.

PART 2 - PRODUCTS

- 2.1 Not Applicable

PART 3 - EXECUTION

- 3.1 Not Applicable

END OF SECTION 013300

SECTION 015100 – ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. U.S. National Archives and Records Administration (NARA)
 - a. 33 CFR 328 (25 August 1993)
 - 1) Definition of Waters of the United States
 - b. 40 CFR 261 (01 July 2012)
 - 1) Identification and Listing of Hazardous Waste
 - c. 49 CFR 171 – 178 (01 October 2012)
 - 1) Hazardous Materials Regulations
 - 2. U.S. Army Corps of Engineers (USACE)
 - a. Wetlands Delineation Manual (January 1987)
 - 1) Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

- A. Environmental Pollution and Damage:
 - 1. Environmental pollution and damage are the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.
- B. Environmental Protection:
 - 1. Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- C. Contractor Generated Hazardous Waste:
 - 1. Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute Work but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

- D. Land Application for Discharge Water:
 - 1. The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

- E. Surface Discharge:
 - 1. The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

- F. Waters of the United States:
 - 1. All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

- G. Wetlands:
 - 1. Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with Wetlands Delineation Manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 LAND RESOURCES

- A. The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the Work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and landforms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

- B. WORK Area Limits
 - 1. Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general WORK area which are not to be disturbed shall be marked. Monuments and markers shall be protected before construction operations commence. The Contractor 's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

- C. Landscape
 - 1. Trees, shrubs, vines, grasses, landforms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved Work area.

 - D. Erosion and Sediment Controls
 - 1. The Contractor shall be responsible for providing erosion and sediment control measures in accordance with the specifications and plans and all Federal, State, and local laws and regulations. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as indicated on the drawings. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Any temporary measures shall be removed after the area has been stabilized.

 - E. CONTRACTOR Facilities and WORK Areas
 - 1. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or Work areas shall be controlled to protect adjacent areas.

 - F. Water Resources
 - 1. The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor.

 - G. Stream Crossings
 - 1. Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments. Construction of stream crossing structures shall be in compliance with Clean Water Act Section 404, Nation Wide Permit No. 12, and Section 10 of Rivers and Harbors Act.

 - H. Wetlands
 - 1. The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands. The Contractor shall be responsible for the protection of the wetlands shown on the drawings in accordance with all Environmental Permits and Approvals.
- 3.2 BURNING
- A. Burning shall not be allowed on the project site.

3.3 SOLID WASTES

- A. Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become commingled with solid waste. Waste materials shall be disposed of in a timely manner at an authorized disposal facility.
- B. **CONTRACTOR GENERATED HAZARDOUS WASTES/EXCESS HAZARDOUS MATERIALS**
1. Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in accordance with all Federal, State and local laws and regulations. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Engineer and the Owner. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.
- C. **FUEL AND LUBRICANTS**
1. Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with State, and local laws and regulations. There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that WORK is performed.
- D. **WASTE WATER**
1. Disposal of waste water shall be as specified below.
 - a. Wastewater from construction activities, such as on-site material processing, clean-up, test water, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related wastewater in accordance with all requirements of Project Permits, Pitt County, and the City of Greenville.
 - b. Water generated from the flushing of lines after hydrostatic testing shall be emptied into the dewatering structure constructed by the Contractor as shown in the Project Plans, in accordance with the Project Permits and all Federal, State,

and Local laws and regulations. The Contractor shall discharge the water at a slow enough rate that allows it to fill the containment structure without damaging it or overflowing the straw/hay bale perimeter.

E. HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

1. Existing historical, archaeological, and cultural resources within the Contractor 's Work area will be shown on the construction drawings. The Contractor shall protect these resources and shall be responsible for their preservation during the life of the Contract. If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify Engineer so that the appropriate authorities may be notified, and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

F. BIOLOGICAL RESOURCES

1. The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

G. POST CONSTRUCTION CLEANUP

1. The Contractor shall clean up all areas used for construction. The Contractor shall, unless otherwise instructed in writing by Engineer, obliterate all signs of temporary construction facilities such as haul roads, Work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the Work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

END OF SECTION 015100

SECTION 015200 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 Related Documents

- A. Drawings, more specifically Plan Sheets 800-001 through 800-005 for erosion and sediment control details, general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, Apply to this Section.
- B. SECTION 015100 – Environmental Protection
- C. SECTION 017419 – Construction Waste Management and Disposal
- D. SECTION 329100 – ROW Restoration

1.2 The Contractor shall implement the erosion and sediment control and prevention measures specified in the Plans and this section in a manner which will meet the requirements of Section 01500 Environmental Protection, and the requirements of the North Carolina Department of Environmental Quality (NC DEQ) Erosion and Sediment Control (E&SC) Permit.

1.3 Contractor must comply with the requirements of the Erosion and Sediment Control Plan, approved September 2020, and the requirements of NPDES General Stormwater Permit NCG010000 (Construction Activities). Approval also includes the following conditions:

- A. In the event of a conflict between the requirements of the Sedimentation Pollution Control Act, the submitted plan and/or the contract specifications, the more restrictive requirement shall prevail;
- B. The land disturbing activity shall be conducted in accordance with the approved erosion and sedimentation control plan;
- C. The latest approved erosion and sediment control plan will be used during periodic unannounced inspections to determine compliance and a copy of the plan must be on file at the job site. If it is determined that the implemented plan is inadequate, this office may require the installation of additional measures and/or that the plan be revised to comply with state law.
- D. All site revisions, including those required by other local, state or federal agencies, which affect site layout, drainage patterns, limits of disturbance and/or disturbed acreage must be submitted to this office for approval a minimum of fifteen (15) day prior implementing the revision;

- E. Revisions exceeding the approved scope of this project without this office's prior approval of the plan showing the changes can be considered a violation. Failure to comply with any part of the approved plan or with any requirements of this program could result in appropriate legal action (civil or criminal) against the financially responsible party. Legal actions could include Stop Work Orders, the assessing of a civil penalty of up to \$5,000 for the initial violation and/or a civil penalty of up to \$5,000 per day for each day the site is out of compliance;
- F. The Certificate of Plan Approval must be posted at the primary entrance to the job site and remain until the site is permanently stabilized;
- G. In cases of natural disaster related changes to the proposed land disturbing activity, all appropriate actions and adequate measure installations may be performed to prevent sediment damage, prior to submitting and receiving approval of the revised plan. A revised plan must be submitted for approval as soon as possible, but no later than fifteen (15) days after all emergency actions have been performed;
- H. Erosion and sediment control measures or devices are to be constructed and/or installed to safely withstand the runoff resulting from a 10-year storm event (25-year storm event in High Quality Zones). The 10-year storm event is generally equivalent to a storm producing 6.5 - 7 inches in 24 hours or at the rate of 6.5 - 7 inches in 1 hour, depending on the location of the project within the region;
- I. No earthen material is to be brought on or removed from the project site, until the off- site borrow and/or disposal sites are identified as part of the erosion control plan. If an off-site borrow and/or disposal site is to be utilized, submit the Permit name and identification number, prior to use;
- J. A buffer zone, sufficient to restrain visible sedimentation within the 25% of the width closest to the land disturbance, must be provided and maintained between the land- disturbing activity and any adjacent property or watercourse;
- K. In order to comply with the intent of the Act, the scheduling of the land-disturbing activities is to be such that both the area of exposure and the time between the land disturbance and the providing of a ground cover is minimized;
- L. Unless a temporary, manufactured, lining material has been specified, a clean straw mulch must be applied, at the minimum rate of 2 tons/acre, to all seeded areas. The mulch must cover at least 75% of the seeded area after it is either tacked, with an acceptable tacking material, or crimped in place;
- M. New or affected cut or filled slopes must be at an angle that can be retained by vegetative cover or other adequate erosion-control devices or structures appropriate, and must be provided with a ground cover sufficient to restrain erosion within 21 calendar days of completion of any phase (rough or final) of grading (Annual Rye Grass is not in the approved seeding specifications nor is it an acceptable substitute for the providing of a temporary ground cover);

- N. A permanent ground cover sufficient to restrain erosion, must be provided within the shorter of 15 working or 90 calendar days (if in a High-Quality Zone, the shorter of 15 working or 60 calendar days) after completion of construction or development on any portion of the tract (ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a nurse cover for the permanent grass cover); and
 - O. All sediment and erosion control details for this project must conform to the standards as shown in the current Erosion & Sediment Control Planning and Design Manual; These details must be utilized for construction and are incorporated in the plan. The Design Manual may be found on-line at: <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/erosion-sediment-control-planning-design-manual>.
- 1.4 The following shall be submitted in accordance with Section 013300 Submittal Procedures:
- A. SD-01 Preconstruction Submittals:
 - 1. Erosion and Sediment Control Inspection Report Form
 - B. SD-07 Certificates
 - 1. Manufacturer's certificates, or specifications for materials proposed by the Contractor for use in erosion and sedimentation control on the Project. Certificates or specifications shall state that the materials meet the requirements of NC DEQ E&SC for the purposes intended.
- 1.5 EROSION AND SEDIMENT CONTROLS
- A. The Contractor shall install and maintain the erosion and sediment controls as indicated in the Plans and these Specifications. The Contractor shall install all permanent erosion and sediment control measures such as seeding, mulching and tacking within 15 working days or 60 calendar days (whichever is shorter) following restoration of trenchline and workspace. Other measures such as silt fences, sediment traps, temporary diverters and other temporary measures shall be installed simultaneously with the land disturbing activity. Some measures will be required to be installed prior to land disturbing activities and are defined in the Plans. The Contractor is responsible for maintaining all erosion and sediment control measures during construction until Engineer and the Owner releases the Contractor from this phase of the project. The Owner will then assume the responsibility of maintaining permanent measures and removing temporary measures such as silt fences. The controls and measures required by the Contractor are described below.
 - B. Stabilization Practices
 - 1. The stabilization practices to be implemented shall include temporary seeding, mulching, protection of trees, preservation of mature vegetation, etc.

- C. Structural Practices
 - 1. Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices including the location and details of installation and construction are shown on the Project Plans.
- D. Silt Fences
 - 1. The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of WORK where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by Engineer.
- E. Refer to the Project Plans for specific details on erosion and sediment control measures, location, and sequencing. Erosion and sediment control details are included on Plan Sheets 800-001 through 800-005.
- F. Refer to the Project Plans for restoration details including seed, mulch, tack and fertilizer requirements.

PART 2 - PRODUCTS

2.1 MATERIALS FOR SILT FENCES

- A. The Contractor shall use material as indicated in the project plans.
 - 1. Certificate or Affidavit
 - a. A certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified in the Project Plans. The Contractor shall submit a certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.
 - 2. Silt fences and erosion and sedimentation control materials shall be supplied by the Contractor.

2.2 MATERIALS FOR TEMPORARY CONSTRUCTION ENTRANCES

- A. Refer to the Project Plans for the locations and construction requirements of temporary construction entrances; and Specifications for the materials to be used.

PART 3 - EXECUTION

3.1 INSTALLATION OF SILT FENCES

- A. Silt fences shall be installed as shown on the Project Plans. Silt fences shall be removed upon approval by Engineer.

3.2 MAINTENANCE

- A. The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

- 1. Silt Fence Maintenance

- a. Silt fences shall be inspected in accordance with paragraph 3.3, INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with the Specifications and Project Plans.

- 2. Stone Temporary Construction Entrances

- a. As soon as practical after completion of restoration of the portion of the site being accessed via a temporary construction entrance, the entrances inclusive of all materials shall be removed.
- b. Refer to SECTION 329100 – ROW Restoration for additional site restoration requirements.

3.3 INSPECTIONS

- A. General

- 1. The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Sites with final stabilization shall be inspected at least once every month.

B. Inspections Details

1. Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

C. Erosion and Sediment Control Inspection Reports

1. For each erosion and sediment control inspection conducted, the Contractor shall prepare an Erosion and Sediment Control Inspection Report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to Engineer within 24 hours of the inspection. A copy of the inspection report shall be maintained on the job site.

END OF SECTION 015200

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous construction waste.
 - 2. Recycling nonhazardous construction waste.
 - 3. Disposing of nonhazardous construction waste.
- B. Related Requirements:
 - 1. Section 311000 – Clearing, for disposition of waste resulting from site clearing.

1.3 DEFINITIONS

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

1.4 GENERAL

- A. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction waste from landfills and incinerators. Facilitate recycling and salvage of materials.

1.5 QUALITY ASSURANCE

- A. Contractor shall appoint a person to ensure that construction waste is handled according to Contractor's waste management plan.

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan identifying the type of waste that will be encountered during construction and how that waste will be handled. It may be handled by disposal, recycling, salvage, and/or salvage for reuse.

PART 2 - PRODUCTS – (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Burning of waste materials is not permitted on the project site.
- C. Disposal: Remove waste debris from clearing and grubbing and dispose of off-site at areas approved for vegetation waste.

END OF SECTION 017419

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data for materials not provided by Owner.
4. X-ray record film and radiography inspection records.
5. Pipeline test records.
6. Miscellaneous record submittals.

- B. Related Requirements:

1. Section 019115 – Pipeline Cleaning, Testing, Drying, Tie-In, Purging and Gas-Up
2. Section 055101 – Natural Gas Pipeline Welding
3. Section 055110 – Steel Natural Gas Pipeline Construction
4. Section 315010 – Horizontal Directional Drilling

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit one (1) full size paper-copy set(s) of marked-up record prints for the GCP-10104 - Memorial Drive Bridge Replacement.
 - 2) Submit PDF electronic files of scanned record prints.
 - 3) Print each drawing sheet, whether or not changes and additional information were recorded.

- B. Miscellaneous Record Submittals: See other Related Requirements above referencing other Specification Sections for record-keeping requirements and submittals in connection with various construction, testing and commissioning activities. Submit one (1) paper copy and annotated PDF electronic files of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation as applicable.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of pipe installation and of underground utilities.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Changes made by Change Order or Work Change Directive.
 - h. Changes made following Engineer's written orders.
 - i. Details not on the original Contract Drawings.
 - j. Field records for variable and concealed conditions.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer and Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file.
 2. Refer instances of uncertainty to Engineer through Construction Manager for resolution.
 - a. See Section 013300 - Submittal Procedures for requirements related to use of Engineer's digital data files.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and any newly prepared record Drawings into same order as the original drawing set. Bind the record drawing set. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file.
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Engineer and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from Construction Plans and Specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as paper copy and/or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

SECTION 019115 – PIPELINE CLEANING, TESTING, DRYING, TIE-IN, PURGING AND GAS-UP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements that apply to cleaning, testing, drying, tying-in purging, gassing-up, and placing the gas main into service, or a service-ready condition.
- B. Related Requirements:
 - 1. Section 017839 - Project Record Documents
 - 2. Section 055110 - Steel Natural Gas Pipeline Construction
- C. The pipeline shall be leak and strength tested by hydrostatic (water) testing. The purpose of the leak and strength test is to ensure the strength and integrity of the pipeline and to establish the maximum allowable operating pressure (MAOP). The Owner shall maintain the resulting test records on file for the life of the pipeline.
 - 1. Length as planned: 5,525 feet.
 - 2. Pipe Specification: API 5L GR-X-52, 8.625-inc OD, 0.322-inch wall thickness

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The CONTRACTOR shall use material as indicated in the project plans.
- B. Test Water Source
 - 1. Test water is available from the fire hydrants.
 - 2. Ten (10) days prior to the scheduled hydrostatic testing, Contractor shall contact the Greenville Utilities Commission Customer Service at 401 S. Greene Street, Greenville, NC, to arrange for a temporary hydrant water meter to be set at the hydrant.
- C. Test Water Disposal
 - 1. The Contractor shall ensure that all federal, state, and local regulations are adhered to, to assure compliance with respect to usage and/or disposal of the water. In disposing of the water after testing, care should be taken to prevent damage to vegetation and excessive erosion or contamination of streams, rivers, or other waterbodies including groundwater.

2. A dewatering structure is included in the project plans. Contractor is responsible for acquiring approval from Engineer and all jurisdictional authorities should Contractor propose to use other means of disposal.

PART 3 - EXECUTION

3.1 SAFETY

- A. Work performed under this contract shall comply with OSHA requirements in 29 CFR 1910 and 29 CFR 1926, and state specific OSHA requirements where applicable. The Contractor shall develop and implement a Safety and Health Program (SHP) which incorporates requirements in OSHA standards 29 CFR 1910 and 29 CFR 1926.
- B. Suitable barricades, lights, applicable signs, flagmen, and watchmen shall be provided when required by the Engineer and/or the North Carolina Department of Transportation in all areas in which Work is performed. All safety related equipment specified herein shall be in full compliance with the minimum governing regulation subject to approval of the Engineer and shall be included in the Contract price.
- C. All pressure tests shall be conducted with due regard for the safety of people and property. During the pressure test appropriate precautions shall be taken to keep people not engaged in the testing operations clear of the testing area while the hydrostatic test is in progress.
- D. Only approved tools are to be used for test assemblies and plugs. Any tool or fitting that shows evidence of wear or damage that may affect its safe use shall be repaired or replaced.
- E. Take every reasonable precaution to protect employees and the public during testing.
- F. Construction in the immediate vicinity of the pipeline shall be discontinued during the period of the strength test and not commence until the pipeline has been blown-down to 100 psig or 90 psig.
- G. During pigging of the pipeline, the Contractor shall ensure that the exiting pigs are contained within the ditchline and that they cannot escape and cause damage to people or property.
- H. Before the hydrostatic test, notify and obtain the approval from responsible agencies (e.g., Department of Environmental Quality, Water Resources Division and local agencies, etc.) and dispose of the water in accordance with applicable regulations and the project Plans and Permits.
- I. If possible, avoid the use of hoses for filling and de-watering. If hoses must be used, they shall be securely staked and chained to the ground. Hoses and connecting fittings used for the test shall be rated equal to, or above, the maximum hydrostatic test pressure.
- J. During purging operations, it is important that all possible sources of ignition be eliminated. Open flames, sparks, heated materials, and materials that can ignite spontaneously in the presence of gas shall not be in the area of purging, especially the vent areas.

- K. Static electricity is one of the major concerns for purging operations and is one of the most difficult ignition hazards to control. Static electricity is often present during purging and it is more serious when the relative humidity is low. To eliminate static electricity during the purging operation the pipe and other equipment used in the purge operation shall be grounded. Before disconnecting pipes and equipment, a bond wire shall be attached to the pipe at two points to provide a connection across the proposed disconnection.

3.2 PRE-TEST MEETING

- A. The Contract shall notify the Engineer ten working days before beginning testing and cleaning operations. At least three days before the test, a pre-test meeting shall be held to define responsibilities, review the safety aspects, Contract procedures, and schedules for the test. Representatives from the Owner, Engineer and the Contractor shall attend the meeting.

3.3 PREPARATION

- A. With the exception of certain bellholes required for the installation and operation of testing equipment, each test segment shall be completely backfilled along its entire length prior to testing. Testing and inspection of the piping segment shall be conducted by the Contractor and witnessed by representatives of the Engineer. During the test, additional Contractor personnel should be available to make adjustments or repairs.
- B. Verify the pressure differentials due to elevation. The pressure gradient for water is 0.433 psi per foot of elevation in this location. Actual pipeline elevations may vary from what is shown in the project plans due to depth of installation, sag and over bends, and fitting pipe into the ditch. Contractor should take care to locate the highest and lowest points of the pipeline as installed and record their elevations.
- C. Pre-Test Actions
 1. The Contractor shall ensure that adequate communications equipment is available for the test.
 2. The Contractor shall ensure the accuracy of all pressure gauges being used in the test. Calibration records shall be available upon request.
 3. The Contractor shall have sufficient tools and personnel available to perform any necessary repairs.
 4. Before beginning the fill and test, the Contractor shall prepare a test plan. The test plan should include:
 - a. Piping segment to be filled and tested.
 - b. Fill sequence and monitoring plan.
 - c. Estimated volume of line-fill for the test segment. (contractor's estimate)
 - d. Desired test pressures.
 - e. Shut-in sequence to isolate test segments (if required). When required, test segments shall not be isolated with valves, but by being separated from the system.
 - f. Communication requirements.
 - g. Designate the person to be in charge of the testing.

5. The Contractor shall ensure that all mainline valves in the piping segment to be tested are completely open.
6. The Contractor 's test plan shall be submitted to the Engineer for approval.
7. The Contractor shall schedule and conduct the pre-test meeting.

3.4 TESTING AND CLEANING

- A. The steel gas main shall be cleaned, and pressure tested after installation. Testing shall meet the requirements of 49 CFR Part 192, Sub-part J, B31.8 and as otherwise specified herein.
- B. Test Pressure
 1. The following table sets the hydrostatic testing volume and pressure requirements according to the project plans. Contractor is responsible for verifying all parameters with actual installation conditions.

Hydrostatic Testing Volume and Pressure Parameters		
Length	5,525 feet	
Highest elevation	30 feet ASL	Pipe depth at Southern Tie-In Location
Lowest elevation	-17 feet BSL	Below Tar River
Desired MAOP	60 psig	
Required test pressure	90 psig	
Estimated pressure at fill point	85 psig	At pipe depth
Maximum allowable test pressure	90 psig	At fill point pipe depth
Water fill volume	14,360 gal	
Approximate water for testing	14,460 gal	
Approximate total water required	14,600 gal	

- C. Test Duration
 1. Once the pipe test pressure is reached and it has stabilized, the pressure shall be maintained for eight (8) hours.
- D. Pipeline Filling for Testing
 1. The Contractor shall use a pump or pumps to fill the pipeline with water. Filling shall be continuous and follow directly behind one or more poly pigs to minimize the amount of air in the line. The pipeline shall be filled with a flow rate of approximately 200 GPM (a fill rate of 2.2 feet per second requiring approximately 3.39 hours to fill). The quantity of water pumped into the pipeline shall be monitored by metering the water, and by calculating the volume of line filled. The high elevation point vent valve assemblies shall be open when filling begins. Contractor personnel shall attend the vents. After the pig passes the vent and a full stream of water with no trapped air exits the valve, the vent valve assemblies shall be closed. If necessary, a period of temperature stabilization between the ground and fill water should be provided.
 2. The Contractor shall take a flow meter reading at the time the pig is launched and again as the pig is received at the end of the pipeline to get a reading of the line fill in the pipeline. After the pig has arrived in the receiver, the pump rate shall be slowed and the discharge pressure shall be gradually increased, in 50 psig increments or less, until the desired pressure is reached.

E. Test Procedure

1. The Contractor shall furnish accurate pressure and temperature gauges and a clock or strip type-recording instrument capable of recording an eight (8) hour test. The Contractor shall also furnish a deadweight tester accurate to plus or minus 1-psig, to calibrate the pressure recorder. Accuracy and reliability of test instruments are the responsibility of the Contractor. The Contractor shall ensure that all gauges and instruments have been calibrated within twelve (12) months of the test date. Calibrated back-up instruments are recommended.
2. For pressurizing the pipeline during the test, the Contractor shall use a pump with a capacity to provide a reasonable pressurizing rate. The pressure rating of the pump must be higher than the anticipated maximum test pressure. The Contractor shall develop a pressure-volume plot during pressurizing operations by recording pump strokes on an X-axis and pressure on a Y-axis. The Contractor shall use this plot to help ensure that the pipeline does not exceed 50% SMYS during testing.
3. The design pressure of the test heads and piping and the rated pressure of hoses and valves in the test manifold shall be no less than the anticipated test pressure. All equipment shall be inspected prior to the test to determine that it is in satisfactory condition.
4. Pressurization Sequence
 - a. At a uniform rate, raise the pressure in the pipeline to the required test pressure.
 - b. Monitor the pressure and check the pipeline for leakage. If any section of the pipeline shows leakage, the Contractor shall make any repairs or replacements required until a satisfactory leak test is obtained. After the leak is repaired, a new test period must be started at the test pressure.
 - c. When the test pressure is reached and stabilized from pressuring operations, a hold period shall commence. During this period, test medium may be added as required to maintain the minimum test pressure. The addition of small amounts of test medium due to temperature changes or small leakage around the test headers is normal. However, the requirement to add large or continuous amounts of test medium indicates leakage and should be investigated.
 - d. The length of the leak/strength test period shall be eight (8) hours. An eight (8) or a twelve (12) hour pressure-recording clock with a strip or clock chart shall be used to record the test. Pressure and temperature readings shall be recorded at fifteen-minute intervals for the first hour of the test and at 30-minute intervals thereafter. The pressures shall be verified from the dead weight tester. The pressure and temperature readings shall be recorded on a field pressure test report. The Contractor representative performing the test, the witnesses, and the inspector shall sign the test records. The records shall be delivered to the Engineer upon the successful completion of the pressure test.
 - e. The Contractor is responsible for repairing any damage to the pipeline and the surrounding area resulting from the test and for retesting the pipeline until a satisfactory leak/strength test has been obtained.

F. Test Records

1. The Contractor shall provide the Leak/Strength Test Report to the Engineer after a successful test has been conducted. In addition to the Leak/Strength field pressure test report, a pressure-recording chart will be made to document the test and to validate the MAOP of the pipeline. The recording chart used should be appropriate for the test pressures and duration listed above. The recording pens shall be in good condition, cleaned and filled with sufficient ink to last the duration of the test. The chart shall be included in the Final Leak/Strength Test Report. Documentation on the chart shall include:
 - a. Exact time and pressure at the start and at the end of the test.
 - b. Job project number.
 - c. Test description and location.
 - d. Test date(s).
 - e. Environmental factors (temperature, raining, snowing, etc.).
 - f. Name of person entering the data.
 - g. Pipe sizes, grades, and wall thickness information.
 - h. Length of tested pipeline.
 - i. Test medium and duration.
 - j. Maximum and minimum test pressures.
 - k. Pressure at high and low elevations.
 - l. Name of Contractor and person responsible for the test.
 - m. Recording gauge number, range, and last calibration date.
 - n. The location of the recording gauge on the pipeline.

G. Dewatering

1. After testing the Contractor shall remove the water from the pipeline by draining the pipe using air compressors and pigs. The air compressors shall have sufficient capacity to remove the water at about the same rate as the filling rate. A valve shall be used to control the amount of water being discharged from the test segment.
2. Contractor shall utilize a dewatering structure as shown in the project Plans. If alternate means of dewatering are proposed, Contractor is responsible for obtaining all necessary permits and approvals.

H. Cleaning and Drying

1. After dewatering, the Contractor shall clean and dry the pipeline. For cleaning, the Contractor shall use a brush pig to displace a slug of water (at least 500 gallons) injected into the pipeline. After the brush pig, a second slug of water shall be injected followed by a poly pig for cleaning. Short slugs of water batched between two pigs are desired as long as there is enough water to keep the pigs apart and maintain a velocity of about three feet per second. This process will be repeated until the entire pipeline is cleaned to the Engineer's requirements and satisfaction. Air compressors shall be used to displace the pigs and water slugs.

2. After dewatering and cleaning, the Contractor shall dry the pipeline using clean super dry air. Soft foam pigs shall be pushed through the pipeline by the super dry air. The pigs are used to absorb any remaining free water in the cleaned pipeline. After the pipeline is dry, wire brush pigs shall be pushed through the pipeline to remove any water bearing debris from the pipe wall. After the wire brush pigs are pushed through the pipeline, soft foam pigs are again pushed through the pipe section to absorb the loosened debris.
3. After pipeline drying, dew-point readings shall be made to determine when the line has been dried sufficiently. The specific target dew point will be -35 degrees F.

3.5 PURGING AND GAS-UP

- A. The Contractor shall purge the natural gas steel pipeline of air with natural gas. The Owner (GREENVILLE UTILITIES COMMISSION) will provide the natural gas to purge and pack the pipeline. The air and natural gas shall be separated by a slug of nitrogen (inert gas). The purpose of the slug of nitrogen is to prevent the air and natural gas from meeting and mixing during the purge.
 1. A pre-purge meeting will be required between the Contractor, Owner, and Engineer to review plan, process and schedule.
 2. Contractor shall provide a written purging plan to Owner and Engineer for approval prior to beginning purging.
 3. Pipeline will be considered purged of air and nitrogen when a consistent reading of 100% gas is obtained on a calibrated combustible gas detector.
- B. After the pipeline is successfully purged the pipeline will be packed with natural gas to the operational pressure.
- C. Detailed procedures for the purging operation shall be provided by the Contractor and approved by the Engineer. A general overview of purging procedures are as follows:
 1. Ensure that all the applicable parties have approved the purge and gas-up procedures.
 2. Ensure notification of all jurisdictional and safety agencies.
 3. Ensure that the required personnel are available and prepared.
 4. Ensure that the required purging and communication equipment is on hand.
 5. Isolate each pipeline segment to be purged by using the inline valves.
 6. Open the valve at the vent stack in the end of the segment to be purged (Stage 1).
 7. Inject a slug of nitrogen into the pipeline at the beginning of the segment being purged followed by the natural gas, maintaining the required pressure on the gauge at the bypass fitting.
 8. Follow the progress of the purge by observing a gravitometer (or combustible gas indicator) at the vent. Specific gravities will decrease from air to nitrogen to gas.
 9. Stop the injection of the gas and close the vent stack valve when the indicator at the vent indicates 100% natural gas.
 10. Remove the purge fittings, hoses, etc., and plug the injection fittings.
 11. Open the mainline valve and pack the pipeline segment to the desire pressure.
 12. Observe the pipeline segment pressure and check the segment for leaks.

- D. Following completion of gas up a Purging, Pipeline Cleaning, Drying, and Gas-Up Report shall be provided to the Engineer.
- E. Safety
 - 1. The purging and gas-up operations shall be performed in accordance with Title 29 of the Code of Federal Regulations, Chapter I (29 CFR 1926), "Occupational Safety and Health Standards for the Construction Industry"; and any other applicable standards.

END OF SECTION 019115

SECTION 055101 – NATURAL GAS PIPELINE WELDING

PART 1 - GENERAL

1.1 REFERENCES

- A. The publications listed below form a part of this SPECIFICATION to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. ASME International (ASME)
 - a. B31.8 (2018) - Gas Transmission and Distribution Piping Systems
 - 2. American Petroleum Institute (API)
 - a. API Standard 1104 – Welding of Pipelines and Related Facilities (21st Edition)

1.2 RELATED DOCUMENTS

- A. Section 055110 – Natural Gas Pipeline Construction

1.3 SUBMITTALS

- A. The following shall be submitted in accordance with Section 013300:
 - 1. SD-03 Product Data
 - a. Manufacturer's data shall be submitted for the following items:
 - 1) Welding consumable materials
 - 2. SD-07 Certificates
 - a. Welder qualifications
 - b. Welder and welding operator performance qualification certificates
 - c. Welding Procedure Specification and Qualification

1.4 GENERAL REQUIREMENTS

- A. This section covers the welding of the natural gas pipeline. Deviations from applicable codes, approved procedures, and approved detail drawings will not be permitted without prior written approval from the Engineer. Materials or components with welds made offsite will not be accepted if the welding does not conform to the requirements of this Specification, unless otherwise specified.
- B. Contractor shall follow the Welding Procedure Specifications found in Greenville Utilities Commission's Operation & Maintenance Manual and Operator Qualification Manual for welding all metals included in the WORK. Welding shall not be started until welding procedures, welders, and welding operators have been qualified. The Contractor shall provide Engineer their Qualification. Qualification testing shall be performed by the Contractor if approved by Engineer. Costs of such testing shall be borne by the Contractor. Engineer shall be notified at least 24 hours in advance of the time and place of the tests. When practicable, the qualification tests shall be performed at or near the worksite.

- C. The Contractor shall maintain current records of the test results obtained in the welding procedure, and welding operator and welder performance qualifications readily available at the site for examination by Engineer.
- D. The procedures for making transition welds between different materials or between plates or pipes of different wall thicknesses shall be qualified.
- E. ASME B31.8 requirements for branch connections may be used in lieu of detailed designs. Unless otherwise specified, the choice of welding process shall be the responsibility of the Contractor.

1.5 PERFORMANCE

- A. The Contractor shall be responsible for the quality of all joint preparation and welding. All materials used in the welding operations shall be clearly identified and recorded. The inspection and testing defined in this Specification are minimum requirements. Additional inspection and testing shall be the responsibility of the Contractor when he deems it necessary to achieve the quality required.
- B. The Contractor shall provide Engineer with Contractor's:
 - 1. Welding Operations that contain detailed procedures which define methods of compliance to the contract drawings and specifications.

1.6 WELDER QUALIFICATIONS

- A. The Contractor shall provide ENGINEER their welder and welding operator performance qualifications certificates. Welding procedures, welders, and welding operators previously qualified by test may be accepted for the WORK without requalification, provided that all of the following conditions are fulfilled:
 - 1. Copies of the welding procedures, the procedure qualification test records, and the welder and welding operator performance qualification test records are submitted and approved in accordance with paragraph SUBMITTALS.
 - 2. Testing was performed in accordance with API 1104.
- B. Certification
 - 1. Before assigning welders or welding operators to the Work, the Contractor shall provide Engineer with their names together with certification that each individual is performance qualified as specified. The certification shall state the type of welding and positions for which each is qualified, the code and procedure under which each is qualified, date qualified, and the firm and individual certifying the qualification tests.

C. Identification

1. Each particular weld shall be identified with the personal number, letter, or symbol assigned to each welder or welding operator. To identify welds, written records indicating the location of welds made by each welder or welding operator shall be submitted, and each welder or welding operator shall apply the personal mark adjacent to the welds on pipe coating using a rubber stamp or felt-tipped marker with permanent, weatherproof ink or other methods approved by the Engineer that do not deform the metal. For seam welds, identification marks shall be placed adjacent to the welds at 3-foot intervals. Identification by die stamps or electric etchers will not be allowed.

D. Renewal of Qualification

1. Requalification of a welder or welding operator shall be required under any of the following conditions:
 - a. When a welder or welding operator has not used the specific welding process for a period of 6 months.
 - b. When a welder or welding operator has not welded with any process during a period of 3 months, all the personal qualifications shall be considered expired, including any extended by virtue of a., listed above.
 - c. There is specific reason to question the person's ability to make welds that will meet the requirements of the specifications.
 - d. The welder or welding operator was qualified by an employer, other than those firms performing WORK under this contract, and a qualification test has not been taken within the preceding 12 months.
 - e. Renewal of qualification for a specific welding process under conditions a., b., and d., above, needs to be made on only a single test joint or pipe of any thickness, position, or material to reestablish the welder's or welding operator's qualification for any thickness, position, or material covered under previous qualification.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PROCEDURE

- A. All steel pipe and/or fittings, connections and other fabrications within the Work shall be welded, unless otherwise specified or directed by Engineer. All welding shall be performed in accordance with the requirements of API 1104.
- B. Welding shall be performed in accordance with qualified procedures using qualified welders and welding operators. Welding shall not be done when the quality of the completed weld could be impaired by the prevailing working or weather conditions. Engineer shall determine when weather or working conditions are unsuitable for welding.

C. Base Metal Preparation

1. All welding material and/or equipment shall, at all times, be protected from damage and kept in good working condition. Filler metals and fluxes shall be protected from deterioration and excessive moisture changes. Welding rods and other materials which show signs of deterioration or damage shall be replaced. Welding machines which, in the opinion of Engineer, are in poor repair or are not of sufficient capacity to perform the Work shall be replaced by the Contractor at no cost to the Owner.
2. Suitable wind guards shall be provided to protect the Work during periods of excessive wind.
3. The Contractor shall, at the direction of Engineer, temporarily suspend all welding operations whenever conditions are not conducive to the performance of good Work.
4. All steel pipe, fittings, connections and fabrications shall be butt welded by the shielded metal arc welding process using a manual welding technique.
5. All surfaces to be welded shall be properly cleaned and free of material that may be detrimental to the integrity of the completed weld. The ends of pipe and/or fittings at all welded joints shall be properly beveled using an appropriate pipe beveling machine.
6. Each completed weld shall be free of overlaps, undercuts, excessive convexity, scale, oxides, pin holes, non-metallic inclusions, air pockets and all other defects to the extent allowed by API 1104.
7. Arc burns on the pipe and/or fittings shall be removed by grinding, provided the resulting pipe wall thickness is not less than ninety (90) percent of the required design wall thickness. Arc burns which cannot be repaired by grinding and repair attempts which result in less than ninety (90) percent of the original wall thicknesses shall be cut out.
8. All welds shall be air cooled. Accelerated cooling by any method shall not be permitted.

D. Weld Joint Fit-Up

1. Parts that are to be joined by welding shall be fitted, aligned, and retained in position during the welding operation by the use of bars, jacks, clamps, or other mechanical fixtures.
2. Welded temporary attachments shall not be used except when it is impractical to use mechanical fixtures.
3. When temporary attachments are used, they shall be the same material as the base metal and shall be completely removed by grinding or thermal cutting after the welding operation is completed.
4. If thermal cutting is used, the attachment shall be cut to not less than 1/4 inch from the member and the balance removed by grinding. After the temporary attachment has been removed, the area shall be visually examined.

3.2 EXAMINATIONS, INSPECTIONS, AND TESTS

- A. Visual, nondestructive and/or destructive testing procedures shall be implemented by the Engineer, as required by Owner, to determine the acceptability of the welds. The Owner shall obtain and pay for radiographic testing. Radiographic inspection will be performed on 100% of the welds used in HDD pipe sections and 100% of welds used in road and highway crossings, and 100% of all tie-in piping.

- B. Engineer may randomly require up to 10% of remaining welds to be radiographically inspected.
- C. The certified welding inspector (CWI) provided by the Owner shall make all determinations as to what constitutes an acceptable weld as well as the disposition of all defective welds. These determinations shall be made upon completion of either a visual or a radiograph inspection.

3.3 ACCEPTANCE STANDARDS

- A. Nondestructive Testing
 - 1. The acceptance standards of API 1104 shall apply.

3.4 CORRECTIONS AND REPAIRS

- A. Defects shall be removed and repaired as specified in API Standard 1104 and ASME B31.8 unless otherwise specified.
- B. Disqualifying defects discovered between weld passes shall be repaired before additional weld material is deposited.
- C. Wherever a defect is removed, and repair by welding is not required, the affected area shall be blended into the surrounding surface eliminating sharp notches, crevices, or corners.
- D. After defect removal is complete and before rewelding, the area shall be examined by the same test method which first revealed the defect to ensure that the defect has been eliminated.
- E. After rewelding, the repaired area shall be reexamined by the same test method originally used for that area.
- F. Any indication of a defect shall be regarded as a defect unless reevaluation by NDE or by surface conditioning shows that no disqualifying defects are present.
- G. The use of any foreign material to mask, fill in, seal, or disguise welding defects will not be permitted.

END OF SECTION 055101

SECTION 055110 – NATURAL GAS PIPELINE CONSTRUCTION

PART 1 - GENERAL

1.1 REFERENCES

- A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.
1. ASME INTERNATIONAL (ASME) (<https://www.asme.org/>)
 - a. B31.8 (2018) – Gas Transmission and Distribution Piping Systems
 - b. B16.5 (2017) – Pipe Flanges and Flanged Fittings
 - c. B16.9 (2018) – Factory-Made Wrought Steel Butt welding Fittings
 2. American Petroleum Institute (API) (<http://www.api.org/>)
 - a. Standard 1104 – Welding of Pipelines and Related Facilities (21st Edition)
 - b. 6D – Pipeline Valves (24th Edition)
 - c. 5L – Specification for Line Pipe (46th Edition)
 3. Code of Federal Regulations
 - a. 49 CFR Part 192 – Transportation of Natural Gas and Other Gas By Pipeline (November 16, 2020)
 - 1) https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfr192_main_02.tpl
 - b. 29 CFR Part 1910 – Occupational Safety and Health Standards (OSHA) (November 16, 2020)
 - 1) <https://www.ecfr.gov/cgi-bin/text-idx?node=pt29.5.1910&rpn=div5>
 - c. 29 CFR Part 1926 – Safety and Health Regulations for Construction (November 16, 2020)
 - 1) <https://www.osha.gov/laws-regs/regulations/standardnumber/1926>
 4. National Society of Corrosion Engineers (NACE)
 - a. SP0274 – High-Voltage Electrical Inspection of Pipeline Coatings (2011)
 - 1) <https://store.nace.org/sp0274-2011-formerly-rp0274->

1.2 RELATED DOCUMENTS

- A. Section 055101 – Natural gas Pipeline Welding
- B. Section 017839 – Project Record Drawings
- C. Section 019115 – Pipeline Cleaning, Testing, Drying, Tie-In, Purging and Gas-Up

1.3 SUBMITTALS

- A. The following shall be submitted in accordance with Section 013300:
1. SD-06 Test Reports
 - a. Test reports shall be submitted for the following tests in accordance with Section 019115
 2. SD-011 Closeout Submittals
 - a. Fabrication Drawings shall be submitted for all items fabricated by the Contractor or suppliers.
 - b. Prior to final inspection and transfer of the completed facility; all reports, statements, data, and completed checklists for the leak/strength test of the natural gas pipeline shall be submitted to and approved by Engineer as specified in applicable technical specification sections.
 - c. Purging, pipeline cleaning, drying, and gas-up report
 - 1) Prior to final inspection and transfer of the completed facility; all reports, statements, data, and completed checklists for the purging, cleaning, drying, and gas up of the natural gas pipeline shall be submitted to and approved by Engineer as specified in applicable technical specification sections.
 - d. Final Site cleaning and restoration report
 - 1) The premises shall be left clean. Paved areas shall be swept, and landscaped areas shall be raked clean. The site shall have waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed. A list of completed clean-up items shall be submitted on the day of final inspection.

1.4 GENERAL REQUIREMENTS

- A. Safety
1. Work performed under this contract shall comply with OSHA requirements in 29 CFR 1910 and 29 CFR 1926, and state specific OSHA requirements where applicable. The Contractor shall develop and implement a Safety and Health Program (SHP) which incorporates requirements in OSHA standards 29 CFR 1910 and 29 CFR 1926.
 2. Suitable barricades, lights, applicable signs, flagmen, and watchmen shall be provided when required by the Engineer and/or the North Carolina Department of Transportation in all areas in which Work is performed. All safety related equipment specified herein shall be in full compliance with the minimum governing regulation subject to approval of the Engineer and shall be included in the Contract price.
 3. All pressure tests shall be conducted with due regard for the safety of people and property. During the pressure test appropriate precautions shall be taken to keep people not engaged in the testing operations clear of the testing area while the hydrostatic test is in progress.
 4. Take every reasonable precaution to protect employees and the public during testing.
 5. Only approved tools are to be used for test assemblies and plugs. Any tool or fitting that shows evidence of wear or damage that may affect its safe use shall be repaired or replaced.

6. Construction in the immediate vicinity of the pipeline shall be discontinued during the period of the strength test and not commence until the pipeline has been blown-down to 90-100 psig.
 7. During pigging of the pipeline, the Contractor shall ensure that the exiting pigs are contained within the ditchline and that they cannot escape and cause damage to people or property.
 8. Comply with all permit and notification requirements during the recovery of the hydrostatic test water.
 9. If possible, avoid the use of hoses for filling and de-watering. If hoses must be used, they shall be securely staked and chained to the ground. Hoses and connecting fittings used for the test shall be rated equal to, or above, the maximum hydrostatic test pressure.
 10. During purging operations, it is important that all possible sources of ignition be eliminated. Open flames, sparks, heated materials, and materials that can ignite spontaneously in the presence of gas shall not be in the area of purging, especially the vent areas.
 11. Static electricity is one of the major concerns for purging operations and is one of the most difficult ignition hazards to control. Static electricity is often present during purging and it is more serious when the relative humidity is low. To eliminate static electricity during the purging operation the pipe and other equipment used in the purge operation shall be grounded. Before disconnecting pipes and equipment, a bond wire shall be attached to the pipe at two points to provide a connection across the proposed disconnection.
- B. Contractor Qualifications
1. The Contractor shall use only competent and skilled Workmen for the performance of any and all Work on the gas pipeline system, as specified herein. Workmen must be Operator Qualified for covered tasks.
- C. Welding Qualifications
1. Testing and certification of welders, whether by destructive or nondestructive inspection methods, shall be in accordance with Section 055101 and with API 1104, which is hereby incorporated by reference and made a part of these Specifications. The Workmen shall not perform any welding operations on any pipe or associated fittings within the system until they have been qualified to perform such operations in accordance with Section 055101 – Natural Gas Pipeline Welding.
- D. Right-of-Way and Easements
1. Portions of the Work will be carried out within the rights-of-way of State roadways. All provisions pertinent to construction within such rights-of-way as provided in the latest edition of the North Carolina Department of Transportation Policies and Procedures for Accommodating Utilities on Highway Rights-of-Way shall be followed.
 2. The necessary rights-of-way and construction easements for the natural gas pipeline will be provided by The Owner. All construction operations shall be confined to the immediate vicinity of the project location, and due care shall be used in placing construction tools, equipment, excavated materials, and pipeline materials and supplies so as to cause the least possible damage to property and the least interference with traffic. The placing of such tools, equipment, and materials shall be subject to the approval of the Engineer.

3. Construction will be conducted in such a manner as to cause the least inconvenience to the citizens of the area, thereby maintaining good public relations. The Work shall not cause any unnecessary interference with the use of any public or private improvements, including landscaping and/or any unnecessary damage to such improvements. Any damage to such improvements shall be brought back to pre-construction condition, or as otherwise directed by the Engineer.
4. During the execution of the Work, a continuous ingress and egress to all affected parcels and traveled ways shall be maintained. When ingress and egress to affected parcels must be blocked, due to the direct executing of the Work, twenty-four (24) hours advance notice must be given to the affected property Owner. In no case shall the blocking of ingress and egress be allowed for more than twenty-four (24) hours consecutively.

E. Inspection

1. The Owner and Engineer shall have access to the Work at all times. The Engineer shall be present for all special testing or approval of the Work that is required by the Specifications or the Engineer's instructions.
2. The Engineer, in order to be present, shall be given sufficient notice prior to any required testing or approval. The Contractor shall have no claim against the Owner and/or the Engineer for time or monies when sufficient notice, as described above, is not given to the Engineer.
3. The Engineer may require re-examination of any of the Work. If required, the Contractor shall provide all labor, material and equipment necessary to uncover the Work. If the Work is determined to be in accordance with the Specifications, the Owner will pay the costs of re-examination and replacement. If the Work is not in accordance with the Specifications, the Contractor shall pay such costs.
4. Inspectors may be stationed at the Work site to report the Engineer as to the progress of the Work and the manner in which it is being performed. The Inspectors shall report whenever it appears that the materials furnished, or the Work performed by the Contractor fails to meet the requirements of the Plans or Specifications.
5. If a dispute arises between the Inspector and the Contractor as to the materials furnished or to the manner of performing the Work, the Inspector shall have the authority to reject the questionable materials or suspend the Work until the issue can be referred to and a decision can be made by the Engineer. Inspectors are not allowed to revoke, alter, enlarge, relax or release any requirements of these Specifications or to issue instructions contrary to the Contract Documents. Inspectors shall in no case act as foremen or perform duties for the Contractor or interfere with the management of the Work by the Contractor.
6. The Owner and Engineer will make a final inspection of the Work included in the Contract as soon as possible after notification from the Contractor that the Work is substantially complete and ready for inspection. If any of the Work is not acceptable at the time of the inspection, the Engineer will advise the Contractor, in writing, as to the particular item(s) to be completed or corrected before the Work can be given final approval and final payment for the Work is approved.

PART 2 - PRODUCTS

2.1 Materials

- A. Owner shall supply all materials listed on the Bills of Material included in the Project Plans. Contractor shall provide all materials not listed on the Bills of Material that are essential for completing the Work according to the Project Plans, Specifications and Permit Requirements.
- B. Materials provided by the Contractor shall be suitable for their intended use and are subject to approval by the Engineer and Owner.
- C. The Contractor shall submit to the Engineer all Information, Data Sheets, and Manuals for items provided to Contractor by suppliers and manufacturers.
- D. Line Pipe
 - 1. 8" steel, API-5L GR X-52, 0.322" wall thickness
- E. Fittings
 - 1. 8" steel, buttweld, API-5L GR WPHY-52, 0.322" wall thickness
 - 2. Elbows: 1.5R, field segmentable
 - 3. Spherical 3-Way Tee: TDW Shortstopp Style, ANSI 150
- F. Coating
 - 1. Fusion Bonded Epoxy (FBE), 12 to 14 mils, Preferred Product 3M Scotchkote 226N/6233
 - 2. Abrasion Resistant Overcoat (ARO), 60 mils, Preferred Product Powercrete

PART 3 - EXECUTION

3.1 EQUIPMENT, TOOLS AND LABOR TO BE FURNISHED BY THE CONTACTOR

- A. The Contractor shall provide all equipment, tools and labor necessary for the completion of the WORK specified herein, including but not limited to:
 - 1. Excavation, trenching, and boring equipment;
 - 2. Matting and other materials in support of construction;
 - 3. Pipe cutting and welding equipment and supplies;
 - 4. Testing equipment and fittings;
 - 5. Dewatering equipment;
 - 6. Traffic control devices; and
 - 7. Any and all applicable safety equipment which may be required.

- B. The Contractor shall supply all the material items necessary for the completion of the WORK specified herein that is not included in the Bills of Material included on the Project Plans, including but not limited to:
 - 1. Select fill, sand and gravel;
 - 2. Concrete;
 - 3. Asphalt;
 - 4. Erosion and sediment control materials;
 - 5. Protective rock shields;
 - 6. Paint for above ground piping; and
 - 7. Field applied pipeline coating repair materials.
- C. Workmanship, tools, equipment and materials shall be of good quality meeting established industry standards. The Contractor shall, as required by Engineer, furnish satisfactory evidence as to the kind and quality of materials.
- D. When crossing improved road surfaces with equipment which will damage it, wood boards, flat pads or other approved methods shall be used to prevent damage to the surface.

3.2 PIPE AND MATERIAL HANDLING

- A. All materials shall be handled and placed in a manner which prevents damage and does not interfere with public and private travel.
- B. All pipe handling shall be accomplished using equipment which will not damage the pipe or the pipe coating. All damaged coating shall be repaired and acceptance of same shall be contingent upon approval of Engineer.
- C. Coated steel pipe shall be stacked not more than ten (10) layers high on padded skids in a manner which will not damage the coating.
- D. Care shall be taken during handling so as not to damage the beveled ends of steel pipe. All ends so damaged shall be repaired by removing the end of the pipe and re-beveling the pipe with a pipe beveling machine.
- E. Inspection of Pipe Coatings
 - 1. Contractor shall inspect pipe during receipt from the pipe supplier. Any damage to the protective covering during transit and handling shall be repaired before installation. After field coating and wrapping has been applied, the entire pipe shall be inspected by an electric holiday detector with impressed current set at a value in accordance with NACE RP0274 using a full-ring, spring-type coil electrode. The holiday detector shall be equipped with a bell, buzzer, or other type of audible signal which sounds when a holiday is detected. All holidays in the protective covering shall be repaired immediately upon detection. Labor, materials, and equipment necessary for conducting the inspection shall be furnished by the Contractor.
- F. Joint Repair
 - 1. All steel fittings, valves, pipe joints, piping installed below ground that is not plant coated, and holidays in the plant coating shall be wrapped with a hot applied tape

coating system, such as Tapecoat20, designed for corrosion protection. The thickness of the tape shall be 50 mils. The tape shall be applied with a single, continuous overlap wrapping with at least a 1-inch overlap on the tape.

2. The Contractor shall furnish all labor, equipment and material required, shall prepare all surfaces to be coated and shall apply the coating to all surfaces to be coated.
3. All coating materials, including repair or patch materials, purchased or used under these specifications, shall be packaged in suitable and approved containers. The containers shall be plainly marked with the name of the Manufacturer, type of material and batch or lot number where applicable. Bulk shipments shall be allowed provided the above information is included in the bill of lading.
4. The coating material shall be packaged in containers suitable to keep the contents clean and dry during handling, shipping and storage. Storage and handling conditions shall be in accordance with the Manufacturer's recommendations.
5. Precautions shall be taken during the handling, shipping and storage of all materials to prevent damage to the containers that would result in contamination of the coating materials. All contaminated or otherwise damaged materials shall be discarded.
6. The surface to be coated must be cleaned of all rust, mud, oil, grease, moisture, mill lacquer or other deleterious substances. Wire brushing and/or solvent washing is sufficient in most instances. Weld splatter should be removed by filing.
7. Primer Application
 - a. Welded joints shall be allowed to cool prior to application of primer. A uniform and continuous coat of primer shall be applied in accordance with the Manufacturer's recommendation for the specific tape and primer system being used. The primer coverage and curing or drying time shall be sufficient to insure an effective bond between the substrate and the coating.
 - b. According to manufacturer's recommendations.
8. Tape Application
 - a. Hot-applied tapes are applied by hand or machine, spirally or in a cigarette wrap, after heating to obtain a softening of the coating material. Only enough tape should be heated to ensure that it will remain in a liquefied state during application. When being applied by hand, a propane fueled torch with a wide mouth tip is recommended. Application proceeds by alternately heating and wrapping the tape to obtain the tension and the overlap recommended by the Manufacturer. Hot-applied tapes with removable separators require a light bleeding over the exterior surface to insure lap seal. Exterior surface heating is not required for hot-applied tapes designed for machine application or for hot-applied tapes that incorporate the separator liner as a part of the finished application.
 - b. According to manufacturer's recommendations.

G. ALIGNMENT

1. The gas pipeline shall be installed true to the horizontal and vertical alignment indicated on the Plans, or as otherwise directed by the Engineer. The Contractor shall make no deviations to the proposed horizontal and/or vertical alignment of the gas pipe unless otherwise directed to do so by the Engineer.
2. The Contractor shall control the vertical alignment by maintaining the desired 48-inch depth below the surface grade.
 - a. Absolute minimum pipe depth is 36 inches below the surface grade.

3. In such cases where the proposed horizontal and/or vertical pipeline alignment will cause conflict with other utilities and/or structures or result in less than the specified minimum clearance or cover, the Engineer shall be notified, and the pipeline relocated as per the Engineer's direction.

H. PIPE BENDING

1. The Contractor may use pipe bends in place of fabricated fittings to change the horizontal and/or vertical alignment of the pipe when the plans do not call out a fabricated fitting. Fabricated fittings shall be used when they are called out on the plans.
2. All bends in steel pipe shall be made by a smooth bending method. They shall be made with a bending shoe, as approved by the Engineer. When bends are used in steel pipe, they shall be made in the pipe section prior to welding the bent section to the rest of the piping. The steel pipe has a minimum field cold bending radius of 18 pipe diameters.
3. Bends shall be free of wrinkles, buckles, cracks or other evidence of damage or characteristics which, in the opinion of the Engineer, will reduce the quality of the finished pipeline. Miter bends shall not be used. In no case shall a bend section contain a weld joint. The longitudinal weld of steel pipe shall be at the neutral axis of the bend.
4. Field bends in steel pipelines that damage the pipe coating shall require the area of damaged coating to be coated with a hot applied wrap, tape, or other approved coating material prior to lowering the pipe. Bends with radii less than 40D in fusion bonded epoxy coated pipe shall be assumed to cause damage to the pipe coating.

I. MAINTENANCE OF TRAFFIC

1. Contractor shall provide maintenance of traffic according to the Project Plans and Highway Encroachment requirements.

J. PIPE LOCATING DEVICES

1. The Contractor shall be required to install warning tape as a means to warn of placement of the gas pipeline. The warning tape shall be placed from 12-18 inches from grade with the text facing up.

K. LINE MARKERS

1. The Owner shall provide the line markers. The Contractor shall place line markers over the buried gas pipeline as shown on the Project Plans. The line markers shall be placed as close as practical over the buried pipeline.

END OF SECTION 055101

SECTION 315001 – EXCAVATION, TRENCHING AND BACKFILLING FOR PIPELINE

PART 1 - GENERAL

1.1 SUBMITTALS

- A. The following shall be submitted in accordance with Section 013300:
 - 1. SD-06 Test Reports
 - a. Field Density Tests upon request of Engineer in NCDOT right-of-way or where the Engineer determines that compaction and soil conditions warrant testing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Materials
 - 1. Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than one (1) inch. Engineer shall be notified of any contaminated materials.
- B. Unstable Material
 - 1. Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.
- C. Select Granular Material (Select fill)
 - 1. Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain no more than ten (10) percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve.
- D. Initial Backfill Material
 - 1. Initial backfill shall consist of select granular material or satisfactory materials free from rocks 1 inch or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. Initial backfill shall consist of naturally occurring sand or manufactured stone sand. Natural sand shall consist of grains of hard, sound material, predominantly quartz, occurring in natural deposits. Manufactured sand shall consist of sound crushed particles of stone, essentially free from flat or elongated pieces, with sharp edges and corners removed. All sand shall be clean and free from foreign matter such as loam, dirt, sticks, roots, leaves, silt, vegetable matter and oil or dyestuffs.

PART 3 - EXECUTION

3.1 LOCATION OF OTHER UTILITIES

- A. Engineer assumes no responsibility for the existence and/or location of any other utilities in the Work area. It shall be the responsibility of the Contractor, to investigate and verify the existence and location of all utilities within the vicinity of the Work.
- B. The Contractor shall comply with all the provisions of the North Carolina Excavation Manual. At least seventy-two (72) hours prior to starting the Work the Contractor shall verify the existence and location of all underground utilities, structures and associated appurtenances. The Contractor shall notify the Owner and **North Carolina One-Call (811) or (800-632-4949) or through their Website at nc811.org** to locate all participating underground utilities. The Contractor shall be responsible for identifying all utilities in the Work area which are not participating members of the one-call system. These utility operators shall be provided with a minimum seventy-two (72) hour notice to have their facilities located prior to starting the WORK.
- C. The excavation of test holes may be required by the Contractor to ascertain the existence, location, size, type, and alignment of existing utilities or underground structures. The dimensions of these test holes shall be the minimum required to effectively locate said utilities and underground structures.
- D. In the event that any gas lines, water lines, sewer lines, electric lines, cables, conduit, and/or any other existing utility, either underground or above ground, are damaged by the Contractor during the execution of the Work, the owner of the damaged utility shall be notified immediately. If approved and/or requested by the owner of the damaged utility, the Contractor shall immediately make the necessary repairs, to the satisfaction of the utility and Engineer.

3.2 REQUIRED CLEARANCE

- A. Regardless of the method of installation, whether by open trench, directional drilling, or boring, all gas mains shall be installed such that a minimum of twenty-four (24) inches, or as otherwise specified by the Engineer, horizontal and vertical clearance is maintained from all other existing underground utilities and/or structures, thereby permitting proper routine maintenance and protection against damage which may result from proximity to the utilities and/or structures.

3.3 ALIGNMENT

- A. All gas pipes shall be installed true to the horizontal and vertical alignment indicated on the Plans, or as otherwise directed by the Engineer. The Contractor shall make no deviations to the proposed horizontal and/or vertical alignment of the gas pipes unless otherwise directed to do so by Owner or the Engineer.
- B. In such cases where the proposed horizontal and/or vertical pipeline alignment will cause conflict with other utilities and/or structures or result in less than the specified minimum clearance or cover, Engineer shall be notified, and the pipeline relocated as per Engineer's direction.

3.4 REQUIRED COVER

- A. Regardless of the method of installation; whether by open trench, directional drilling, or boring, all gas mains shall be installed such that a minimum cover of thirty-six (36) inches is provided between the top of the pipe or casing pipe and the finished grade. A depth of thirty-six (36) inches may be accepted by the Engineer under certain circumstances.
- B. When the mains cross creeks, land subjected to flooding, or major drainage ditches, a minimum of forty-eight (48) inches of cover shall be provided, or as otherwise specified on the project plans.
- C. The Contractor may, upon the approval of the Engineer, install gas pipes with less cover when the specified minimum cover cannot be obtained, provided the pipe is adequately protected from all superimposed loads by means of approved sleeving or shielding.

3.5 DIRECT BURIAL

- A. The Contractor shall, unless otherwise indicated on the Plans or as directed by Engineer, install all gas pipes and associated facilities by direct burial.
- B. Direct burial of the gas pipes and associated facilities shall include, but not be limited to: clearing and grubbing, trench excavation (trenching), rock excavation (as required), trench stabilization (as required), lowering and laying pipe and backfilling, as described herein.
- C. Trenching
 1. Trenching shall include all excavation necessary to prepare the ditch for the pipe to be installed regardless of what means or methods are necessary to produce such ditch. All trench excavation operations shall be performed in accordance with 29 CFR 1926, Subpart P - Excavations.
 2. In cases where the pavement is to be broken, Engineer shall obtain any and all required permits prior to cutting or breaking the pavement. No paved roadways shall be cut without the approval of Engineer. No pavement cuts are included in the project plans.
 3. Prior to trenching, the Contractor shall verify the existence, location, elevation and orientation of all underground and aboveground facilities within the vicinity of the WORK, in accordance with 3.1 Location of Other Utilities. The Contractor shall exercise

care in the vicinity of any and all such obstructions. In the event that any such gas lines, water lines, sewer lines, electric lines, cables, conduits, and/or any other existing utility, either above ground or below ground, is damaged by the Contractor during the execution of the Work, the owner of the damaged utility shall be notified immediately. If approved and requested by the owner of the damaged utility, the Contractor shall immediately make the necessary repairs, to the satisfaction of the utility and Engineer.

4. The trench shall be excavated to a depth which will provide the minimum required cover, as specified in 3.4 Required Cover.
5. The maximum width of the trench shall be twenty-four (24) inches plus the nominal pipe diameter, and the minimum width of the trench shall be sixteen (16) inches plus the nominal pipe diameter. Site conditions shall be considered.
6. The trench shall be excavated in a manner which offers smooth, firm and continuous support along the entire length of the pipeline. All sharp objects and debris shall be removed from the trench or the pipe shall be bedded with sand or clean fill to protect the pipe. A minimum of six (6) inches of pipe bedding shall be required in such locations. Where pipe bedding is required, the trench shall be excavated to a depth which will provide the minimum required cover, as specified in 3.4 Required Cover.
7. Whenever wet or otherwise unsuitable material, which is incapable of properly supporting the pipe, as determined by Engineer, is encountered in the trench bottom, such material shall be over-excavated as directed by Engineer to a depth necessary to allow for construction of stable pipe bedding. The over-excavated portion of the trench shall then be backfilled with select fill to proper grade to provide the minimum required cover, as specified in 3.4 Required Cover.

D. Trench Stabilization

1. Where the depth of the trench and/or the type and condition of the soil requires stabilization, the Contractor shall provide a method of trench stabilization. All materials and installation methods required for shoring, sheeting, bracing and any other required means of trench stabilization shall conform to any and all requirements of 29 CFR 1926 and applicable appendices.
2. Trench stabilization system members shall be securely connected together and installed in a manner that prevents sliding, falling, kickouts or other predictable failures of the trench sides. Support systems shall be installed and removed in a manner that protects employees from all forms of trench failure or from being struck by members of the support system.
3. Cross braces installed above the pipe to support the sheeting shall be removed only after pipe embedment has been completed.
4. Where trench sheeting is required to be left in place, such sheeting shall be cut-off at a minimum of three (3) feet below finished grade and the cut-off portion removed from the trench. Sheeting left in place shall not be braced against the pipe but shall be supported in a manner which will eliminate concentrated loads and horizontal thrusts on the pipe.

E. Lowering and Laying Pipe

1. Belt slings and/or padded calipers which are sized to the particular pipe being laid shall be used to handle the pipe provided such slings or calipers are free of all characteristics which might damage the pipe.

2. Inspection of the trench shall be made by the Contractor prior to lowering the pipe to ensure that no rocks or other sharp objects which may damage the pipe are located within the trench. If found, rocks and/or sharp objects shall be removed from the trench.
3. When piping is lowered into the trench, care shall be exercised to avoid over stressing or buckling the piping or imposing excessive stress on the joints.
4. Anchors and supports shall be provided as directed and where required for fastening WORK into place.
5. Where the Work is suspended, at night or for any other reason, the open ends of the pipe shall be securely plugged, capped, or closed to prevent entrance of water and other foreign material.

F. Backfilling

1. Backfilling operations shall include the furnishing of all labor, materials and equipment necessary for the backfilling and compaction of all trenches, bellholes, and excavations over the entire length of the pipeline, as specified herein.
2. Trenches shall not be backfilled until the pipe has proper cover, bedding and smooth, firm and continuous support along the entire length of the pipe, as specified in *C Trenching*.
3. The trench shall be backfilled as soon as possible after the pipe has been properly placed.
4. Where the trench crosses driveways, roads, streets, or other places used for the travel of vehicles or pedestrians, proper care shall be taken so as not to impede the flow of traffic. All traveled ways, including driveways, walks, streets, or alleys crossed by the trench shall be compacted by mechanical means at +/- 20% of optimum moisture content to 95% of the Modified Proctor Density. Compaction may be verified by Engineer.
5. Unsuitable material encountered during trench excavation shall not be used as backfill. Unsuitable material shall be removed and replaced with select fill, as specified herein.
6. All backfill material shall be free from all objects which might damage the pipe. Wherever it is deemed necessary by Engineer, hand labor shall be used in starting the backfill. The backfill placed from the bottom of the ditch to the top of the pipe shall be placed in the trench simultaneously on both sides of the pipe for the full width of the trench in layers not to exceed six (6) inches in depth. The backfill material shall be thoroughly compacted under and on each side of the pipe to provide solid backing against the external surface of the pipe and to remove all voids. The trench may be backfilled from one foot above the pipe to the top of the trench with mechanical equipment provided the machine is operated parallel to the trench, and the material is placed in the trench in layers not to exceed six inches for the full width.
7. All trenched construction shall be adequately compacted by means of rolling, tamping with mechanical rammers, or hand tamping such that no future settlement of the trench backfill will occur. If vibratory rollers are used for backfill compaction, vibratory motors shall not be activated until at least one (1) foot of backfill has been placed and compacted around the pipe. Flooding shall not be permitted as a means of backfill consolidation. Backfill compaction achieved by means of driving any type of construction equipment and/or vehicles, other than those specifically designed for trench compaction WORK, across any part of the trench shall not be permitted. The CONTRACTOR shall refill and compact backfill areas where settlement occurs.

3.6 STOCKPILES

- A. Stockpiles of satisfactory and unsatisfactory materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material.
- B. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to Owner.

3.7 TRACING WIRE

- A. Tracing wire shall be installed directly above the pipe, at a depth of 12 to 18 inches below finished grade unless otherwise shown.

3.8 FIELD DENSITY TESTS

- A. Tests shall be performed as directed by the Engineer. Costs associated with the testing shall be paid by the Owner.

END OF SECTION 315001

SECTION 315010 – HORIZONTAL DIRECTIONAL DRILLING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section covers the installation of the natural gas pipeline by Horizontal Directional Drilling (HDD). HDD is a trenchless excavation method which is accomplished in two phases. The first phase consists of drilling a small diameter pilot hole along a designed directional path. The second phase consists of enlarging the pilot hole to a diameter suitable for installation of the pipe and pulling the pipe into the enlarged hole. HDD is accomplished using a specialized horizontal drilling rig with ancillary tools and equipment.
- B. The grades and radius shown on the Project Plans are for the design presented on the Plans as part of the contract drawings and are intended for reference only. The exact profile of the HDD drill shall be determined by the Contractor based on the entry and exit locations and control point elevation shown on the drawings. The bend radius shown on the drawings are minimums and shall not be reduced. Control point elevations shown indicate the minimum cover and shall not be reduced.

1.2 RELATED DOCUMENTS

- A. Geotechnical investigations (borings) were conducted near the conceptual HDD sites at the beginning of the Project. The geotechnical bore profiles are included with the Project Plans for reference. The full subsurface *Geotechnical Data Report prepared by GET Solutions, Inc., dated July 9, 2020*, is included in Section T of the Bid Documents as Exhibit 1.
- B. Section 055110 – Steel Natural Gas Pipeline Construction
- C. Section 055101 – Natural Gas Pipeline Welding
- D. Section 017839 – Project Record Documents

1.3 SUBMITTALS

- A. The following shall be submitted in accordance with Section 013300 – Submittal Procedures:
 - 1. SD-06 Test Reports
 - a. The Contractor shall provide as-built construction data depicting the entry and exit points and angles, the horizontal and vertical alignment, drilling radius, and minimum cover at control points.
 - b. This information shall be delivered to the Engineer immediately after the HDD has been completed and prior to testing the pipe.
 - 2. Includes submittals required in Section 055110 – Steel Natural Gas Pipeline Construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Coated Pipe

1. Abrasion Resistant Over-coated (ARO) pipe will be provided by the Owner for the HDDs.
2. Contractor must supply joint repair materials recommended by the Over-coating manufacturer.
3. Fusion-Bonded Epoxy pipe coating underlies the ARO coating and must be repaired according to the coating manufacturer's recommendations.
 - a. Contractor must also provide materials for the Fusion-Bonded Epoxy coating repair.

PART 3 - EXECUTION

3.1 LOCATION OF OTHER UTILITIES

- A. Engineer assumes no responsibility for the existence and/or location of any other utilities in the Work area. It shall be the responsibility of the Contractor, to investigate and verify the existence and location of all utilities within the vicinity of the Work.
- B. The Contractor shall comply with all the provisions of the North Carolina Excavation Manual. At least seventy-two (72) hours prior to starting the Work the Contractor shall verify the existence and location of all underground utilities, structures and associated appurtenances. The Contractor shall notify the Owner and North Carolina One-Call (811) or (800-632-4949) or through their Website at nc811.org to locate all participating underground utilities. The Contractor shall be responsible for identifying all utilities in the Work area which are not participating members of the one-call system. These utility operators shall be provided with a minimum seventy-two (72) hour notice to have their facilities located prior to starting the WORK.
- C. The excavation of test holes is be required by the Contractor to ascertain the existence, location, size, type, and alignment of existing utilities or underground structures to be crossed by the proposed HDD drill path. The dimensions of these test holes shall be the minimum required to effectively locate said utilities and underground structures.
- D. Positively locate and stake all existing lines, cables, or other underground facilities including exposing facilities that are located within 10 feet of the designed drilled path.
- E. In the event that any gas lines, water lines, sewer lines, electric lines, cables, conduit, and/or any other existing utility, either underground or above ground, are damaged by the Contractor during the execution of the Work, the owner of the damaged utility shall be notified immediately. If approved and/or requested by the owner of the damaged utility, the Contractor shall immediately make the necessary repairs, to the satisfaction of the utility and Engineer.

- F. The Contractor shall be responsible for locating all underground facilities regardless of the ENGINEER's previous efforts in this regard. The Contractor shall be responsible for all losses and repairs occasioned by damage to underground facilities resulting from drilling operations.

3.2 HANDLING PIPE

- A. The Contractor shall at all times handle the steel pipe in a manner that does not overstress the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 0.50 of the yield stresses. If the pipe is buckled or otherwise damaged as determined by the Engineer, the damaged section shall be removed and replaced by the Contractor at his expense.

3.3 REQUIRED CLEARANCE

- A. Regardless of the method of installation, whether by open trench, HDD, or boring, all gas mains shall be installed such that a minimum of twenty-four (24) inches, or as otherwise specified by the Engineer, horizontal and vertical clearance is maintained from all other existing underground utilities and/or structures, thereby permitting proper routine maintenance and protection against damage which may result from proximity to the utilities and/or structures.

3.4 ALIGNMENT – DIRECTIONAL TOLERANCE

- A. The pilot hole shall be drilled along the path shown on the construction drawings, or the Contractor's plan and profile approved by the Owner, to the following tolerances:
 1. Elevation – Plus zero feet, minus five (5) feet. The vertical path shall not exceed high points shown in the Contract Documents.
 2. Alignment – Plus two (2) feet, minus two (2) feet.
 3. Entry Point Location – The pilot hole shall initially penetrate the ground surface at the exact location intended. The angle of entry shall not exceed 75% of the allowable bending radius of the carrier pipe.
 4. Exit Point Location – The pilot hole shall finally penetrate the ground surface within:
 - a. +/- 10 feet overall length tolerance and +/- 5 feet left/right alignment tolerance for directional drills of 1,000 linear feet, and
 - b. +/- 40 feet of overall length and +/- 5 feet left/right alignment tolerance for directional drills greater than 1,000 linear feet.

3.5 INSTALLATION

- A. The Contractor, subject to the requirements of these specifications, will determine the exact method and techniques for completing the HDD crossings. Excavated mud pits constructed in the entry and exit areas will be limited to the pipe borehole area only.
- B. The Contractor shall obtain water for construction.
- C. All pipe to be installed by HDD method shall have 100% of weld joints radiographically tested (x-rayed) prior to coating repair and installation.

3.6 CONSTRUCTION LAYOUT

- A. The Engineer shall provide an experienced surveyor to locate the positions of the entry and exit pits, establish elevation and horizontal datum for the borehead control, and layout the pipe assembly area.

3.7 OVERPULLING

- A. After the steel pipe has been pulled into the reamed pilot hole, the pipe shall be pulled through so that a minimum of ten (10) feet of steel pipe is exposed at the end of the bore. The pipe shall be cleaned so that the exterior coating can be examined for damage.

3.8 HANDLING DRILLING MUD AND CUTTINGS

- A. During the HDD operations, the Contractor shall make adequate provisions for handling any muddy water, drilling mud, or cuttings. These contaminants shall not be discharged into waterways. When the Contractor's provisions for storing muddy water, drilling mud, or cuttings onsite are exceeded, the contaminants must be hauled away to a suitable legal disposal site. After completion of the directional drilling WORK, the entry and exit pit location shall be restored to their original conditions.
- B. The Contractor shall comply with all provisions of any permits.
- C. To the extent practical, the Contractor shall maintain a closed-loop drilling fluid system and a drilling fluid cleaning system that will allow return fluid to be reused.

3.9 REAM AND PULL BACK

- A. Pre-reaming
 - 1. Pre-reaming operations shall be conducted at the discretion of the Contractor. All provisions of this Specification relating to simultaneous reaming and pulling back operations shall also pertain to pre-reaming operations.
- B. Pulling Loads
 - 1. The maximum allowable tensile load imposed on the pull section shall be equal to 90% of the specified minimum yield strength of the pipe inclusive of a 0.72 code design factor minus the tensile stress resulting from the bend radius, applied across the area of the pipe section.
 - a. Refer to the HDD profiles on the Project Plans for the maximum allowable pulling loads for the drill designs shown.
 - 2. A swivel shall be used to connect the pull section to the reaming assembly to minimize torsional stress imposed on the section.
 - 3. The pull section shall be supported on rollers as it proceeds during pull back so that it moves freely, and the pipe and corrosion coating are not damaged.

4. The pull section shall be installed in the reamed hole in such a manner that external pressures are minimized. Any damage to the pipe resulting from external pressure during installation shall be the responsibility of the Contractor.
5. Buoyancy modification shall be used at the discretion of the Contractor. Any buoyancy modification procedure proposed for use shall be submitted to Engineer for approval. The Contractor is responsible for any damage to the pull section resulting for buoyancy modification.

3.10 COATING INSPECTION

- A. The pull section is dual coated for corrosion control and coating protection purposes and shall be inspected for holidays with a holiday detector as it enters the hole. Any coating damage found shall be repaired. Inspection and repair of pipe coating shall be conducted in accordance with the applicable Specifications.

3.11 DRILLING FLUIDS

- A. No fluid will be utilized that does not comply with environmental regulations.
- B. The Contractor is responsible for obtaining, transporting, and storing any water required for drilling fluids.
- C. The Contractor shall maximize recirculation of drilling fluid surface returns. The Contractor shall provide solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.
- D. Disposal of excess drilling fluids is the responsibility of the Contractor and shall be conducted in compliance with all environmental regulations, right-of-way and workspace agreements, and permit requirements. Drilling fluid disposal procedures proposed for use shall be submitted to the Engineer for approval.
- E. The Contractor shall employ his best efforts to maintain full annular circulation of drilling fluids. Drilling fluid returns at locations other than the entry and exit points shall be minimized. In the event that annular circulation is lost, the Contractor shall take steps to restore circulation. If inadvertent surface returns of drilling fluids occur, they shall be immediately contained with hand placed barriers (i.e. hay bales, sandbags, silt fences, etc.) and collected using pumps as practical. If the amount of the surface return is not great enough to allow practical collection, the affected area shall be diluted with fresh water and the fluid will be allowed to dry and dissipate naturally. If the amount of the surface return exceeds that which can be contained with hand placed barriers, small collection sumps (less than 5 cubic yards) may be used. If the amount of the surface return exceeds that which can be contained and collected using small sumps, drilling operations shall be suspended until surface return volumes can be brought under control.

3.12 NORTH CAROLINA SPECIAL PROVISIONS – DIRECTIONAL BORING

- A. Directional drilling methods have not been given statewide approval for use on NCDOT right of way. Under no condition shall jetting alone or wet boring with water of utility pipelines be allowed. Directional boring using jetting with a Bentonite (or equivalent material) slurry is approved at a minimum depth of ten (10) feet below the pavement surface [fifteen (15') feet below the surface of partial and/or full control of access roads] and two (2) feet below any ditch line.
- B. Directional boring is not allowed in embankment material. Directional boring is allowed beneath embankment material in naturally occurring soil. Any parallel installation utilizing the directional boring method shall be made at a minimum depth of three (3') feet (cover) below the ground surface and outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway.
- C. All directional bores shall maintain ten (10) feet minimum (clear) horizontal distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. All directional bores shall maintain ten (10) feet minimum (clear) vertical distance from the nearest part of pipe culverts or box culverts. Directional bores are not allowed beneath bridge footings, culvert wing wall footings or retaining walls.
- D. The tip of the drill string shall have a cutter head. Detection wire shall be installed with non-ferrous material. *(Not applicable to this Project.)*
- E. Any changes shall be submitted to the District Engineer for approval prior to construction.
- F. For multiple conduit installations (including perpendicular & parallel installations), install conduits with five (5) feet minimum (clear) horizontal separation between each conduit or install multiple conduits within a single duct. *(Not applicable to this Project.)*
- G. An overbore shall not be more than two (2") inches greater than the diameter of the pipe or encasement. An overbore exceeding two (2") inches greater than the diameter of the pipe or encasement will be considered if the encroachment agreement includes a statement signed and sealed by a licensed North Carolina Professional Engineer indicating that an overbore in excess of two (2") inches of the diameter of the pipe or encasement will arch and no damage will be done to the pavement or sub-grade.
 - 1. Bores are designed with overbore two pipe sizes larger than pipe size. Including the 12 mils minimum Epoxy-Concrete pipe coating, there are approximately 3.3 inches difference in diameter of the hole and the pipe. Settlement calculations have been provided with the NCDOT Encroachment applications.
 - 2. Should Contractor change overbore size, Contractor must have the change approved by NCDOT and provide all necessary calculations for obtaining the approval.
- H. HDPE pipe installed by directional boring shall not be connected to existing pipe or fittings for one (1) week from the time of installation to allow tensional stresses to relax. *(Not applicable to this Project.)*

END OF SECTION 315010

SECTION 315050 – JACKING AND BORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section covers the installation of the natural gas pipeline by the trenchless method of simultaneously jacking or pushing the pipe while maintaining the cutting head of the bore inside of the leading edge of the jacked pipe. This method applies to installation of casing pipe or steel carrier pipe. This specification specifically applies to the installation of steel gas main under a North Carolina Secondary Roadway by the method of jacking and boring without casing.
- B. The grades and bore depth shown on the Project Plans are for the design presented on the Plans as part of the contract drawings and are intended for reference only. The exact depth of the bore shall be determined by the Contractor based on the entry and exit locations and the verified depth of existing utilities along the roadway being crossed with the bore.
- C. RELATED DOCUMENTS
 - 1. Geotechnical investigations (borings) were conducted near the conceptual crossing site. The geotechnical bore profiles are included with the Project Plans for reference. The full subsurface *Geotechnical Data Report prepared by GET Solutions, Inc., dated July 9, 2020*, is included in Section T of the Bid Documents as Exhibit 1.
 - 2. Section 055110 – Steel Natural Gas Pipeline Construction
 - 3. Section 055101 – Natural Gas Pipeline Welding
 - 4. Section 017839 – Project Record Documents
- D. Contractor's bid price includes the price for delivering a completed jack and bore crossing regardless of number of attempts or method of crossing.

1.2 SUBMITTALS

- A. The following shall be submitted in accordance with Section 013300 – Submittal Procedure:
 - 1. Crossing schedule – shall be submitted to the Engineer a minimum of forty-eight (48) hours in advance of the planned start of the jack and bore operations.
 - 2. SD-06 Test Reports
 - a. The Contractor shall provide as-built construction data depicting the entry and exit points and angles (if any), the horizontal and vertical alignment, location of existing crossed utilities as determined from test holes, minimum clearance between bored carrier pipe and existing crossed utilities, and cover at road ditch lines, pavement edges, and the center of pavement.
 - b. This information shall be delivered to the Engineer immediately after the HDD has been completed and prior to testing the pipe.
 - 3. Includes submittals as in Section 055110 – Natural Gas Steel Pipeline Construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Coated Pipe

1. Abrasion Resistant Over-coated (ARO) pipe will be provided by the Owner for the jack and bore section.
2. Contractor must supply joint repair materials recommended by the ARO coating manufacturer.
3. Fusion-Bonded Epoxy (FBE) pipe coating underlies the ARO coating and must be repaired according to the coating manufacturer's recommendations.
 - a. Contractor must also provide materials for the FBE coating repair.

PART 3 - EXECUTION

3.1 LOCATION OF OTHER UTILITIES

- A. Engineer assumes no responsibility for the existence and/or location of any other utilities in the Work area. It shall be the responsibility of the Contractor, to investigate and verify the existence and horizontal and vertical location of all utilities within the vicinity of the WORK.
- B. The Contractor shall comply with all the provisions of the North Carolina Excavation Manual. At least seventy-two (72) hours prior to starting the Work the Contractor shall verify the existence and location of all underground utilities, structures and associated appurtenances. The Contractor shall notify the Owner and **North Carolina One-Call (811) or (800-632-4949) or through their Website at nc811.org** to locate all participating underground utilities. The Contractor shall be responsible for identifying all utilities in the Work area which are not participating members of the one-call system. These utility operators shall be provided with a minimum seventy-two (72) hour notice to have their facilities located prior to starting the Work.
- C. The excavation of test holes is be required by the Contractor to ascertain the existence, location, size, type, and alignment of existing utilities or underground structures to be crossed by the proposed crossing path. The dimensions of these test holes shall be the minimum required to effectively locate said utilities and underground structures.
- D. Positively locate and stake all existing lines, cables, or other underground facilities including exposing facilities that are located within five (5) feet of the designed bore path.
- E. In the event that any gas lines, water lines, sewer lines, electric lines, cables, conduit, and/or any other existing utility, either underground or above ground, are damaged by the Contractor during the execution of the Work, the owner of the damaged utility shall be notified immediately along with GUC's dispatchers. If approved and/or requested by the owner of the damaged utility, the Contractor shall immediately make the necessary repairs, to the satisfaction of the utility and Engineer.

- F. The Contractor shall be responsible for locating all underground facilities regardless of the Engineer's previous efforts in this regard. The Contractor shall be responsible for all losses and repairs occasioned by damage to underground facilities resulting from drilling operations.

3.2 HANDLING PIPE

- A. The Contractor shall at all times handle the steel pipe in a manner that does not overstress the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 0.50 of the yield stresses. If the pipe is buckled or otherwise damaged as determined by the Engineer, the damaged section shall be removed and replaced by the Contractor at his expense.

3.3 REQUIRED CLEARANCE

- A. Regardless of the method of installation, whether by open trench, HDD, or jacking and boring, all gas mains shall be installed such that a minimum of twenty-four (24) inches, or as otherwise specified by the Engineer, horizontal and vertical clearance is maintained from all other existing underground utilities and/or structures, thereby permitting proper routine maintenance and protection against damage which may result from proximity to the utilities and/or structures.

3.4 ALIGNMENT – DIRECTIONAL TOLLERANCE

- A. Vertical and horizontal alignment shall be as near to those depicted on the project Plans as the site conditions permit.
- B. Horizontal alignment shall be as near perpendicular to the centerline of the road as possible.
- C. The horizontal alignment shall be within two feet either direction of the alignment as shown on the Plans depending on conditions at the site at the time of the boring operations.
- D. Vertical alignment shall be as near level as possible considering existing utility locations, bore and receiving pit conditions, and permitted depths of the crossing.
- E. The vertical alignment shall not be less than as shown on the Plans and/or as approved by NCDOT encroachment agreement.

3.5 INSTALLATION

- A. The Contractor, subject to the requirements of these Specifications, will determine the exact method and techniques for completing the jacked and bored crossings. Excavated entry and exit pits will be limited to those required for the jack and bore equipment and for receiving the bored pipe and making tie-ins to the pipeline.
- B. The Contractor shall perform the jack and Bore operations as a “dry bore” without adding water.
- C. Prior to commencing jack and bore operations, Contractor shall obtain surveyed elevations of road surface over the centerline of the proposed crossing.

- D. Contractor shall obtain surveyed elevations of the road surface over the centerline of the crossing at the half-way complete point and after completion of the crossing to verify that unacceptable settlement has not occurred.
- E. Should settlement of the surface be noticed during the boring operations, the operations shall be stopped immediately, and remedial actions shall be taken to stop the settlement.
 - 1. As part of the Contractor's jack and bore plan, Contractor shall have a remedial plan to activate should road settlement occur during the jack and bore operations.
 - 2. Contractor is responsible for any repair to roadway base and surface required by NCDOT as a result of the jack and bore operations.
- F. A short joint of pipe shall be welded to the nose end of leading joint of carrier pipe. This short joint shall be provided with mechanical arrangements or devices that prevent the auger from leading the crossing pipe during the jack and bore operations. This will help to ensure that the hole remains supported throughout the crossing operations.
- G. All carrier pipe to be installed by the jacking and boring method shall have all weld joint ARO and FBE coating repaired according to the coating manufacturers' recommendations for field applied joint repair.
 - 1. Contractor shall install crossing with minimum amount of weld joints.

3.6 CONSTRUCTION LAYOUT

- A. The Contractor shall confine bore pits and equipment layout to within the obtained permanent and temporary easements as shown on the Project Plans.
- B. Contractor shall honor all conditions of the easements as shown on the Project Plans.
- C. Depending upon conditions, contractor should expect the need to dewater bore and receiver pits. Contractor shall provide all materials and equipment associated with dewatering construction excavations.

3.7 OVERJACKING AND COATING INSPECTION

- A. After the steel pipe has been jacked into the hole, the pipe shall be extended beyond the exit hole into the exit pit area so that a minimum of four (4) feet of ARO steel carrier pipe is exposed. The pipe shall be cleaned so that the exterior coating can be examined for damage.
- B. Any pipe coating damage shall be discussed with the Engineer to determine the acceptability of the crossing, or necessity for remedial measures.

3.8 HANDLING DRILLING MUD AND CUTTINGS

- A. During the jack and bore operations, the Contractor shall make adequate provisions for handling any muddy water and cuttings. These contaminants shall not be discharged into waterways. When the Contractor's provisions for storing muddy water or cuttings onsite are exceeded, the contaminants must be hauled away to a suitable legal disposal site. After completion of the jack and bore, the entry and exit pit location shall be restored to their original conditions. Cuttings may be used as restoration material provided they meet the requirements for backfill as presented in Section 315001 – Excavation, Trenching and Backfill for Pipeline.

- B. The Contractor shall comply with all provisions of any permits.

END OF SECTION 315050

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Project Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. References
 - 1. NCDOT – Roadway Design Manual (current addition)
 - a. <https://connect.ncdot.gov/projects/Roadway/Pages/Roadway-Design-Manual.aspx>
 - 2. NCDOT – Standard Specifications and Special Provisions (current edition)
 - a. <https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx>
 - 3. City of Greenville Manual of Standard Designs and Details (current edition)
 - a. <https://www.greenvillenc.gov/government/engineering/manual-of-standard-designs-and-details>

1.2 SUMMARY

- A. Section Includes:
 - 1. Hot-mix asphalt paving.
 - 2. Asphalt surface treatments.
- B. Paving is for the existing residential asphalt driveway that runs parallel to US-13 near the intersection of US-13 (S. Memorial Dr.) and W. 3rd St.

1.3 UNIT PRICES

- A. Work of this Section is included in unit bid prices and includes all labor and materials.

1.4 PREINSTALLATION MEETINGS

- A. Notify Mr. F. Durward Tyson, Jr., P.E. of Greenville Utilities Commission at (252) 551-2048 ten (10) days prior to paving operations.
- B. Coordinate paving operations so as to minimize disruption to access to the residents.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Job-Mix Designs: Acceptable as NCDOT approved SM-9.5B Asphalt mix with B25.0B or B25.0C base course

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Material Certificates: For paving material.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Pavement manufacturers shall be approved by the NCDOT for manufacturing the types of pavement proposed for the site. The concrete and/or asphalt mixtures proposed must be approved for the intended use and installation conditions by the NCDOT.

1.8 FIELD CONDITIONS

- A. Follow manufacturer's recommendations and NCDOT standards.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. Meet the requirements of NCDOT SM-9.5B light duty asphalt pavement

2.2 ASPHALT MATERIALS

- A. Meet the requirements of NCDOT SM-9.5B light duty asphalt pavement
- B. Water: Potable.

2.3 AUXILIARY MATERIALS

- A. Joint Sealant: NCDOT approved.

2.4 MIXES

- A. Meeting all requirements of **NCDOT S-9.5B**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Contractor shall follow NCDOT specifications and Superpave Manual specifications.

- B. Verify that subgrade is dry and in suitable condition to begin paving.
- C. Contractor shall ensure adequate compaction is achieved and that the prescribed pavement or surface treatment including base courses are installed according to the manufacturer's recommendations and NCDOT standards.
- D. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
 - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

3.3 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt surface course in single lift.
 - 2. Spread mix at a minimum temperature of 250 deg F (121 deg C).
 - 3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 - 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat. (as applicable)
- B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches (25 to 38 mm) from strip to strip to ensure proper compaction of mix along longitudinal joints.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

3.5 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 96 percent of reference laboratory density according to NCDOT recommendations.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Single Course: Plus or minus 1/4 inch (6 mm).
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness that matches the grade of the existing driveway and smoothly matches the road grade at the drive entrance.

3.7 SURFACE TREATMENTS

- A. Not applicable.

3.8 FIELD QUALITY CONTROL

- A. Mix records.
- B. Manufacturer's installation recommendations.
- C. Inspector observation.

3.9 WASTE HANDLING

- A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 017419 - Construction Waste Management and Disposal.

END OF SECTION 321216

SECTION 329100 – ROW RESTORATION

PART 1 - GENERAL

- 1.1 Contractor is responsible for restoring the surface to pre-construction contours and restoring vegetation according to the seeding and sodding requirements included in the project plans.
- 1.2 Restoration shall occur in sections that are complete within fourteen (14) days following the restoration of the surface to original contours, removal of construction equipment and debris, and cessation of work in that section of the easement and workspace.
- A. Restoration may not be delayed until after all construction has been completed.
- B. As the remaining construction progresses, the Contractor shall revisit and inspect previously restored sections of the ROW and install remedial restoration measures as necessary.
- 1.3 EROSION AND SEDIMENT CONTROLS
- A. The Contractor shall install and maintain the erosion and sediment controls as indicated in the Plans and these Specifications. The Contractor shall install all permanent erosion and sediment control measures such as seeding, mulching and tacking within fourteen (14) days following restoration of surface contours, removal of construction equipment and debris, and cessation of work in that section of the easement and workspace.
- B. The Contractor is responsible for maintaining all erosion and sediment control measures during construction until Engineer and the Owner releases the Contractor from this phase of the project. The Owner will then assume the responsibility of maintaining permanent measures and removing temporary measures such as silt fences. The controls and measures required by the Contractor are described below.

PART 2 - PRODUCTS

- 2.1 SEED AND SOD
- A. The specifications for soil preparation, fertilizing, seeding, mulching, and tacking are included in the Project Plans.

PART 3 - EXECUTION

3.1 RESTORATION

- A. The ROW surface shall be returned to pre-construction contours as soon as the trench line is restored, debris is removed, matting and equipment are removed, and the ROW is no longer required as a construction road to access portions of the ROW with construction in projects or planned.
- B. Seeding and sodding shall occur within fourteen (14) days following restoration.

3.2 MAINTENANCE

- A. The Contractor shall revisit restored portions of the ROW as the Project continues and apply remedial measures to the section of ROW previously restored in order to obtain the cover necessary to prevent erosion to occur.

3.3 INSPECTIONS

- A. General
 - 1. The Contractor shall inspect restored areas of the construction site at least once every fourteen (14) calendar days and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site.
 - 2. The Contractor's is released from their responsibilities for site restoration after Final Acceptance of the Work by the Owner.

END OF SECTION 329100

Section T

Exhibits

Exhibit 1

Geotechnical Data Report



REPORT OF SUBSURFACE INVESTIGATION AND GEOTECHNICAL ENGINEERING SERVICES

**Greenville Utilities Memorial Bridge
Pipeline Relocation
Greenville, North Carolina**

**GET Project No: EC19-277G
July 9, 2020**

PREPARED FOR:

Kimley»»Horn



July 9, 2020

TO: **Kimley-Horn**
4525 Main Street, Suite 1000
Virginia Beach, VA 23462

Attn: Mr. Ryan Clark, P.E.

RE: Report of Subsurface Exploration and Geotechnical Engineering Services
Greenville Utilities Memorial Bridge Pipeline Relocation
Greenville, North Carolina
GET Project No: EC19-277G

Dear: Mr. Clark

In compliance with your instructions, we have completed our Subsurface Exploration and Geotechnical Engineering Services for the above referenced project. The results of this study, together with our recommendations, are presented in this report.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **GET Solutions, Inc.** would be pleased to continue its role as Geotechnical Engineer during the project implementation.

We appreciate the opportunity to work with you on this project. We trust that the information contained herein meets your immediate need, and should you have any questions or if we could be of further assistance, please do not hesitate to contact us.

Respectfully Submitted,
GET Solutions, Inc.

Gerald W. Stalls Jr., P.E.
Senior Project Engineer
NC Reg. # 034336



Camille A. Kattan, P.E.
Principal Engineer
NC Reg. # 014103



TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1.0 PROJECT INFORMATION	1
1.1 Project Authorization	1
1.2 Project Site Location and Description	1
1.3 Project Construction Description.....	1
1.4 Purpose and Scope of Services	2
2.0 FIELD AND LABORATORY PROCEDURES	2
2.1 Field Exploration	2
2.2 Field and Laboratory Testing.....	3
2.2.1 <i>Soil Classification and Index Testing</i>	3
3.0 SITE AND SUBSURFACE CONDITIONS.....	4
3.1 Site Geology	4
3.2 Recent Land Reclamation and Site Development	4
3.3 Subsurface Soil Conditions.....	4
3.4 Groundwater Discussion	5
4.0 REPORT LIMITATIONS	6
APPENDIX I BORING LOCATION PLAN	
APPENDIX II CLASSIFICATION SYSTEM FOR SOIL EXPLORATION	
APPENDIX III SUMMARY OF LABORATORY CLASSIFICATION RESULTS	
APPENDIX IV BORING LOGS	
APPENDIX V GENERALIZED SOIL PROFILES	

EXECUTIVE SUMMARY

The project site for this development is located along US-13/NC-11 in the vicinity of the existing Memorial Bridge in Greenville, North Carolina. It is our understanding that the proposed construction will include the relocation of an existing gas pipeline to facilitate the construction of a new bridge and roadway. The new utility alignment will extend along the northwest side of US 13 and has a total length of about 1 mile starting at approximately 700 feet south of the existing Memorial Bridge. The new utility will be installed by means of directional drilling at an approximate depth of about 20 to 30 feet below the existing site grade elevations along the northwest portion of the existing US-13/NC-11 right of way.

Our field exploration program included four (4) 65- to 70-foot deep Standard Penetration Test (SPT) borings within the construction area. The initial groundwater level was measured to occur at depths ranging from 16 to 23 feet below the existing grades at the boring locations, corresponding to approximate elevations ranging from 1 to 4 feet NAVD88, as estimated from the project site plan. A summary of the subsurface and groundwater conditions encountered at the boring locations is presented in Section 3 of this report.

This summary briefly discusses some of the major topics mentioned in the attached report. Accordingly, this report should be read in its entirety to thoroughly evaluate the contents.

1.0 PROJECT INFORMATION

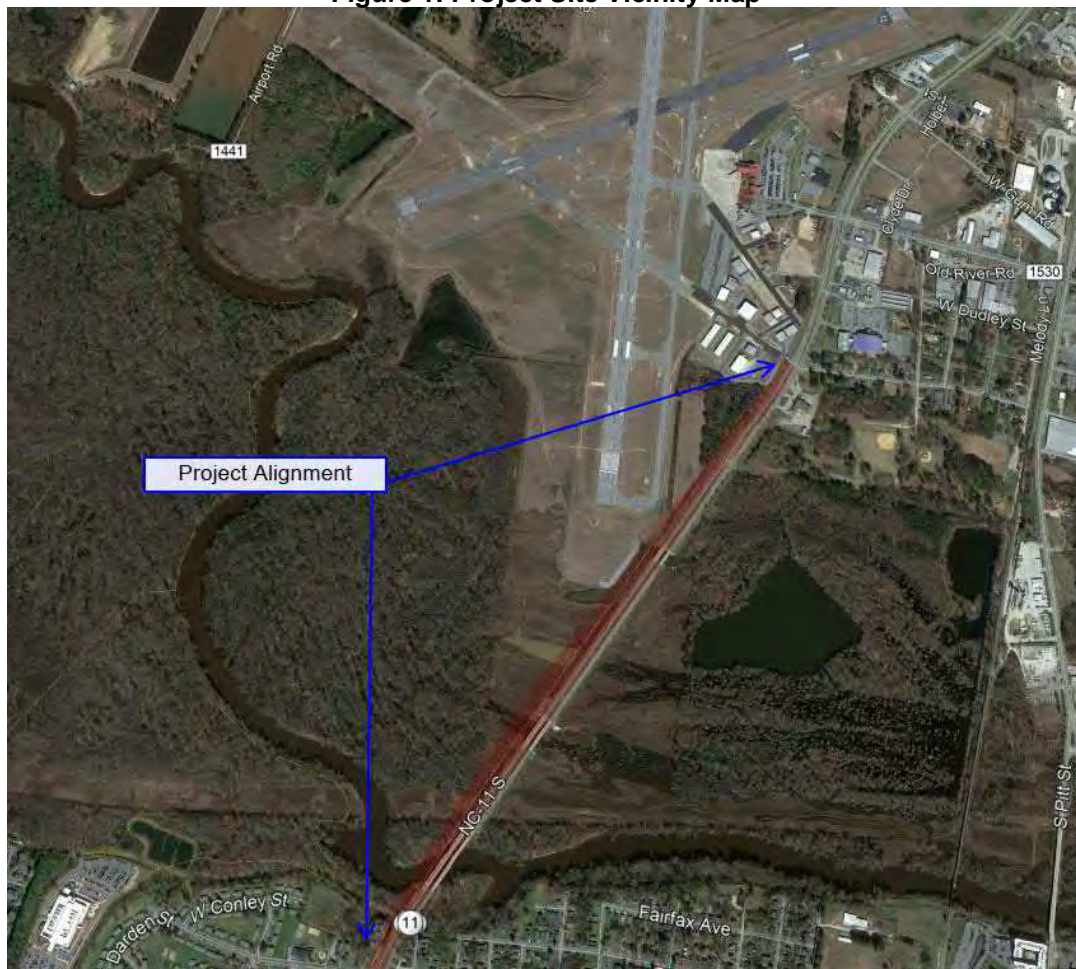
1.1 Project Authorization

G E T Solutions, Inc. has completed our subsurface exploration and geotechnical engineering services for the proposed Greenville Utilities Memorial Bridge Pipeline Relocation project located in Greenville, North Carolina. The geotechnical engineering services were conducted in general accordance with the scope presented in **G E T** Proposal No. PEC19-148G. Authorization to proceed with our services was received from the client in the form of a Individual Project Order Number executed on the date of October 29, 2019.

1.2 Project Site Location and Description

This project site is located along the northwest side of US-13/NC-11 in the vicinity of the existing Memorial Bridge in Greenville, North Carolina. More specifically, the site is about 1 mile in length and starts approximately 700 feet south of the existing Memorial Bridge. The utility alignment crosses the Tar River as well as an electrical transmission alignment and generally consists of grass covered areas and low-lying marsh areas. Finally, portions of the project site are in the immediate vicinity of the Pitt County – Greenville Airport. A site vicinity map is provided in Figure 1 with the project site indicated.

Figure 1: Project Site Vicinity Map



1.3 Project Construction Description

The proposed development at this site is planned to include the relocation of an existing gas pipeline to facilitate the construction of a new bridge and roadway. The new utility alignment will extend along the northwest side of US-13/NC-11 and has a total length of about 1 mile starting at approximately 700 feet south of the existing Memorial Bridge. The new utility will be installed by means of directional drilling at an approximate depth of about 20 to 30 feet below the existing site grade elevations along the northwest portion of the existing US-13/NC-11 right of way.

If any of the noted information is incorrect or has changed, please inform G E T Solutions, Inc. so that we may amend the recommendations presented in this report, if appropriate.

1.4 Purpose and Scope of Services

The purpose of this study was to obtain information on the general subsurface conditions at the proposed project site. The subsurface conditions encountered were then evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

1. General assessment of the soils revealed by the borings performed at the proposed development.
2. General location and description of potentially deleterious material encountered in the borings that may interfere with construction progress or structure performance, including existing fills or surficial/subsurface organics.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic material in the soil, bedrock, surface water, groundwater or air, on or below or around this site. Prior to development of this site, an environmental assessment is advisable.

2.0 FIELD AND LABORATORY PROCEDURES

2.1 Field Exploration

In order to explore the general subsurface soil types and to aid in developing associated design parameters and recommendations, the following exploration program was performed:

- § Four (4) 65- to 70-foot deep SPT borings (designated as B-1 through B-4) were drilled within the general vicinity of the proposed utility alignment. Due to existing site conditions, the borings were performed along the northwest shoulder or within the median of US-13/NC-11.

Standard Penetration Tests were performed in the field in general accordance with ASTM D 1586. The tests were performed continuously from 13 feet below the existing ground surface to a depth of 25 feet and at 5-foot intervals thereafter, starting at a depth of 28 feet below grade. The soil samples were obtained with a standard 1.4" I.D., 2" O.D., 30" long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches, using a safety hammer. The number of blows required to drive the sampler each 6-inch increment of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value (uncorrected for automatic hammer and overburden pressure). A representative portion of each disturbed split-spoon sample was collected with each SPT, placed in a sealed glass jar, and returned to our laboratory for review. Following the exploration procedures, the borings were backfilled with a neat cement grout mix in accordance with NCDENR requirements for aquifer protection.

The boring locations were established by **G E T Solutions, Inc.** and the engineer of record as well as staked in the field by a representative of **G E T Solutions, Inc.** by referencing the project site plan (developed by Kimley-Horn and dated January 15, 2020) and by measuring from corroborating and identifiable landmarks. Approximate soil boring locations are shown on the attached "Boring Location Plan" sheets (Appendix I) which was developed using the project plans prepared by Kimley-Horn.

2.2 Field and Laboratory Testing

Soil testing provided by **G E T Solutions, Inc.** was performed in accordance with American Society for Testing and Materials (ASTM) standards. All soils and materials tests were performed in our AASHTO re:source (formally AMRL) certified Elizabeth City laboratory.

2.2.1 Soil Classification and Index Testing

Representative portions of all soil samples collected during drilling operations were labeled, preserved and transferred to our laboratory in accordance with ASTM D4220 for classification and analysis. Soil descriptions on the boring logs are provided using visual-manual methods in general accordance with ASTM D2488 using the Unified Soil Classification System (USCS). Soil samples that were selected for index testing were classified in general accordance with ASTM D2487. It should be noted that some variation can be expected between samples classified using the visual-manual procedure (ASTM D2488) and the USCS (ASTM D2487). A summary of the soil classification system is provided in Appendix II.

Representative split-spoon soil samples were selected and subjected to natural moisture, #200 sieve wash, and/or Atterberg Limits testing in order to corroborate the visual classification. These test results are presented in Appendix III and on the soil test boring logs provided in Appendix IV. Generalized subsurface soil profiles are provided in Appendix V.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Geology

The project site lies within a major physiographic province called the Atlantic Coastal Plain. Numerous transgressions and regressions of the Atlantic Ocean have deposited marine, lagoonal, and fluvial (stream lain) sediments. The regional geology is very complex, and generally consists of interbedded layers of varying mixtures of sands, silts and clays. Based on our review of existing geologic and soil boring data, the geologic stratigraphy encountered in our subsurface explorations generally consisted of marine deposited Sands, Silts, and Clays.

3.2 Recent Land Reclamation and Site Development

Based on a review of historical United States Geological Survey (USGS) topographic maps of Winterville and Greenville, North Carolina produced between the years of 1905 and 2019, the project site does not appear to be located within a previously reclaimed area. However, the general project site includes the existing US-13/NC-11 roadway alignment, an electrical transmission alignment, and the memorial bridge. As such, subsurface obstructions and/or conflicts with existing conditions (i.e. foundations, utilities, etc.) may occur.

3.3 Subsurface Soil Conditions

The soils encountered at the explored locations generally consisted of FILL underlain by very loose to very dense SAND (SP, SP-SM, SM, SC-SM, SC) having varying amounts of Silt, Clay, Mica, and/or Marine Shell Fragments as well as very soft to stiff CLAY (CL, CH) and SILT (ML) having varying amounts of Sand and/or Marine Shell Fragments. A summary of the subsurface soil conditions encountered at the SPT boring locations is presented in Table II on the following page of this report.

Table II – Subsurface Soil Conditions

Average Depth (ft)	Stratum	Description	Ranges of SPT ⁽¹⁾ N-Values
0 to 17 – 20.5	FILL	∅ FILL: SAND (SP, SP-SM, SC) having amounts of Silt and/or Clay	–
17 – 20.5 to 38 – 43.5	I	∅ Cohesive: CLAY (CL, CH) with varying amounts of Sand and/or Marine Shell Fragments ∅ Granular: SAND (SP, SP-SM, SM, SC) with varying amounts of Silt and/or Clay	Cohesive: 2 to 9 Granular: 2 to P.R. ⁽²⁾
17 – 25 to 19 – 28.5	Deposit IA ⁽³⁾	∅ Organics: SAND (SM) with trace Organics Wood (Stump)	-
38 – 43.5 to 65 – 70	II ⁽⁴⁾	∅ Cohesive: Sandy SILT (ML), CLAY (CL, CH) with varying amounts of Sand and Marine Shell Fragments ∅ Granular: SAND (SM, SC-SM, SC) with varying amounts of Silt, Clay, Mica, and/or Marine Shell Fragments	Cohesive: 6 to 12 Granular: 6 to P.R. ⁽²⁾
Note(s): (1) SPT = Standard Penetration Test, N-Values in Blows-per-foot (uncorrected) (2) P.R. = Practical Refusal (3) Encountered at Boring B-1 Only (4) All borings terminated in this Stratum			

The subsurface descriptions are of a generalized nature provided to highlight the major soil strata encountered. The records of the subsurface exploration are included in Appendix IV (Boring Log sheets) and in Appendix V (Generalized Soil Profiles) which should be reviewed for specific information as to the individual borings. The stratifications shown on the records of the subsurface exploration represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

3.4 Groundwater Discussion

The groundwater level was recorded at the boring locations and as observed through the relative wetness of the recovered soil samples during the drilling operations. The initial groundwater level was measured to occur at depths ranging from about 16 to 23 feet below the existing grades at the boring locations, corresponding to approximate elevations ranging from 1 to 4 feet NAVD88, as estimated from the project site plan.

The soils encountered at the explored locations and at the corresponding initial groundwater levels consisted of either relatively porous soils containing less than 15 percent fines (SAND: SP-SM, SP-SC, SM) or relatively impermeable soils (SAND: SM with Clay, SC-SM, SC; CLAY: CH). Drilling fluids (water) are introduced into the bore holes during the drilling operations further impairing the ability to accurately determine the groundwater levels. In addition, as subsurface soils begin to dry, moisture moves upwards through the soil profile by means of capillary action. Based on the subsurface soil compositions, these initial groundwater level readings (based on the relative wetness of the soils) could be in part attributed to the capillary action of the soils. As such, the reported initial groundwater levels may not be indicative of the static groundwater level. The SPT boreholes and the removed temporary piezometers boreholes were backfilled upon completion for safety considerations as well as in accordance with NCDENR requirements for aquifer protection.

4.0 REPORT LIMITATIONS

The data submitted are based on the available soil information obtained by **G E T Solutions, Inc.** and the information supplied by the client for the proposed project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of the client and their designated agents for the specific application to the proposed Greenville Utilities Memorial Bridge Pipeline Relocation project located in Greenville, North Carolina.

APPENDICES

APPENDIX I	BORING LOCATION PLAN
APPENDIX II	CLASSIFICATION SYSTEM FOR SOIL EXPLORATION
APPENDIX III	SUMMARY OF LABORATORY CLASSIFICATION RESULTS
APPENDIX IV	BORING LOGS
APPENDIX V	GENERALIZED SOIL PROFILES

APPENDIX I

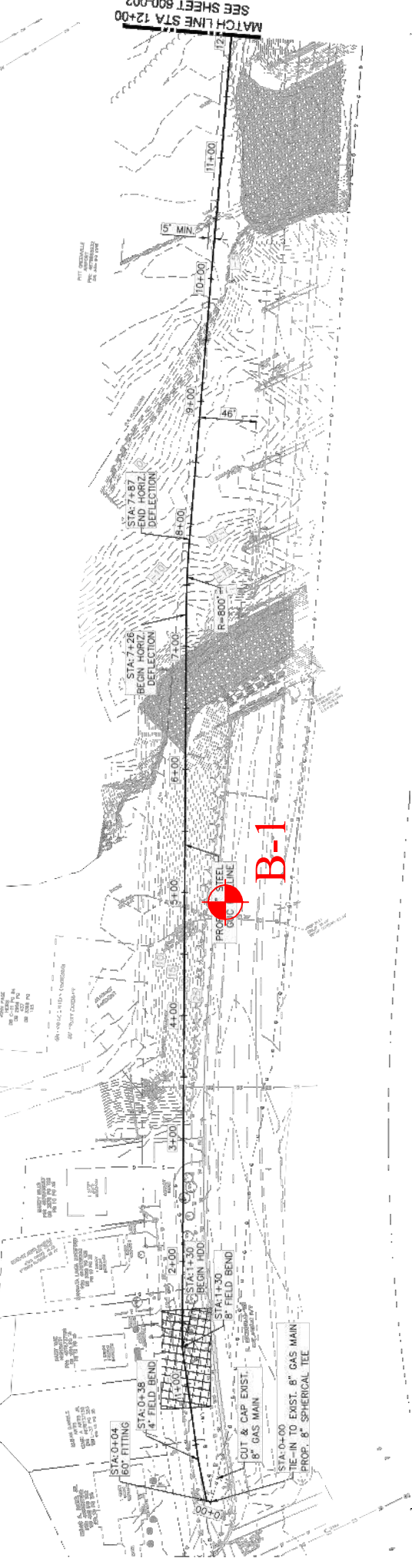
BORING LOCATION PLAN

OWNER

RESTRICT. R/W

RESTRICT. R/W

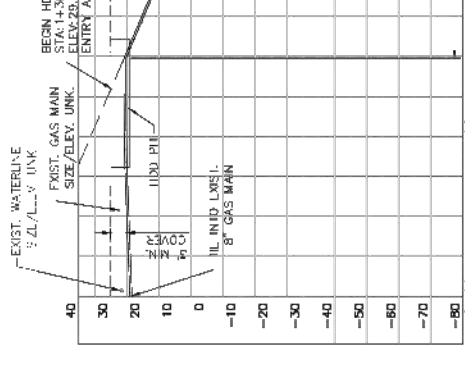
S. MEMORIAL DR.
200' R/W



SEE SHEET 600-002

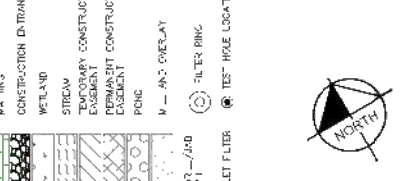
PIPE	LENGTH (L)	FITTINGS	CAT. PROTECTION
1	144	4	2.1
1	A	1	A
A	144	4	2.1
A	1052'		

PIPE BAR

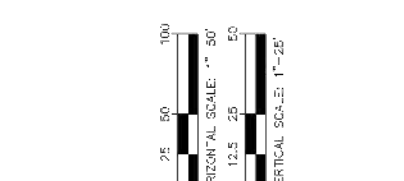
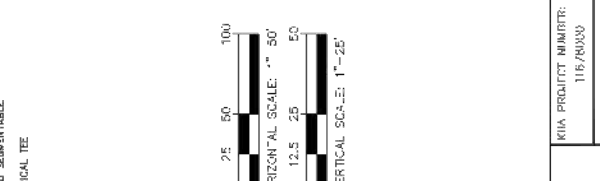


PROFILE

	EASEMENT BOUNDARY
	PROPERTY LINE
	UTILITY LINE
	MAJOR CONTROL LINE
	MINOR CONTROL LINE
	SANITARY SEWER LINE
	STORM SEWER LINE
	WATER LINE
	GAS LINE
	FIRE LINE
	SURFACE UNKNOWN
	STREET NAME
	SIDEWALK
	STREAM
	WETLAND
	CONSTRUCTION D-TRACE
	STREAM
	TEMPORARY CONSTRUCTION EASEMENT
	PERMANENT CONSTRUCTION EASEMENT
	POND
	MANHOLE
	MANHOLE COVER
	MANHOLE COVER OFFSET
	MANHOLE COVER OFFSET
	MANHOLE COVER OFFSET
	MANHOLE COVER OFFSET



B-1	12\"/>
A	18\"/>
1	2\"/>
2	8\"/>



REV. # PERISH

DATE: 7/13/20
SCALE: 1/8\"/>

DESIGNER: KIMLEY-HORN & ASSOCIATES, PC
5225 HALL CREEK RD
GREENVILLE, SC 29612
TEL: (757) 213-8000

PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: PLAN & PROFILE

DATE: 7/13/20
SCALE: 1/8\"/>

DESIGNER: KIMLEY-HORN & ASSOCIATES, PC
5225 HALL CREEK RD
GREENVILLE, SC 29612
TEL: (757) 213-8000

PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: PLAN & PROFILE

DATE: 7/13/20
SCALE: 1/8\"/>

DESIGNER: KIMLEY-HORN & ASSOCIATES, PC
5225 HALL CREEK RD
GREENVILLE, SC 29612
TEL: (757) 213-8000

PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: PLAN & PROFILE

DATE: 7/13/20
SCALE: 1/8\"/>

DESIGNER: KIMLEY-HORN & ASSOCIATES, PC
5225 HALL CREEK RD
GREENVILLE, SC 29612
TEL: (757) 213-8000

PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: PLAN & PROFILE

DATE: 7/13/20
SCALE: 1/8\"/>

DESIGNER: KIMLEY-HORN & ASSOCIATES, PC
5225 HALL CREEK RD
GREENVILLE, SC 29612
TEL: (757) 213-8000

PUBLIC R/W

S. MEMORIAL DR.
200' R/W

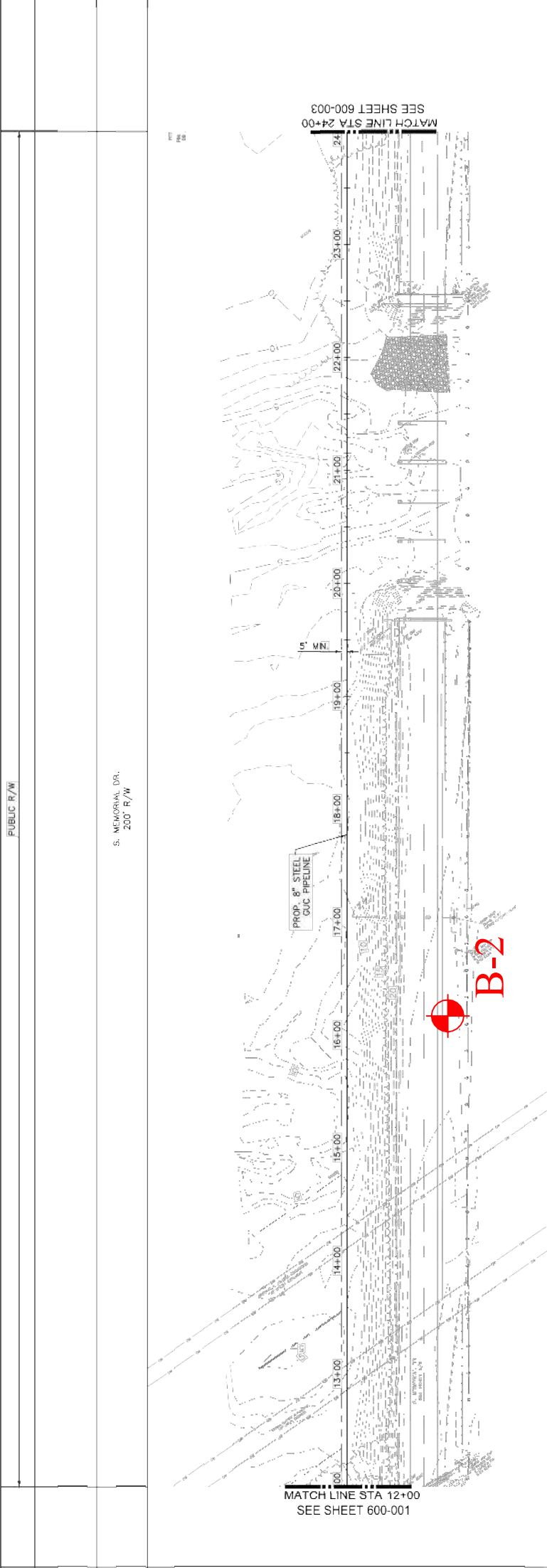
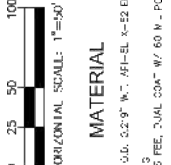
LEGEND

PROPERTY BOUNDARY	EXISTING PAVEMENT	EXISTING CONC. DRIVEWAY	EXISTING ASPH. DRIVEWAY	EXISTING CONCRETE DRIVEWAY	EXISTING SIDEWALK	EXISTING CONC. SIDEWALK	EXISTING ASPH. SIDEWALK	EXISTING ASPH. DRIVEWAY	EXISTING ASPH. DRIVEWAY	EXISTING ASPH. DRIVEWAY	EXISTING ASPH. DRIVEWAY
PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY	PROPOSED ASPH. DRIVEWAY

MATERIAL

PIPE COATING
A - 4 MILS FEB. JUAL CON. W/ 60 W. POWDERCOATE
B - 4 MILS FEB. JUAL CON. W/ 60 W. POWDERCOATE

HUNTS
1 - 8" SPHERICAL TILE
2 - 6" SPHERICAL TILE



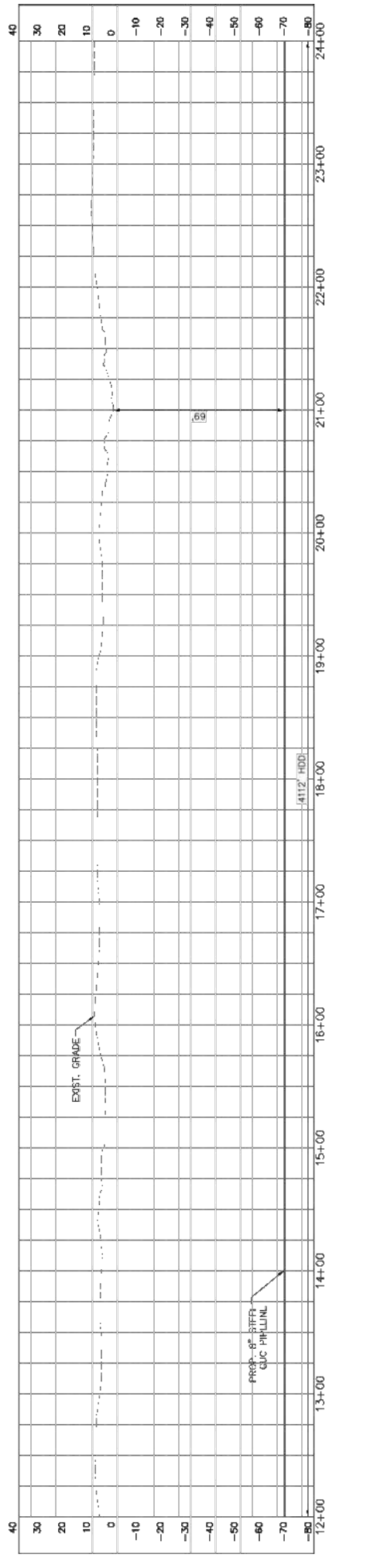
MATCH LINE STA 12+00
SEE SHEET 600-001

MATCH LINE STA 24+00
SEE SHEET 600-003

OWNER RESTRICT

PIPE BAR

PROFILE



<p>Kimley»Horn INCORPORATED 305 WEST MAIN STREET GREENVILLE, SOUTH CAROLINA 29601 TEL: 864.638.8200 WWW.KIMLEY-HORN.COM</p>	<p>Greenville Utilities</p>	<p>MEMORIAL DRIVE BRIDGE REPLACEMENT PITT COUNTY, NORTH CAROLINA</p>	<p>DATE: 7/9/2020 DRAWN BY: GVS CHECKED BY: GVS</p>	<p>PROJECT NO.: EC19-277G DATE: 7/9/2020</p>



Project Name: GREENVILLE UTILITIES
MEMORIAL BRIDGE PIPELINE RELOCATION
GREENVILLE, NORTH CAROLINA

Project No.: EC19-277G
Date: 7/9/2020

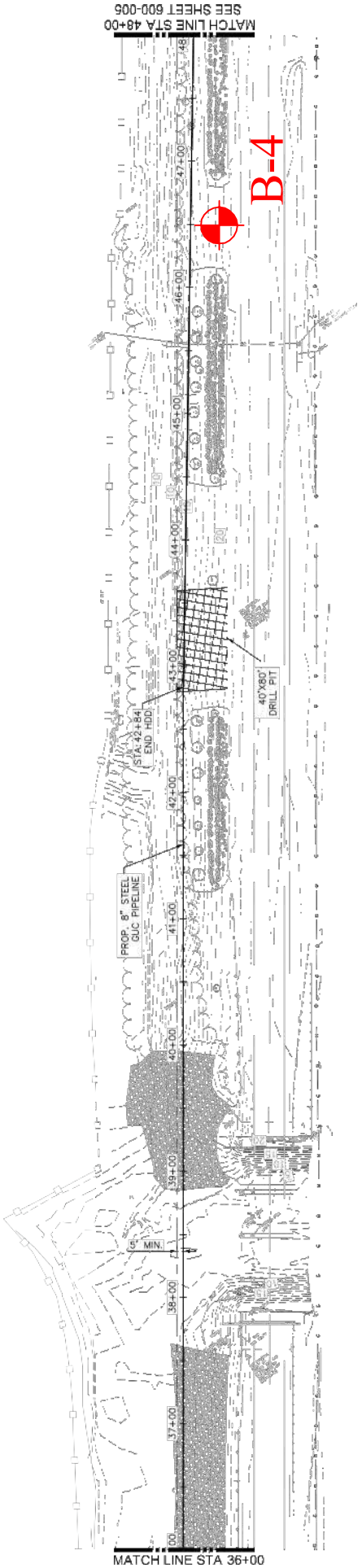
Drawn By: GVS
Figure No.: 1

BORING LOCATION PLAN
SHEET 2 OF 4

SCALE:
NOT TO SCALE

PUBLIC R/W

N. MEMORIAL DR.
2207 R/W



MATCH LINE STA 36+00
SEE SHEET 600-003

MATCH LINE STA 48+00
SEE SHEET 600-006

B-4

LEGEND

	RIGHT-OF-WAY BOUNDARY
	EASEMENT
	UTILITY LINE
	STORM SEWER LINE
	WATER MAIN LINE
	GAS LINE
	ELECTRIC LINE
	SEWER LINE
	FIRE LINE
	CABLE TV LINE
	FIBER OPTIC LINE
	TELEPHONE LINE
	OTHER UTILITY LINE
	STORM SEWER MANHOLE
	WATER MAIN VALVE
	GAS VALVE
	ELECTRIC POLE
	SEWER MANHOLE
	FIRE MANHOLE
	CABLE TV MANHOLE
	TELEPHONE MANHOLE
	OTHER UTILITY MANHOLE
	STORM SEWER INLET
	WATER MAIN INLET
	GAS INLET
	ELECTRIC INLET
	SEWER INLET
	FIRE INLET
	CABLE TV INLET
	TELEPHONE INLET
	OTHER UTILITY INLET
	STORM SEWER CATCHMENT
	WATER MAIN CATCHMENT
	GAS CATCHMENT
	ELECTRIC CATCHMENT
	SEWER CATCHMENT
	FIRE CATCHMENT
	CABLE TV CATCHMENT
	TELEPHONE CATCHMENT
	OTHER UTILITY CATCHMENT
	STORM SEWER VALVE
	WATER MAIN VALVE
	GAS VALVE
	ELECTRIC VALVE
	SEWER VALVE
	FIRE VALVE
	CABLE TV VALVE
	TELEPHONE VALVE
	OTHER UTILITY VALVE
	STORM SEWER FILTER
	WATER MAIN FILTER
	GAS FILTER
	ELECTRIC FILTER
	SEWER FILTER
	FIRE FILTER
	CABLE TV FILTER
	TELEPHONE FILTER
	OTHER UTILITY FILTER

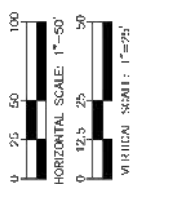
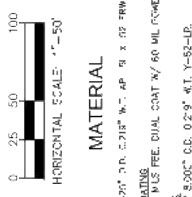
MATERIAL

PIPE: 8" R4000, 10' L, 0.718" W.T., 48" 3.0' OF TRW

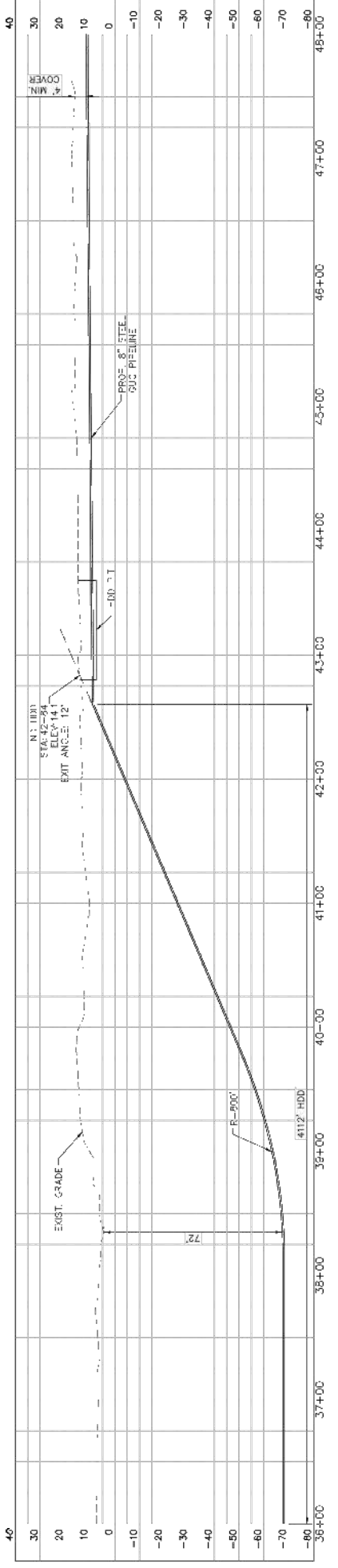
PIPE COATING: A-14 M/S FREE DIAL COAT 70/60 ML CONDENSE

CLINCH: 5/8" 8 500' C.D. 0.25" 4" T. Y=52-UP.

C.L.C. FIELD SEGMENT: 2 = 8" 5" RIBBON T.C.



DETAIL	A	1
DATE	A	5/10
LENGTH (LF)	883'	
FITTINGS		
CAT. PROTECTOR		



MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

PLAN & PROFILE



Kimley»Horn
4033 WALNUT STREET
SUITE 1002
Raleigh, NC 27614
TEL: (919) 213-8800

ENGINEER	
DATE	
PROJECT NO.	116/2020
DRIVING NUMBER	600 004
SHEET NUMBER	6 OF 8

GET SOLUTIONS, INC.
Greenville • Environmental • Planning

Project Name: GREENVILLE UTILITIES
MEMORIAL BRIDGE PIPELINE RELOCATION
GREENVILLE, NORTH CAROLINA

Project No: EC19-277G
Date: 7/9/2020
Drawn By: GWS
Figure No: 1

**BORING LOCATION PLAN
SHEET 4 OF 4**

SCALE:
NOT TO SCALE

APPENDIX II

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION



Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23462
(757) 518-1703

Williamsburg
701 Alexander Lee Parkway
Williamsburg, Virginia 23185
(757) 564-6452

Elizabeth City
504 East Elizabeth St. Suite 2
Elizabeth City, NC 27909
(252) 335-9765

Jacksonville
415-A Western Boulevard
Jacksonville, NC 28546
(910) 478-9915

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

Standard Penetration Test (SPT), N-value

Standard Penetration Tests (SPT) were performed in the field in general accordance with ASTM D 1586. The soil samples were obtained with a standard 1.4" I.D., 2" O.D., 30" long split-spoon sampler. The sampler was driven with blows of a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler each 6-inch increment (4 increments for each soil sample) of penetration was recorded and is shown on the boring logs. The sum of the second and third penetration increments is termed the SPT N-value.

NON COHESIVE SOILS

(SILT, SAND, GRAVEL and Combinations)

Relative Density

Very Loose	4 blows/ft. or less
Loose	5 to 10 blows/ft.
Medium Dense	11 to 30 blows/ft.
Dense	31 to 50 blows/ft.
Very Dense	51 blows/ft. or more

Particle Size Identification

Boulders	8 inch diameter or more
Cobbles	3 to 8 inch diameter
Gravel	Coarse 1 to 3 inch diameter
	Medium 1/2 to 1 inch diameter
	Fine 1/4 to 1/2 inch diameter
Sand	Coarse 2.00 mm to 1/4 inch (diameter of pencil lead)
	Medium 0.42 to 2.00 mm (diameter of broom straw)
	Fine 0.074 to 0.42 mm (diameter of human hair)
Silt	0.002 to 0.074 mm (cannot see particles)

CLASSIFICATION SYMBOLS (ASTM D 2487 and D 2488)

Coarse Grained Soils

More than 50% retained on No. 200 sieve

GW - Well-graded Gravel
GP - Poorly graded Gravel
GW-GM - Well-graded Gravel w/Silt
GW-GC - Well-graded Gravel w/Clay
GP-GM - Poorly graded Gravel w/Silt
GP-GC - Poorly graded Gravel w/Clay
GM - Silty Gravel
GC - Clayey Gravel
GC-GM - Silty, Clayey Gravel
SW - Well-graded Sand
SP - Poorly graded Sand
SW-SM - Well-graded Sand w/Silt
SW-SC - Well-graded Sand w/Clay
SP-SM - Poorly graded Sand w/Silt
SP-SC - Poorly graded Sand w/Clay
SM - Silty Sand
SC - Clayey Sand
SC-SM - Silty, Clayey Sand

Fine-Grained Soils

50% or more passes the No. 200 sieve

CL - Lean Clay
CL-ML - Silty Clay
ML - Silt
OL - Organic Clay/Silt
 Liquid Limit 50% or greater
CH - Fat Clay
MH - Elastic Silt
OH - Organic Clay/Silt

Highly Organic Soils

PT - Peat

COHESIVE SOILS

(CLAY, SILT and Combinations)

Consistency

Very Soft	2 blows/ft. or less
Soft	3 to 4 blows/ft.
Medium Stiff	5 to 8 blows/ft.
Stiff	9 to 15 blows/ft.
Very Stiff	16 to 30 blows/ft.
Hard	31 blows/ft. or more

Relative Proportions

<u>Descriptive Term</u>	<u>Percent</u>
Trace	0-5
Few	5-10
Little	15-25
Some	30-45
Mostly	50-100

Strata Changes

In the column "Description" on the boring log, the horizontal lines represent approximate strata changes.

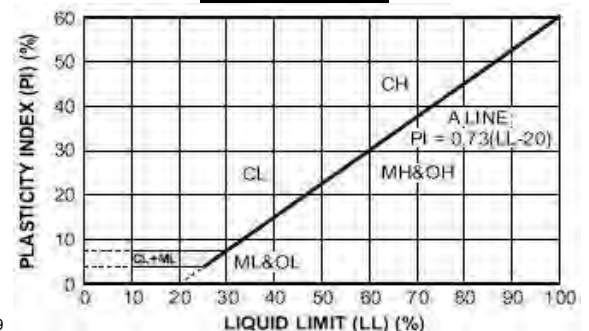
Groundwater Readings

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as tidal influences and man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc.).

Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent	GW, GP, SW, SP
More than 12 percent	GM, GC, SM, SC
5 to 12 percent	Borderline cases requiring dual symbols

Plasticity Chart





GET Solutions, Inc.

KEY TO MATERIAL GRAPHICS

CLIENT Kimley-Horn

PROJECT NAME Greenville Utilities Memorial Bridge Gas Pipeline Relocation

PROJECT NUMBER EC19-277G

PROJECT LOCATION Greenville, North Carolina

LITHOLOGIC SYMBOLS (Unified Soil Classification System)



CH: USCS High Plasticity Clay



CL: USCS Low Plasticity Clay



FILL: Fill (made ground)



ML: USCS Silt



SAND WITH ORGANICS: Topsoil



SC: USCS Clayey Sand



SC-SM: USCS Clayey Sand



SM: USCS Silty Sand



SP: USCS Poorly-graded Sand



SP-SM: USCS Poorly-graded Sand with Silt



TOPSOIL: Topsoil

APPENDIX III

SUMMARY OF LABORATORY CLASSIFICATION RESULTS



GET Solutions, Inc.

SUMMARY OF LABORATORY RESULTS

CLIENT Kimley-Horn

PROJECT NAME Greenville Utilities Memorial Bridge Gas Pipeline Relocation

PROJECT NUMBER EC19-277G

PROJECT LOCATION Greenville, North Carolina

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
B-1	29.0	43	19	24	0.075	89	CL	34.2			
B-1	44.0	43	29	14	0.075	28	SM	29.2			
B-2	20.0				0.075	34	SC	18.1			
B-2	34.0				0.075	4	SP	15.7			
B-2	44.0	47	22	25	0.075	34	SC	31.5			
B-2	54.0	45	20	25	0.075	38	SC	31.4			
B-3	29.0				0.075	7	SP-SM	11.3			
B-3	54.0	39	24	15	0.075	38	SC	29.8			
B-4	24.0				0.075	3	SP	25.7			
B-4	34.0	55	22	33	0.075	52	CH	35.2			
B-4	44.0	42	21	21	0.075	34	SC	30.8			
B-4	54.0	34	18	16	0.075	35	SC	28.7			

(1) GET - LABORATORY TEST SUMMARY - GET_STANDARD_DATA_TEMPLATE(03-17-14).GDT - 6/29/20 11:46 - G:\GINT\PROJECTS\EC19\EC19-277G GREENVILLE UTILITIES MEMORIAL BRIDGE GAS PIPELINE RELOCATION.GPJ

APPENDIX IV

BORING LOGS



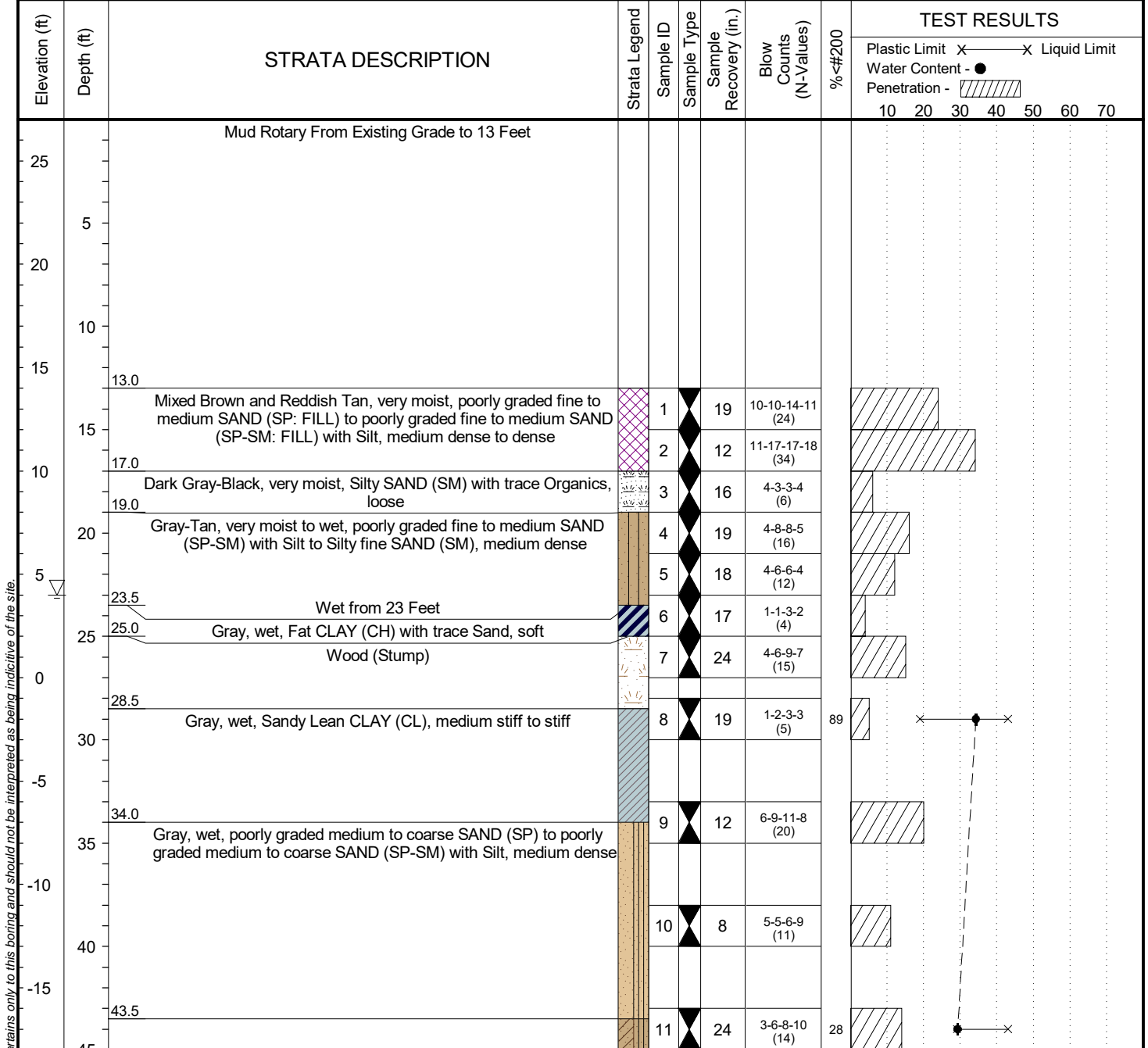
RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road 757-518-1703
 Williamsburg 1592-E Penniman Road 757-564-6452
 Elizabeth City 106 Capital Trace Unit E 252-335-9765
 Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID B-1

PROJECT NAME: **Greenville Utilities Memorial Bridge Gas Pipeline Relocation**
 CLIENT: **Kimley-Horn**
 PROJECT LOCATION: **Greenville, North Carolina**
 BORING COORDINATES: **EAST: 1 NORTH: 1**
 DRILLING METHOD(S): **Rotary wash "mud"**
 GROUNDWATER*: INITIAL (ft) ▽: **23** AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓞ: _____
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: **EC19-277G**
 SURFACE ELEVATION (MSL) (ft): **27**
 LOGGED BY: **G. Stalls, PE**
 DATE STARTED: **6/11/2020**
 DATE COMPLETED: _____
 DRILLER: **GET Solutions, Inc.**



This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road Virginia Beach, VA 23642 757-518-1703
 Williamsburg 1592-E Penniman Road Williamsburg, VA 23185 757-564-6452
 Elizabeth City 106 Capital Trace Unit E Elizabeth City, NC 27909 252-335-9765
 Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID B-1

PROJECT NAME: Greenville Utilities Memorial Bridge Gas Pipeline Relocation PROJECT NUMBER: EC19-277G
 CLIENT: Kimley-Horn SURFACE ELEVATION (MSL) (ft): 27
 PROJECT LOCATION: Greenville, North Carolina LOGGED BY: G. Stalls, PE
 BORING COORDINATES: EAST: 1 NORTH: 1 DATE STARTED: 6/11/2020
 DRILLING METHOD(S): Rotary wash "mud" DATE COMPLETED: _____
 GROUNDWATER*: INITIAL (ft) ▽: 23 AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓞ: _____
The initial groundwater readings are not intended to indicate the static groundwater level. DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS						
									Plastic Limit X	Liquid Limit X	Water Content ●	Penetration -			
									10	20	30	40	50	60	70
-20		Dark Gray, wet, Silty fine SAND (SM) mixed with Clay and with trace Mica and Marine Shell Fragments to Silty Clayey fine SAND (SC-SM) with trace Mica and Marine Shell Fragments, loose to medium dense (layer continued from previous page)		12	Standard Penetration Test	24	2-3-4-3 (7)								
53.0		Dark Gray, wet, Silty fine SAND (SM) with trace Mica and Marine Shell Fragments, very dense		13	Standard Penetration Test	20	6-21-39-32 (60)								
-25		With Clay from 58 Feet		14	Standard Penetration Test	18	35-21-35-31 (56)								
63.0		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose to medium dense		15	Standard Penetration Test	24	4-4-3-5 (7)								
-35				16	Standard Penetration Test	24	3-7-4-7 (11)								
65															
-40		Boring terminated at 70 feet below existing grade.													
70															

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23642
757-518-1703

Williamsburg
1592-E Penniman Road
Williamsburg, VA 23185
757-564-6452

Elizabeth City
106 Capital Trace Unit E
Elizabeth City, NC 27909
252-335-9765

Jacksonville
415-A Western Blvd
Jacksonville, NC 28546
910-478-9915

BORING ID B-2

PROJECT NAME: **Greenville Utilities Memorial Bridge Gas Pipeline Relocation**
 CLIENT: **Kimley-Horn**
 PROJECT LOCATION: **Greenville, North Carolina**
 BORING COORDINATES: **EAST: 2 NORTH: 2**
 DRILLING METHOD(S): **Rotary wash "mud"**
 GROUNDWATER*: INITIAL (ft) ▽: **23** AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓞ: _____
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: **EC19-277G**
 SURFACE ELEVATION (MSL) (ft): **24**
 LOGGED BY: **G. Stalls, PE**
 DATE STARTED: **6/11/2020**
 DATE COMPLETED: _____
 DRILLER: **GET Solutions, Inc.**

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS				
									Plastic Limit X	Liquid Limit X	Water Content ●	Penetration - [Hatched Box]	
		Mud Rotary From Existing Grade to 13 Feet											
13.0		Tan-Reddish Tan, very moist, Clayey SAND (SC: FILL), loose	[Hatched Box]	1	◆	16	4-4-4-7 (8)						
15.5		Tan, very moist, poorly graded fine to medium SAND (SP: FILL), medium dense	[Hatched Box]	2	◆	18	7-14-8-5 (22)						
18.0		Gray, very moist, Clayey SAND (SC), very loose to loose	[Hatched Box]	3	◆	24	5-5-5-5 (10)						
21.0		Mottled Gray-Reddish Tan, very moist to wet, Lean CLAY (CL) with Sand, soft to medium stiff	[Hatched Box]	4	◆	24	1-1-2-3 (3)	34					
24.5		Wet from 23 Feet	[Hatched Box]	5	◆	24	3-2-3-2 (5)						
26.0		Gray, wet, Clayey fine SAND (SC), very loose to medium dense	[Hatched Box]	6	◆	23	1-1-2-8 (3)						
26.0		Gray-Tan, wet, poorly graded medium to coarse SAND (SP) to poorly graded medium to coarse SAND (SP-SM) with Silt, medium dense	[Hatched Box]	7	◆	18	5-8-8-14 (16)						
			[Hatched Box]	8	◆	12	5-6-9-7 (15)						
			[Hatched Box]	9	◆	12	6-12-7-8 (19)	4					
38.5		Dark Gray, wet, Sandy SILT (ML) with trace Mica and Marine Shell Fragments, stiff	[Hatched Box]	10	◆	24	7-6-6-7 (12)						
43.0		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose	[Hatched Box]	11	◆	24	4-4-4-4 (8)	34					

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23642
757-518-1703

Williamsburg
1592-E Penniman Road
Williamsburg, VA 23185
757-564-6452

Elizabeth City
106 Capital Trace Unit E
Elizabeth City, NC 27909
252-335-9765

Jacksonville
415-A Western Blvd
Jacksonville, NC 28546
910-478-9915

BORING ID B-2

PROJECT NAME: Greenville Utilities Memorial Bridge Gas Pipeline Relocation
 CLIENT: Kimley-Horn
 PROJECT LOCATION: Greenville, North Carolina
 BORING COORDINATES: EAST: 2 NORTH: 2
 DRILLING METHOD(S): Rotary wash "mud"
 GROUNDWATER*: INITIAL (ft) ▽: 23 AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓞ: _____

PROJECT NUMBER: EC19-277G
 SURFACE ELEVATION (MSL) (ft): 24
 LOGGED BY: G. Stalls, PE
 DATE STARTED: 6/11/2020
 DATE COMPLETED: _____
 DRILLER: GET Solutions, Inc.

The initial groundwater readings are not intended to indicate the static groundwater level.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS							
									Plastic Limit X	Liquid Limit X	Water Content ●	Penetration - [Hatched Box]				
									10	20	30	40	50	60	70	
		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose <i>(layer continued from previous page)</i>	[Hatched Box]													
	48.0															
-25	50	Dark Gray, wet, Silty fine SAND (SM) with trace Clay, Mica, and Marine Shell Fragments, medium dense	[Hatched Box]	12	▲	24	4-6-11-23 (17)									
	53.0															
-30	55	Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose to medium dense	[Hatched Box]	13	▲	24	20-14-8-9 (22)	38		X	●	X				
	60															
-35	60			14	▲	24	3-3-4-6 (7)									
	65															
-40	65			15	▲	24	3-4-4-4 (8)									
	70															
-45	70	Boring terminated at 70 feet below existing grade.		16	▲	18	4-5-6-7 (11)									

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road Virginia Beach, VA 23642 757-518-1703
 Williamsburg 1592-E Penniman Road Williamsburg, VA 23185 757-564-6452
 Elizabeth City 106 Capital Trace Unit E Elizabeth City, NC 27909 252-335-9765
 Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID B-3

PROJECT NAME: **Greenville Utilities Memorial Bridge Gas Pipeline Relocation**
 CLIENT: **Kimley-Horn**
 PROJECT LOCATION: **Greenville, North Carolina**
 BORING COORDINATES: **EAST: 3 NORTH: 3**
 DRILLING METHOD(S): **Rotary wash "mud"**
 GROUNDWATER*: INITIAL (ft) ▽: **23** AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓞ: _____
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: **EC19-277G**
 SURFACE ELEVATION (MSL) (ft): **24**
 LOGGED BY: **G. Stalls, PE**
 DATE STARTED: **6/11/2020**
 DATE COMPLETED: _____
 DRILLER: **GET Solutions, Inc.**

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS				
									Plastic Limit X	Liquid Limit X	Water Content ●	Penetration - [diagonal lines]	
		Mud Rotary From Existing Grade to 13 Feet											
13.0		Reddish Tan, very moist, poorly graded fine to medium SAND (SP: FILL) with trace Clay, medium dense	[diagonal lines]	1	SP	19	5-6-17-18 (23)						
		Tan and with Clayey SAND (SC) lenses from 15 Feet	[diagonal lines]	2	SC	18	10-10-7-7 (17)						
17.5		Gray, very moist, Sandy Lean CLAY (CL), very soft	[horizontal lines]	3	CL	20	1-1-1-2 (2)						
19.0		Gray, very moist, Silty fine SAND (SM) with trace Clay, loose	[vertical lines]	4	SM	21	2-2-3-3 (5)						
22.0		Tan, very moist, poorly graded fine to medium SAND (SP) with trace Silt, loose	[diagonal lines]	5	SP	24	4-4-6-5 (10)						
23.0		Reddish Tan, wet, Silty fine SAND (SM) with trace Clay, loose	[diagonal lines]	6	SM	19	2-2-3-3 (5)						
26.0		Reddish-Tan, wet, poorly graded medium to coarse SAND (SP) to poorly graded medium to coarse SAND (SP-SM) with Silt, loose to medium dense	[diagonal lines]	7	SP	14	3-4-5-5 (9)						
			[diagonal lines]	8	SP	13	5-8-22-25 (30)						
33.0		Gray, wet, Silty fine to medium SAND (SM), very dense	[diagonal lines]	9	SM	18	39-40-39-42 (79)						
34.0		Tan, wet, poorly graded fine to coarse SAND (SP) with trace Silt, very dense	[diagonal lines]										
38.0		Dark Gray, wet, Sandy Lean CLAY (CL) with trace Mica and Marine Shell Fragments, medium stiff	[horizontal lines]	10	CL	24	3-3-3-5 (6)						
43.0		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose	[diagonal lines]	11	SC	24	3-3-3-3 (6)						

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23642
757-518-1703

Williamsburg
1592-E Penniman Road
Williamsburg, VA 23185
757-564-6452

Elizabeth City
106 Capital Trace Unit E
Elizabeth City, NC 27909
252-335-9765

Jacksonville
415-A Western Blvd
Jacksonville, NC 28546
910-478-9915

BORING ID B-3

PROJECT NAME: Greenville Utilities Memorial Bridge Gas Pipeline Relocation
 CLIENT: Kimley-Horn
 PROJECT LOCATION: Greenville, North Carolina
 BORING COORDINATES: EAST: 3 NORTH: 3
 DRILLING METHOD(S): Rotary wash "mud"
 GROUNDWATER*: INITIAL (ft) ∇ : 23 AFTER _____ HOURS (ft) ∇ : _____ CAVE-IN (ft) \odot : _____

PROJECT NUMBER: EC19-277G
 SURFACE ELEVATION (MSL) (ft): 24
 LOGGED BY: G. Stalls, PE
 DATE STARTED: 6/11/2020
 DATE COMPLETED: _____
 DRILLER: GET Solutions, Inc.

The initial groundwater readings are not intended to indicate the static groundwater level.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS				
									Plastic Limit X	Water Content - ●	Penetration -	Liquid Limit X	
		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose <i>(layer continued from previous page)</i>											
-25	50	Dark Gray, wet, Silty fine SAND (SM) with trace Mica and Marine Shell Fragments to Silty Clayey fine SAND (SC-SM) with trace Mica and Marine Shell Fragments, loose to very dense Practical Refusal at 48.8 Feet with 50 Blows/4 Inches of Penetration		12	X	6	3-50						
-30	55			13	X	24	3-3-4-6 (7)	38		X	●	X	
-35	60	Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose		14	X	23	3-2-4-4 (6)						
-40	65			15	X	24	3-4-3-5 (7)						
-45	70	Boring terminated at 70 feet below existing grade.		16	X	20	4-5-5-6 (10)						

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach
5465 Greenwich Road
Virginia Beach, VA 23642
757-518-1703

Williamsburg
1592-E Penniman Road
Williamsburg, VA 23185
757-564-6452

Elizabeth City
106 Capital Trace Unit E
Elizabeth City, NC 27909
252-335-9765

Jacksonville
415-A Western Blvd
Jacksonville, NC 28546
910-478-9915

BORING ID B-4

PROJECT NAME: **Greenville Utilities Memorial Bridge Gas Pipeline Relocation**
 CLIENT: **Kimley-Horn**
 PROJECT LOCATION: **Greenville, North Carolina**
 BORING COORDINATES: **EAST: 4 NORTH: 4**
 DRILLING METHOD(S): **Rotary wash "mud"**
 GROUNDWATER*: INITIAL (ft) ▽: **16** AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) ⊖: _____
The initial groundwater readings are not intended to indicate the static groundwater level.

PROJECT NUMBER: **EC19-277G**
 SURFACE ELEVATION (MSL) (ft): **20**
 LOGGED BY: **G. Stalls, PE**
 DATE STARTED: **6/12/2020**
 DATE COMPLETED: _____
 DRILLER: **GET Solutions, Inc.**

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS				
									Plastic Limit X	Liquid Limit X	Water Content - ●	Penetration - ▨	
		Mud Rotary From Existing Grade to 13 Feet											
15	5												
10	10												
5	15	13.0 Tan-Reddish Tan, moist to wet, poorly graded medium to coarse SAND (SP: FILL) to poorly graded medium to coarse SAND (SP-SM: FILL) with Silt, loose to medium dense Wet from 16 Feet Tan-Gray from 17 Feet	1	15	6-6-6-6 (12)								
			2	13	3-5-3-3 (8)								
			3	9	3-3-4-5 (7)								
0	20	20.5 Gray, wet, poorly graded fine to medium SAND (SP) to poorly graded fine to medium SAND (SP-SM) with Silt, very loose to medium dense	4	15	3-4-5-5 (9)								
			5	17	9-10-9-4 (19)								
			6	12	1-1-1-2 (2)								
-5	25	25.0 Gray, wet, Silty fine SAND (SM), dense to very dense	7	20	9-20-28-50 (48)								
			8	11	39-50								
-10	30	Practically Refusal at 28.9 Feet with 50 Blows/5 Inches of Penetration											
-15	35	33.0 Dark Gray, wet, Sandy Fat CLAY (CH), medium stiff to stiff	9	24	3-3-6-7 (9)								
			10	24	3-3-4-4 (7)								
-20	40	With trace Mica and Marine Shell Fragments from 38 Feet											
-25	45	43.0 Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose	11	24	3-3-3-4 (6)								

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 SPT - Standard Penetration Test

Notes:



RECORD OF SUBSURFACE EXPLORATION

Virginia Beach 5465 Greenwich Road Virginia Beach, VA 23642 757-518-1703
 Williamsburg 1592-E Penniman Road Williamsburg, VA 23185 757-564-6452
 Elizabeth City 106 Capital Trace Unit E Elizabeth City, NC 27909 252-335-9765
 Jacksonville 415-A Western Blvd Jacksonville, NC 28546 910-478-9915

BORING ID B-4

PROJECT NAME: Greenville Utilities Memorial Bridge Gas Pipeline Relocation PROJECT NUMBER: EC19-277G
 CLIENT: Kimley-Horn SURFACE ELEVATION (MSL) (ft): 20
 PROJECT LOCATION: Greenville, North Carolina LOGGED BY: G. Stalls, PE
 BORING COORDINATES: EAST: 4 NORTH: 4 DATE STARTED: 6/12/2020
 DRILLING METHOD(S): Rotary wash "mud" DATE COMPLETED: _____
 GROUNDWATER*: INITIAL (ft) ▽: 16 AFTER _____ HOURS (ft) ▼: _____ CAVE-IN (ft) Ⓢ: _____
The initial groundwater readings are not intended to indicate the static groundwater level. DRILLER: GET Solutions, Inc.

Elevation (ft)	Depth (ft)	STRATA DESCRIPTION	Strata Legend	Sample ID	Sample Type	Sample Recovery (in.)	Blow Counts (N-Values)	% <#200	TEST RESULTS						
									Plastic Limit X	Liquid Limit X	Water Content - ●	Penetration - ▨			
									10	20	30	40	50	60	70
		Dark Gray, wet, Clayey fine SAND (SC) with trace Mica and Marine Shell Fragments, loose (layer continued from previous page)													
		With Silty fine SAND (SM) lenses from 48 Feet													
-30	50			12	⊗	24	3-4-6-10 (10)								
-35	55			13	⊗	23	3-4-4-4 (8)	35							
-40	60			14	⊗	21	3-4-4-5 (8)								
-45	65			15	⊗	19	4-3-5-4 (8)								
	65.0	Boring terminated at 65 feet below existing grade.													

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Sample Type(s):
 ⊗ SPT - Standard Penetration Test

Notes:

APPENDIX V

GENERALIZED SOIL PROFILES



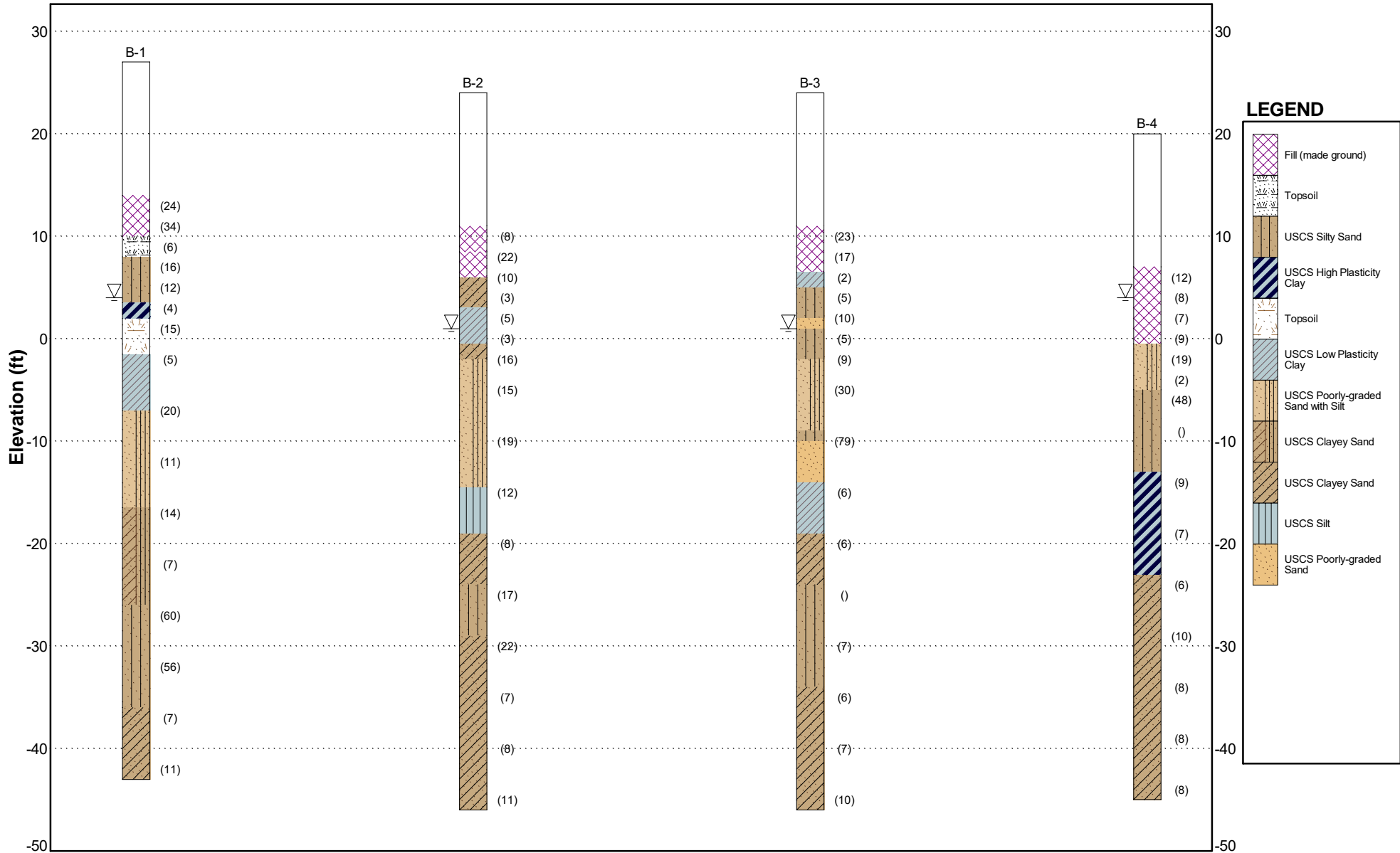
GENERALIZED SOIL PROFILE

PROJECT NAME: Greenville Utilities Memorial Bridge Gas Pipeline Relocation

PROJECT NUMBER: EC19-277G

PROJECT LOCATION: Greenville, North Carolina

CLIENT: Kimley-Horn



(Numerical Value) = Sample N-Value

Exhibit 2

Erosion & Sedimentation Control Plan



Erosion & Sedimentation Control Plan

Memorial Drive Bridge
Gas Main Relocation
Greenville Utilities Commission
Greenville, NC

Prepared for:

North Carolina Department of
Environmental Quality
Washington, North Carolina

Kimley»»Horn

TABLE OF CONTENTS

- A. NARRATIVE
- B. SITE LOCATION MAPS
 - SITE VICINITY MAP*
 - USGS TOPOGRAPHIC MAP*
 - USDA SOIL SURVEY MAP*
 - TOPOGRAPHIC CONTOUR MAP*
- C. REFERENCE MATERIALS
- D. EROSION AND SEDIMENTATION CONTROL PLAN CHECKLIST
- E. PROJECT SPECIFICATIONS
 - INCLUDING:
 - SECTION 02230 – CLEARING AND GRUBBING*
 - SECTION 02300 – EARTHWORK*
 - SECTION 02315 – TRENCHING FOR UTILITIES*
 - SECTION 02370 – EROSION CONTROL*
 - SECTION 02920 – LAWNS AND GRASSES*

A. EROSION AND SEDIMENTATION CONTROL NARRATIVE

EROSION CONTROL NARRATIVE

For

Memorial Drive Bridge Gas Main Relocation

Greenville Utilities Commission

PITT COUNTY, NC

September 2020

**Kimley-Horn
4525 Main Street, Suite 1000
Virginia Beach, VA 23462
757-213-8600**

Kimley-Horn Project No. 116780000

Project Description

This project consists of constructing approximately 5,600 LF of 8” steel natural gas main and 50 LF of 16” steel casing pipe. The Project Area begins at the existing Greenville Utilities Commission gas main at the corner of S. Memorial Drive and W. 3rd Street. along Memorial Drive, across Tar River, and terminates approximately 400 feet south of W. Moore St. The proposed infrastructure will be located in existing roadway rights-of-way. See the attached Vicinity Map for approximate project location. The project will disturb approximately 1.68 acres of land during the construction period.

Site Description

The project corridor currently consists of existing City/State right-of-way. Soil types and topography varies throughout the approximate project corridor. The areas impacted are in the right-of-way but are adjacent to developed and residential areas.

Adjacent Properties

The gas main runs along the roadway across Greenville, NC. The gas main and other associated utilities travel predominately through the right-of-way adjacent to residential or developed areas.

Soils

Soils vary predominantly among Lenoir fine sandy loam, Swamp (Johnston) – sandy and loamy alluvium, Bibb complex – sandy and loamy alluvium, Pactolus loamy sand, Lakeland sand, and Osier loamy sand (loamy substratum). All excavation areas will be returned to their pre-construction elevations.

Existing topsoil will be stockpiled and respread prior to landscaping in order to aid in establishing vegetation on the remainder of the soils. In the event of unsuitable soils, proper care will be taken to remove the unsuitable soil and replace with Engineer approved soils.

Erosion Control Devices

The erosion control devices have been designed to limit the effects of the erosion and sedimentation for the disturbed area.

Check Dams – Check dams will be constructed periodically along grass or fiber mat lined swales and ditches where necessary to reduce the stormwater velocity, reduce erosion, and allow for settlement of sediment. Spacing is to match spacing requirements shown on check dam detail.

Drop / Curb / Yard Inlet Protection - Inlet protection will be installed around all necessary drop inlets to prevent sediment from entering the existing stormwater system and being discharged to receiving waters.

Silt Fence – Silt fence will be installed at locations indicated on the plans to retain sediment on site.

Stone Filter – Stone filters will be installed at locations indicated on the plans to filter sediment out of stormwater runoff at focal points/vertexes of the silt fence.

Temporary Construction Entrance – Temporary construction entrances will be installed throughout the project. The locations of construction entrances and exits will be adjusted as necessary throughout construction.

Diversion / Silt Ditch – Ditches will be installed at locations indicated on the plans at a maximum of 5 acres drainage area per ditch. Detail is included on sheet EC-1.

Concrete Washout – Concrete washouts will be installed throughout the project area. The locations will be adjusted as necessary throughout construction.

Tree Protection Fence – Tree protection fencing will be installed at locations indicated on the plans for tree protection only.

Temporary Stream Crossing – Temporary stream crossing will be installed at the one (1) location indicated on the plans per sheet ST-1.

Rip-Rap – Rip rap shall be sized and used where excessive stormwater velocities prohibit vegetative linings.

Stormwater Treatment and Management Devices

The stormwater treatment and management devices have been designed to promote the settlement of solids prior to runoff.

Along the route, the ground will be returned to its previous vegetated condition. Current stormwater control measures will remain in place. Stormwater treatment devices during construction will consist of the erosion control devices noted above. Additional permanent stormwater treatment and management devices are proposed as shown on the plans.

Construction Sequence

1. Obtain Sedimentation and Erosion Control Plan approval.
2. Obtain other applicable permits.
3. Install sedimentation and erosion control measures.
4. Clear and grub.
5. Excavate and install utilities.
6. Maintain all erosion control devices throughout construction. Revise as necessary to provide erosion control during all phases.

7. Stabilize and seed all denuded areas.
8. Remove temporary sediment and erosion control devices after construction is complete and vegetation has been established.

Erosion Control Maintenance Plan

1. The general contractor will check for stability and operation of all erosion control measures following every runoff-producing rainfall. As a minimum, all erosion and sedimentation control devices shall be checked no less than once every week. Any needed repairs will be made immediately to maintain all devices as designed.
2. The sediment traps and rock dams will be cleaned out when the storage capacity has been approximately 50% filled. Gravel will be cleaned or replaced when the sediment pool no longer drains properly.
3. Sediment will be removed from behind sediment fencing when it becomes 6-inches deep at the fence. The fencing will be repaired as necessary to maintain a sufficient barrier.
4. All seeded areas will be fertilized, re-seeded as necessary, and mulched according to the plans and specifications to maintain a vigorous, dense vegetative cover.
5. See the construction plans for additional notes and details.

Vegetative Plan See Specifications (Section 02920 Lawns and Grasses).

Seedbed Preparation

1. Smooth uneven areas
2. Scarify to loosen soil to the following depths:
 - a. 5” on solid, undisturbed earth
 - b. 3” on embankments or other disturbed
3. Track slope
4. Apply lime at 4,000 lbs/acre
5. Apply fertilizer (see attached)
6. Apply seed (see attached)
7. Apply proper ground cover (see attached)

Limits of Disturbance

The project is in existing roadways, paved areas, wetlands, and the right-of-way. The total disturbed length of the project is approximately 1,410 LF. The average disturbed corridor width varies but yields a total calculated disturbed area of 1.68 AC.

Project Location

Greenville, NC

Property Owner

NCDOT
Transportation Building
1 S. Wilmington St.
Raleigh, NC 27601
(919) 996-3490

Civil Engineer

Kimley-Horn
4525 Main Street, Suite 1000
Virginia Beach, VA 23462
(757) 213-8600
Attn.: Mr. Ryan Clark, P.E.

B. SITE LOCATION MAPS

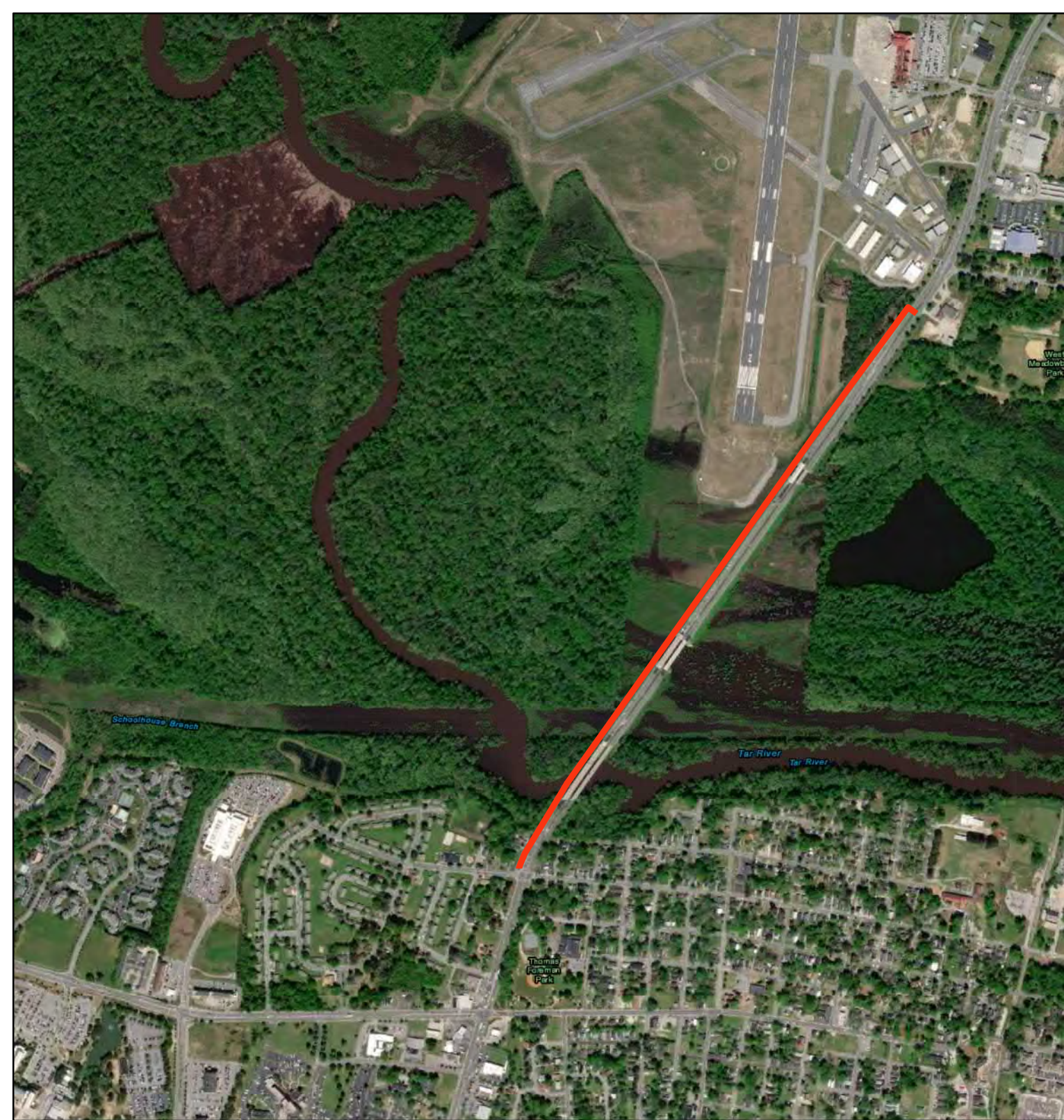
SITE VICINITY MAP

USGS TOPOGRAPHIC MAP

USDA SOIL SURVEY MAP

TOPOGRAPHIC CONTOUR MAP

NRCS SOIL MAP

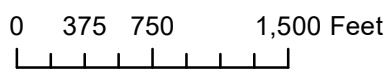


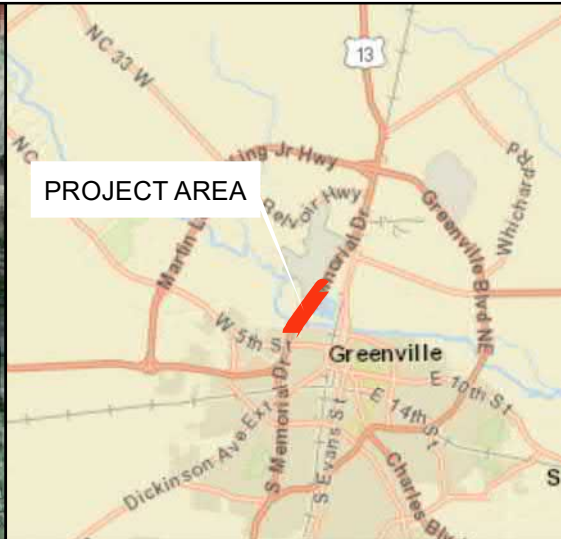
Legend

— Project Corridor

GAS DISTRIBUTION SYSTEM
IMPROVEMENTS
MEMORIAL DRIVE BRIDGE
GAS MAIN RELOCATION

FIGURE 1
VICINITY MAP





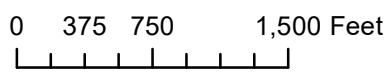
Legend

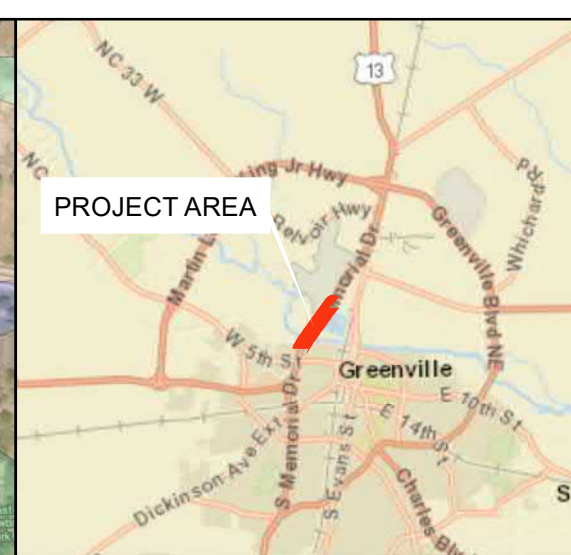
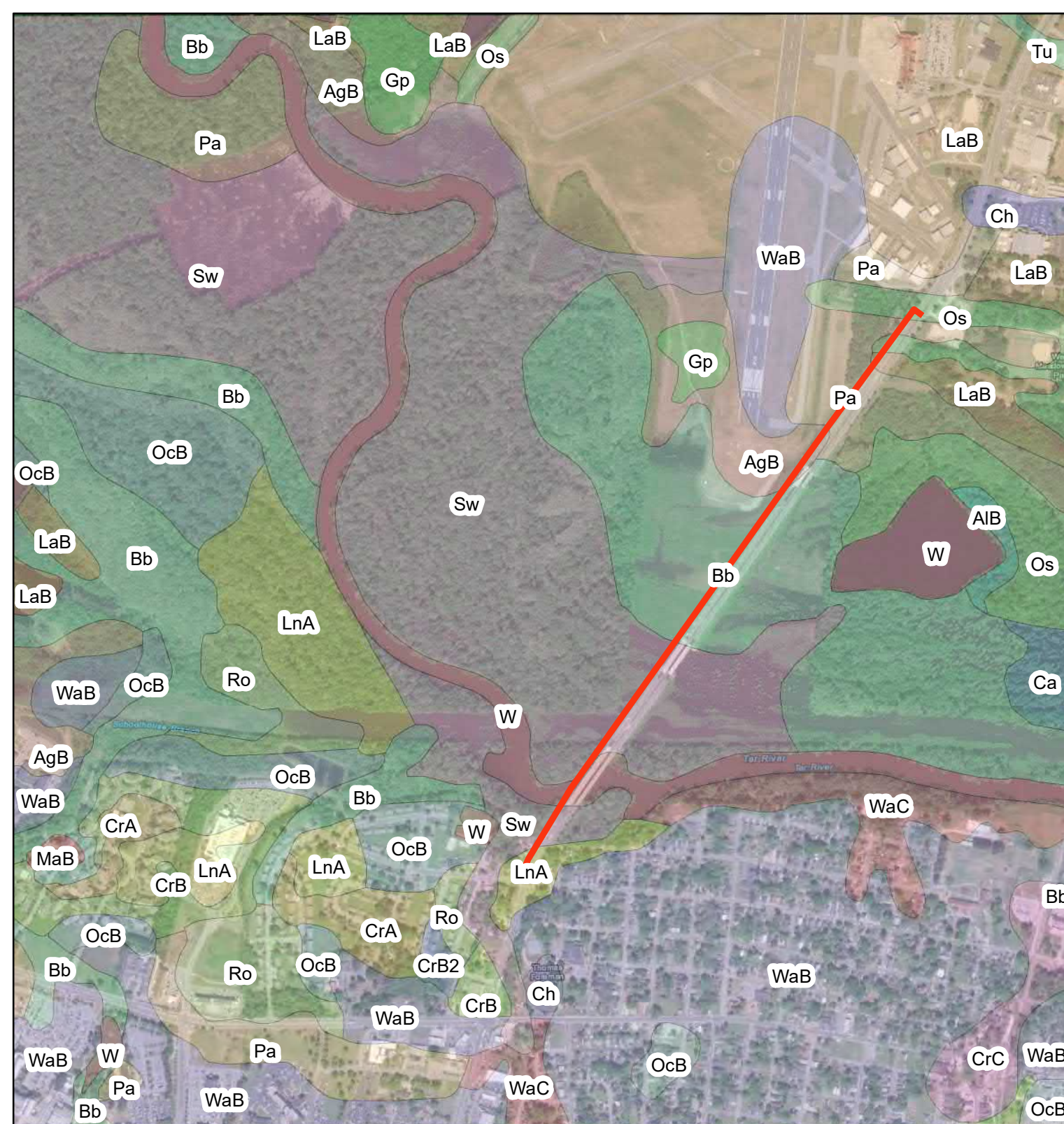
— Project Corridor

GAS DISTRIBUTION SYSTEM
IMPROVEMENTS
MEMORIAL DRIVE BRIDGE
GAS MAIN RELOCATION

FIGURE 2
USGS TOPO MAP

Kimley»Horn
Expect More. Experience Better.





Legend

- Project Corridor
- Soil Boundaries

<p>MUSYM</p> <ul style="list-style-type: none"> CrA CrB CrB2 CrC AIB Bb Ca Ch Gp LnA MaB Ro Sw Tu 	<ul style="list-style-type: none"> OcB Os Pa Po Ro Sw Tu 	<ul style="list-style-type: none"> W WaB WaC
--	---	---

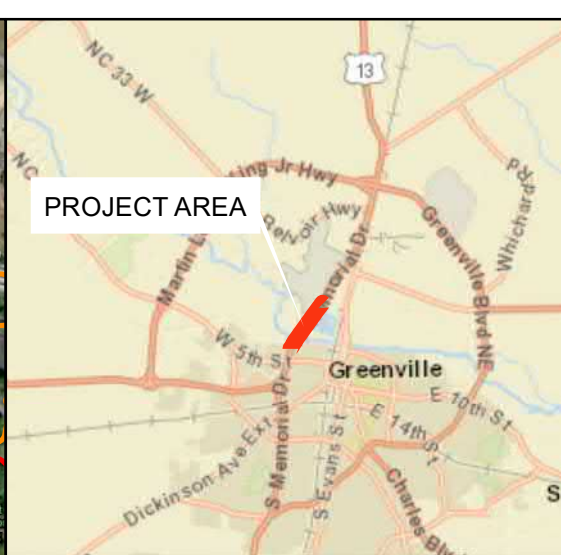
**GAS DISTRIBUTION SYSTEM IMPROVEMENTS
MEMORIAL DRIVE BRIDGE
GAS MAIN RELOCATION**

**FIGURE 3
USDA SOIL SURVEY MAP**

Kimley»Horn
Expect More. Experience Better.

N

0 375 750 1,500 Feet



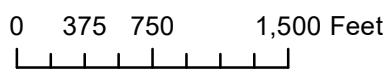
Legend

- Project Corridor
- Contour Elevations (USGS)**
- 10 - 15
- 15.1 - 25
- 25.1 - 45
- 45.1 - 60
- 60.1 - 75

**GAS DISTRIBUTION SYSTEM
IMPROVEMENTS
MEMORIAL DRIVE BRIDGE
GAS MAIN RELOCATION**

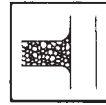
**FIGURE 4
CONTOUR MAP**

Kimley»Horn
Expect More. Experience Better.



C. REFERENCE MATERIALS

*TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT
LAND GRADING (FOR SLOPE BREAKS)
SEDIMENT FENCE
CHECK DAM
TEMPORARY SEEDING
PERMANENT SEEDING
ROCK PIPE INLET PROTECTION
DITCH CALCULATION – SECTION 8.05
INTENSITY-DURATION-FREQUENCY TABLE
TABLE OF RATIONAL RUNOFF COEFFICIENTS*



TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

Purpose To provide a stable entrance/exit condition from the construction site and keep mud and sediment off public roads (Figure 6.06a).

Figure 6.06a
Gravel entrance/
exit keeps mud off
public roads.



Minimum Requirements

- **Material:** 2-3-inch washed stone over a stable foundation as specified in the plan
- **Thickness:** 6 inches minimum (Figure 6.06b).
- **Width:** 12 ft minimum or full width of exit roadway, whichever is greater.
- **Length:** 50 ft minimum.
- **Washing facility** (if required): level area with 3-inch washed stone minimum, or a commercial rack. Divert waste water to a sediment trap or basin.

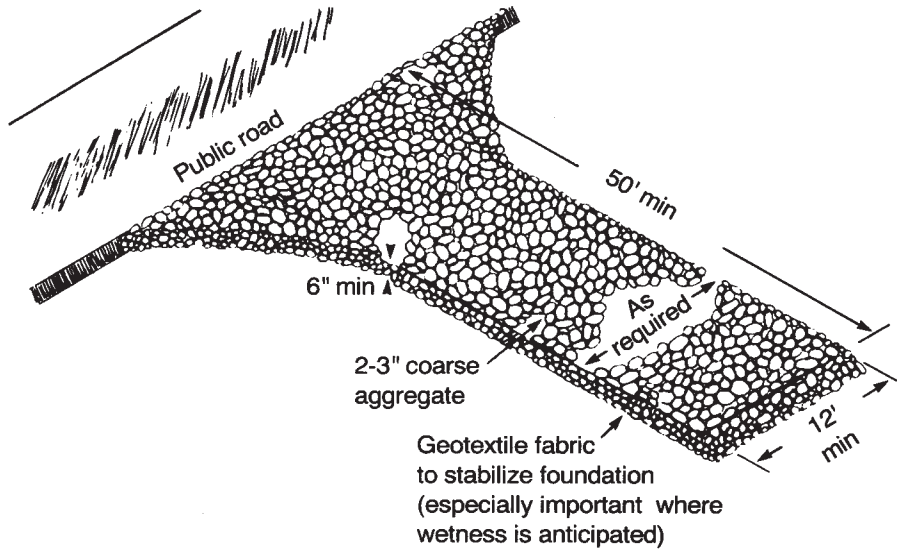


Figure 6.06b Plan of temporary construction entrance/exit.

Installation

Avoid curves in public roads and steep slopes. Remove all vegetation and other objectionable material from the foundation area. Grade and crown foundation for positive drainage.

If the slope toward the road exceeds 2%, construct a ridge, 6 to 8 inches high with 3:1 side slopes, across the foundation approximately 15 ft from the entrance to divert runoff away from the public road (Figure 6.06c)

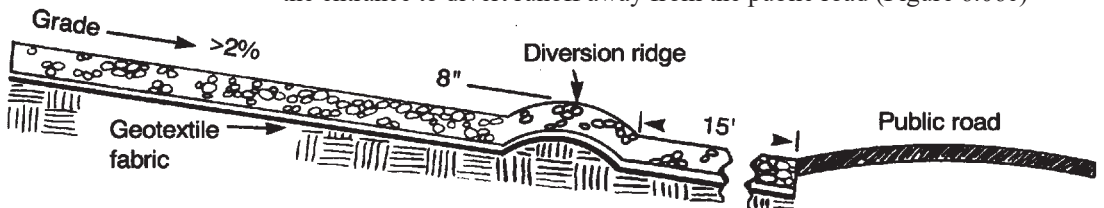


Figure 6.06c Temporary gravel construction entrance/exit with diversion ridge where grade exceeds 2%.

Place geotextile fabric on graded foundation to improve stability, especially where wet conditions are anticipated.

Place stone to dimensions and grade shown on plans. Leave surface smooth and sloped for drainage.

Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

Install pipe under pad if needed to maintain proper public road drainage.

Common Trouble Points

- Inadequate runoff control—sediment washes onto public road (Figure 6.06d).
- Stone too small, pad too thin, or geotextile fabric absent—results in muddy conditions as stone is pressed into soil.
- Pad too short for heavy construction traffic—extend pad beyond the minimum 50-ft length as necessary.
- Pad not flared sufficiently at road entrance—results in mud being tracked onto road and possible damage to road edge.
- Unstable foundation—use geotextile fabric under pad and/or improve foundation drainage.

Figure 6.06d
Trouble point:
Inadequate runoff
control—sediment
washes onto
public road.



Maintenance

Inspect entrance/exit pad and sediment disposal area at least weekly and after each significant ($\frac{1}{2}$ inch or greater) rain event or heavy use

Reshape pad as needed for drainage and runoff control.

Topdress with clean stone as needed.

Immediately remove mud and sediment tracked or washed onto public road.

Repair any broken road pavement immediately.

TEMPORARY DIVERSIONS

Purpose To protect work areas from runoff and divert water to sediment traps or stable outlets (Figure 6.20a).

Figure 6.20a
Temporary
earthen
diversion.



Minimum Requirements

- **Drainage area:** limited to 5 acres.
- **Capacity:** peak runoff from 10-yr storm.
- **Ridge cross section** (Figure 6.20b):
 - Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross)
 - Top width—2 ft minimum
 - Freeboard—0.3 minimum
- **Channel cross section:**
 - Shape—parabolic, trapezoidal, or V-shaped
 - Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross)
- **Grade:** uniform or gradually increasing toward outlet, generally not exceeding 2.0%
- **Outlet:** must be nonerosive for design flow. Divert flow containing sediment to a sediment trap.

6.02



LAND GRADING

Definition Reshaping the ground surface to planned grades as determined by engineering survey evaluation and layout.

Purpose To provide more suitable topography for buildings, facilities, and other land uses, to control surface runoff, and to minimize soil erosion and sedimentation both during and after construction.

Conditions Where Practice Applies This practice is applicable where grading to a planned elevation is necessary and practical for the proposed development of a site, and for proper operation of sedimentation control practices.

Planning Considerations Fitting a proposed development to the natural configurations of an existing landscape reduces the erosion potential of the site and the cost of installing erosion and sedimentation control measures. It may also result in a more desirable and less costly development.

Before grading begins, decisions must be made on the steepness of cut-and-fill slopes, how they will be protected from runoff, how they will be stabilized, and how they will be maintained. The grading plan establishes drainage areas, directs drainage patterns, and affects runoff velocities.

The grading plan forms the basis of the erosion and sedimentation control plan. Key considerations that affect erosion and sedimentation include deciding which slopes are to be graded, when the work will start and stop, the degree and length of finished slopes, where and how excess material will be wasted, and where borrow is needed.

Leaving undisturbed temporary and permanent buffer zones in the grading operation may provide an effective and low-cost erosion control measure that will help reduce runoff velocity and volume and off-site sedimentation. In developing the grading plan, always consider how to take advantage of undisturbed water disposal outlets before storm drains or other constructed outlets are installed.

Design Criteria Base the grading plan and installation upon adequate surveys and soil investigations. In the plan, show disturbed areas, cuts, fills, and finished elevations of the surface to be graded. Include in the plan all practices necessary for controlling erosion on the graded site and minimizing sedimentation downstream. Such practices may include, but are not limited to, sediment basins, diversions, mulching, vegetation, vegetated and lined waterways, grade stabilization structures, and surface and subsurface drains. The practices may be temporary or permanent, depending upon the need after construction is completed.

In the grading plan consider the following as a minimum:

Make a provision to intercept and conduct all surface runoff to storm drains, protected outlets, or to stable watercourses to minimize erosion on newly graded slopes.

Use slope breaks, such as diversions or benches, as appropriate, to reduce the length of cut-and-fill slope to limit sheet and rill erosion and prevent gullying. A spacing guide is shown in Table 6.02a.

**Table 6.02a
Spacing Guide for Slope
Breaks**

	Slope	Spacing (ft)
Steep Slopes	2:1	20
	3:1	35
	4:1	45
Long Slopes	15-25%	50
	10-15%	80
	6-10%	125
	3-6%	200
	<3%	300

Stabilize all graded areas with vegetation, crushed stone, riprap, or other ground cover as soon as grading is completed, or when work is interrupted for 30 working days or more. Use mulch to stabilize areas temporarily where final grading must be delayed. The finished cut-and-fill slopes, which are to be vegetated with grass and legumes, should not be steeper than 2:1. Slopes to be maintained by tractor or other equipment should not be steeper than 3:1. Slopes in excess of 2:1 may warrant vines, special vegetation, or retaining walls. Roughen the surface of all slopes during the construction operation to retain water, increase filtration, and facilitate vegetation. (Practice 6.03, *Surface Roughening*.)

Do not place cuts or fill so close to property lines as to endanger adjoining property without adequately protecting such properties from erosion, sedimentation, slippage, subsidence, or other damages.

Provide subsurface drainage to intercept seepage in areas with high water tables that would affect slope stability, bearing strength, or create undesirable wetness.

Do not place fill adjacent to a channel bank where it can create bank failure or result in deposition of sediment downstream.

Show all borrow and disposal areas in the grading plan, and ensure they are adequately drained and stabilized.

Provide stable channels and floodways to convey all runoff from the developed area to an adequate outlet without causing increased erosion or off-site sedimentation.

Construction Specifications

1. Construct and maintain all erosion and sedimentation control practices and measures in accordance with the approved sedimentation control plan and construction schedule.
2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.
3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil (Practice 6.04, *Topsoiling*).
4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.
5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.
6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.
7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.
8. Do not place fill on a frozen foundation, due to possible subsidence and slippage.
9. Keep diversions and other water conveyance measures free of sediment during all phases of development.
10. Handle seeps or springs encountered during construction in accordance with approved methods (Practice 6.81, *Subsurface Drain*).
11. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 working days or longer.
12. Show topsoil stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

Maintenance

Periodically, check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls. Promptly remove all sediment from diversions and other water-disposal practices. If washouts or breaks occur, repair them immediately. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

References

Chapter 3, Vegetative Considerations
Chapter 5, Overview of Erosion and Sedimentation Control Practices

6.62



SEDIMENT FENCE

Definition A temporary sediment control measure consisting of fabric buried at the bottom, stretched, and supported by posts.

Purpose To retain sediment from small disturbed areas by reducing the velocity of sheet flows to allow sediment deposition.

Conditions Where Practice Applies Below small-disturbed areas that are less than $\frac{1}{4}$ acre per 100 feet of fence. Where runoff can be stored behind the sediment fence without damaging the fence or the submerged area behind the fence.

Do not install sediment fences across streams, ditches, or waterways, or other areas of concentrated flow.

Sediment fence should be placed along topographic elevation contours, where it can intercept stormwater runoff that is in dispersed sheet flow. Sediment fence should not be used alone below graded slopes greater than 10 feet in height.

Planning Considerations

A sediment fence is a system to retain sediment on the construction site. The fence retains sediment primarily by retarding flow and promoting deposition. In operation, generally the fence becomes clogged with fine particles, which reduce the flow rate. This causes a pond to develop behind the fence. The designer should anticipate ponding and provide sufficient storage areas and overflow outlets to prevent flows from overtopping the fence. Since sediment fences are not designed to withstand high water levels, locate them so that only shallow pools can form. Tie the ends of a sediment fence into higher ground to prevent flow around the end of the fence before the pool reaches design level. Curling each end of the fence uphill in a “J” pattern may be appropriate to prevent end flow. Provide stabilized outlets to protect the fence system and release storm flows that exceed the design storm.

Deposition occurs as the storage pool forms behind the fence. The designer can direct flows to specified deposition areas through appropriate positioning of the fence or by providing an excavated area behind the fence. Plan deposition areas at accessible points to promote routine cleanout and maintenance. Show deposition areas in the erosion and sedimentation control plan. A sediment fence acts as a diversion if placed slightly off the contour. A maximum slope of 2 percent is recommended. This technique may be used to control shallow, uniform flows from small disturbed areas and to deliver sediment-laden water to deposition areas. The anchoring of the toe of the fence should be reinforced with 12 inches of NC DOT #5 or #57 washed stone when flow will run parallel to the toe of the fence.

Sediment fences serve no function along ridges or near drainage divides where there is little movement of water. Confining or diverting runoff unnecessarily with a sediment fence may create erosion and sedimentation problems that would not otherwise occur.

Straw barriers have only a 0-20% trapping efficiency and are inadequate. Straw bales may not be used in place of sediment fence. Prefabricated sediment fence with the fabric already stapled to thin wooden posts does not meet minimum standards specified later in this section.

Anchoring of sediment fence is critical. The toe of the fabric must be anchored in a trench backfilled with compacted earth. Mechanical compaction must be provided in order for the fence to effectively pond runoff.

Design Criteria

Ensure that drainage area is no greater than ¼ acre per 100 feet of fence. This is the maximum drainage area when the slope is less than 2 percent. Where all runoff is to be stored behind the fence, ensure that the maximum slope length behind a sediment fence does not exceed the specifications shown in Table 6.62a. The shorter slope length allowed for steeper slopes will greatly reduce the maximum drainage area. For example, a 10–20 % slope may have a maximum slope length of 25 feet. For a 100-foot length of sediment fence, the drainage area would be 25ft X 100ft = 2500sq.ft., or 0.06 acres.

Table 6.62a Maximum Slope Length and Slope for which Sediment Fence is Applicable

Slope	Slope Length (ft)	Maximum Area (ft ²)
<2%	100	10,000
2 to 5%	75	7,500
5 to 10%	50	5,000
10 to 20%	25	2,500
>20%	15	1,500

Make the fence stable for the 10-year peak storm runoff.

Ensure that the depth of impounded water does not exceed 1.5 feet at any point along the fence.

If non-erosive outlets are provided, slope length may be increased beyond that shown in Table 6.62a, but runoff from the area should be determined and bypass capacity and erosion potential along the fence must be checked. The velocity of the flow at the outlet or along the fence should be in keeping with Table 8.05d, Appendix 8.05.

Provide a riprap splash pad or other outlet protection device for any point where flow may overtop the sediment fence, such as natural depressions or swales. Ensure that the maximum height of the fence at a protected, reinforced outlet does not exceed 2 feet and that support post spacing does not exceed 4 feet.

The design life of a synthetic sediment fence should be 6 months.

Construction Specifications

MATERIALS

1. Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or supplier as conforming to the requirements in ASTM D 6461, which is shown in part in Table 6.62b.

Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120° F.

2. Ensure that posts for sediment fences are 1.33 lb/linear ft steel with a minimum length of 5 feet. Make sure that steel posts have projections to facilitate fastening the fabric.
3. For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

Table 6.62b Specifications For Sediment Fence Fabric

Temporary Silt Fence Material Property Requirements					
	Test Material	Units	Supported ¹ Silt Fence	Un-Supported ¹ Silt Fence	Type of Value
Grab Strength	ASTM D 4632	N (lbs)			
Machine Direction			400	550	MARV
			(90)	(90)	
X-Machine Direction			400	450	MARV
			(90)	(90)	
Permittivity ²	ASTM D 4491	sec-1	0.05	0.05	MARV
Apparent Opening Size ²	ASTM D 4751	mm	0.60	0.60	Max. ARV ³
		(US Sieve #)	(30)	(30)	
Ultraviolet Stability	ASTM D 4355	% Retained Strength	70% after 500h of exposure	70% after 500h of exposure	Typical
¹ Silt Fence support shall consist of 14 gage steel wire with a mesh spacing of 150 mm (6 inches), or prefabricated polymer mesh of equivalent strength. ² These default values are based on empirical evidence with a variety of sediment. For environmentally sensitive areas, a review of previous experience and/or site or regionally specific geotextile tests in accordance with Test Method D 5141 should be performed by the agency to confirm suitability of these requirements. ³ As measured in accordance with Test Method D 4632.					

CONSTRUCTION

1. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.
2. Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. (Higher fences may impound volumes of water sufficient to cause failure of the structure.)
3. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.
4. Support standard strength filter fabric by wire mesh fastened securely to the **upslope** side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have minimum 50 pound tensile strength.
5. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Support posts should be driven securely into the ground a minimum of 24 inches.
6. Extra strength filter fabric with 6 feet post spacing does not require wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have minimum 50 pound tensile strength.

7. Excavate a trench approximately 4 inches wide and 8 inches deep along the proposed line of posts and upslope from the barrier (Figure 6.62a).
8. Place 12 inches of the fabric along the bottom and side of the trench.
9. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.
10. Do not attach filter fabric to existing trees.

SEDIMENT FENCE INSTALLATION USING THE SLICING METHOD

Instead of excavating a trench, placing fabric and then backfilling trench, sediment fence may be installed using specially designed equipment that inserts the fabric into a cut sliced in the ground with a disc (Figure 6.62b).

Installation Specifications

1. The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level if necessary.
2. Install posts 4 feet apart in critical areas and 6 feet apart on standard applications.
3. Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.
4. Install posts with the nipples facing away from the silt fabric.
5. Attach the fabric to each post with three ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. Also, each tie should be positioned to hang on a post nipple when tightened to prevent sagging.
6. Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.
7. No more than 24 inches of a 36 inch fabric is allowed above ground level.
8. The installation should be checked and corrected for any deviations before compaction.
9. Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first, and then each side twice for a total of 4 trips.

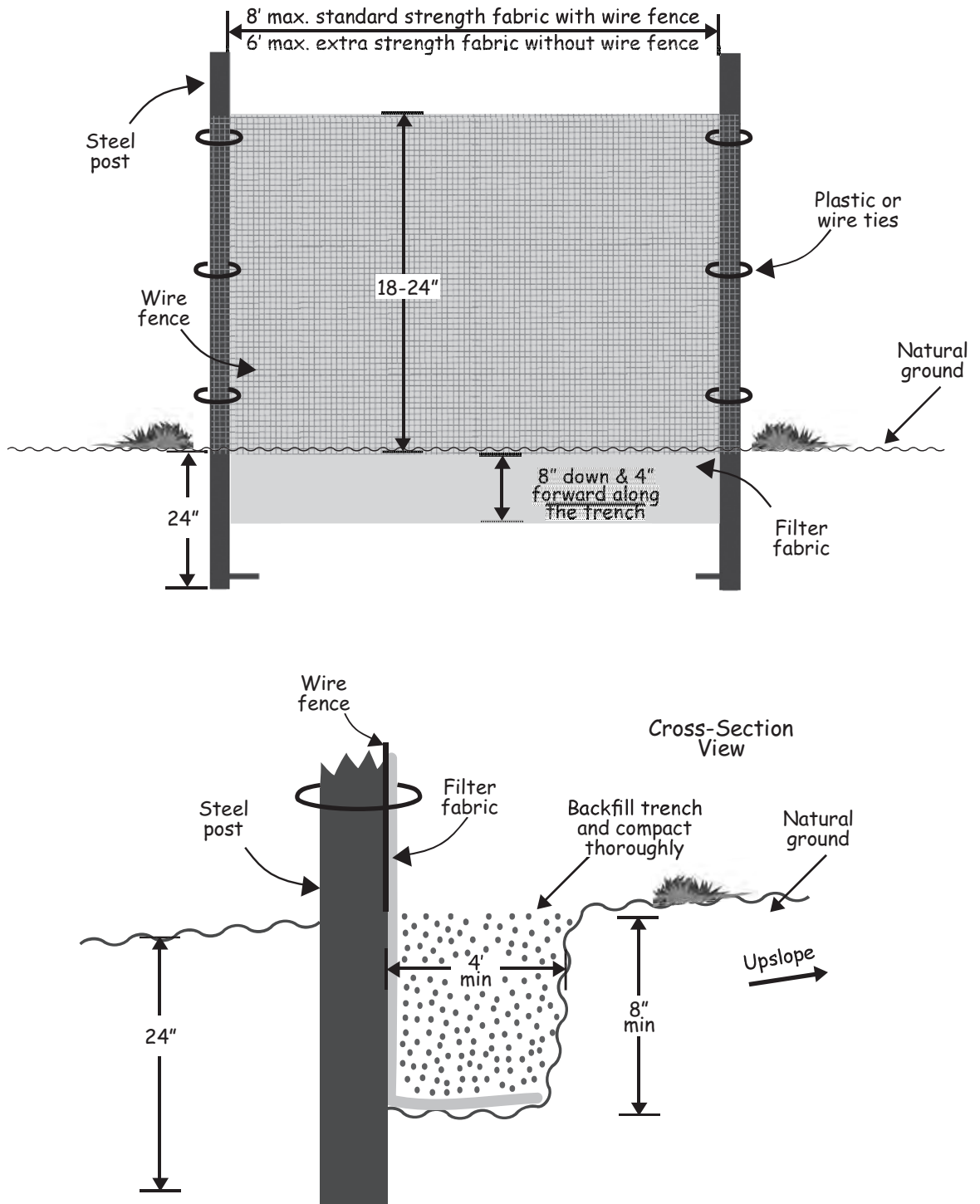
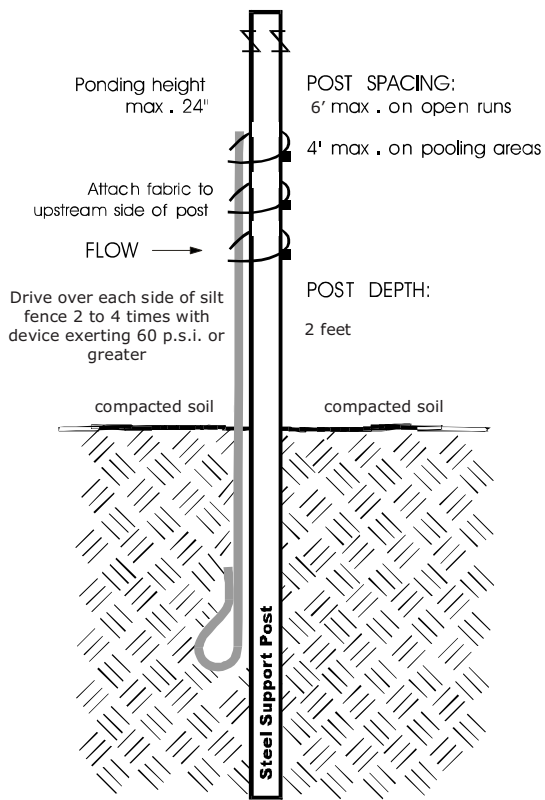
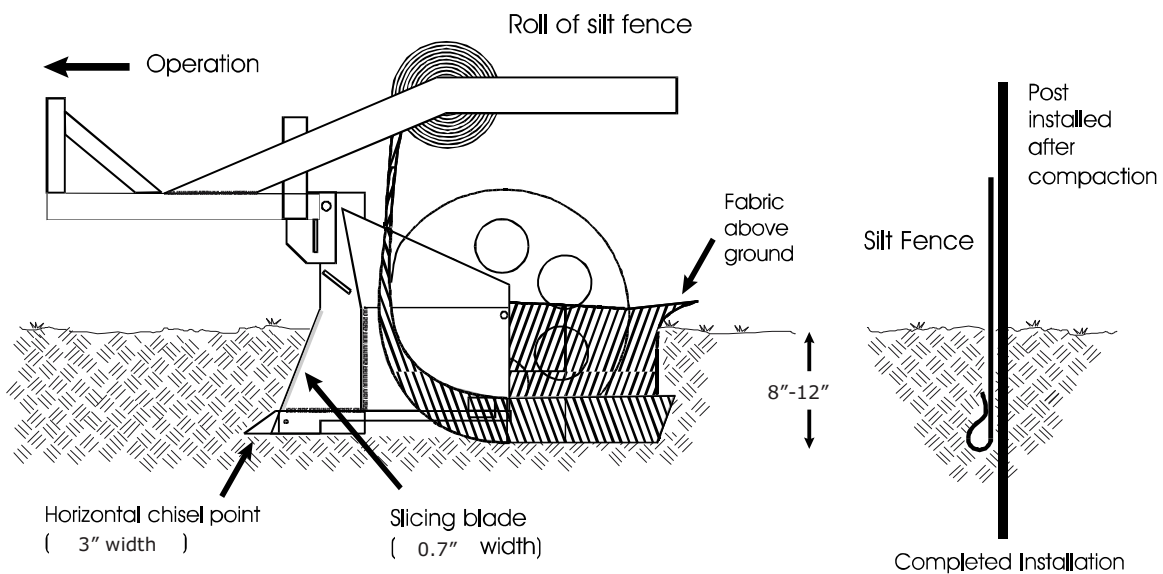
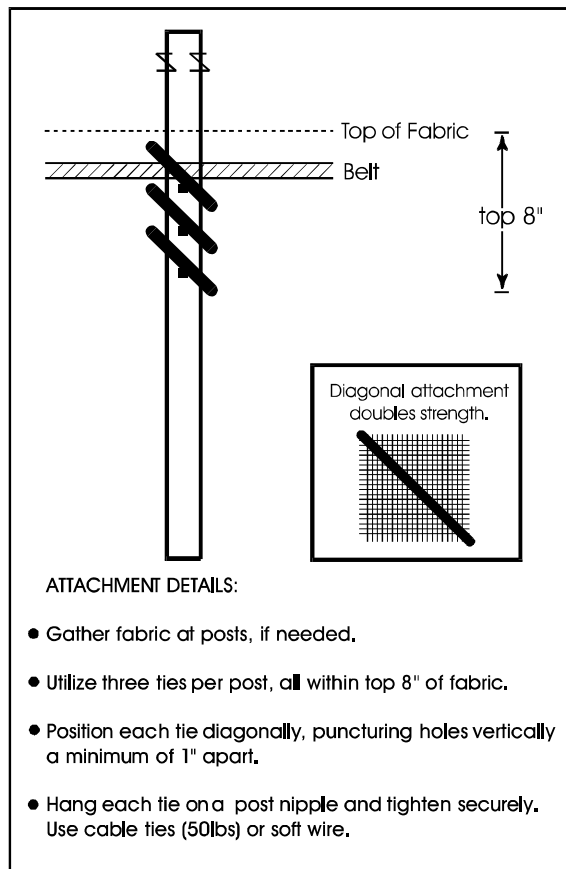


Figure 6.62a Installation detail of a sediment fence.

The Slicing Method



No more than 24" of a 36" fabric is allowed above ground.



Vibratory plow is not acceptable because of horizontal compaction

Figure 6.62b Schematics for using the slicing method to install a sediment fence. Adapted from *Silt Fence that Works*

Maintenance Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

References ASTM D 6461 – 99. “Standard Specification for Silt Fence Materials” ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard’s Document Summary page on the ASTM website.

ASTM D 6462 – 03. “Standard Practice for Silt Fence Installation” ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard’s Document Summary page on the ASTM website.

C. Joel Sprague, PE, Silt Fence Performance Limits and Installation Requirements. Sprague and Sprague Consulting Engineers and TRI/Environmental, Inc.

Carpenter Erosion Control. <http://www.tommy-sfm.com/>

Kentucky Erosion Prevention and Sediment Control Field Manual, 2004.

Runoff Control Measures
6.20, Temporary Diversions

Outlet Protection
6.41, Outlet Stabilization Structure

Appendix
8.03, Estimating Runoff

6.83

CHECK DAM

Definition A small temporary stone dam constructed across a drainage way.

Purpose To reduce erosion in a drainage channel by reducing the velocity of flow.

Conditions Where Practice Applies This practice may be used as a temporary measure to limit erosion by reducing velocity in small open channels. When needed, they can be used in channels, roadside ditches, and temporary diversions.

Check dams may be used to:

- reduce velocity in small temporary channels that are degrading, but where permanent stabilization is impractical due to their short period of usefulness;
- reduce velocity in small eroding channels where construction delays or weather conditions prevent timely installation of nonerosive liners.

Do not use check dams in intermittent or perennial streams.

Planning Considerations Check dams are an expedient way to reduce gully in the bottom of channels that will be filled or stabilized at a later date. The dams should only be used while permanent stabilization measures are being put into place.

Check dams installed in grass-lined channels may kill the vegetative lining if submergence after it rains is too long and/or silting is excessive. All stone and riprap must be removed if mowing is planned as part of vegetative maintenance.

Design Criteria The following criteria should be used when designing a check dam:

- The drainage area is limited to one half acre.
- Keep a maximum height of 2 feet at the center of the dam.
- Keep the center of the check dam at least 9 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the dam at 2:1 or flatter.
- Ensure that the maximum spacing between dams places the toe of the upstream dam at the same elevation as the top of the downstream dam (Figure 6.83a).
- Stabilize outflow areas along the channel to resist erosion.
- Use NC DOT Class B stone and line the upstream side of the dam with NC DOT #5 or #57 stone.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 1.5 feet to avoid washouts from overflow around the dam.

Construction Specifications

1. Place stone to the lines and dimensions shown in the plan on a filter fabric foundation.
2. Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.
3. Extend stone at least 1.5 feet beyond the ditch bank (Figure 6.83b) to keep water from cutting around the ends of the check dam.
4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.
6. Make sure that the channel reach above the most upstream dam is stable.
7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.

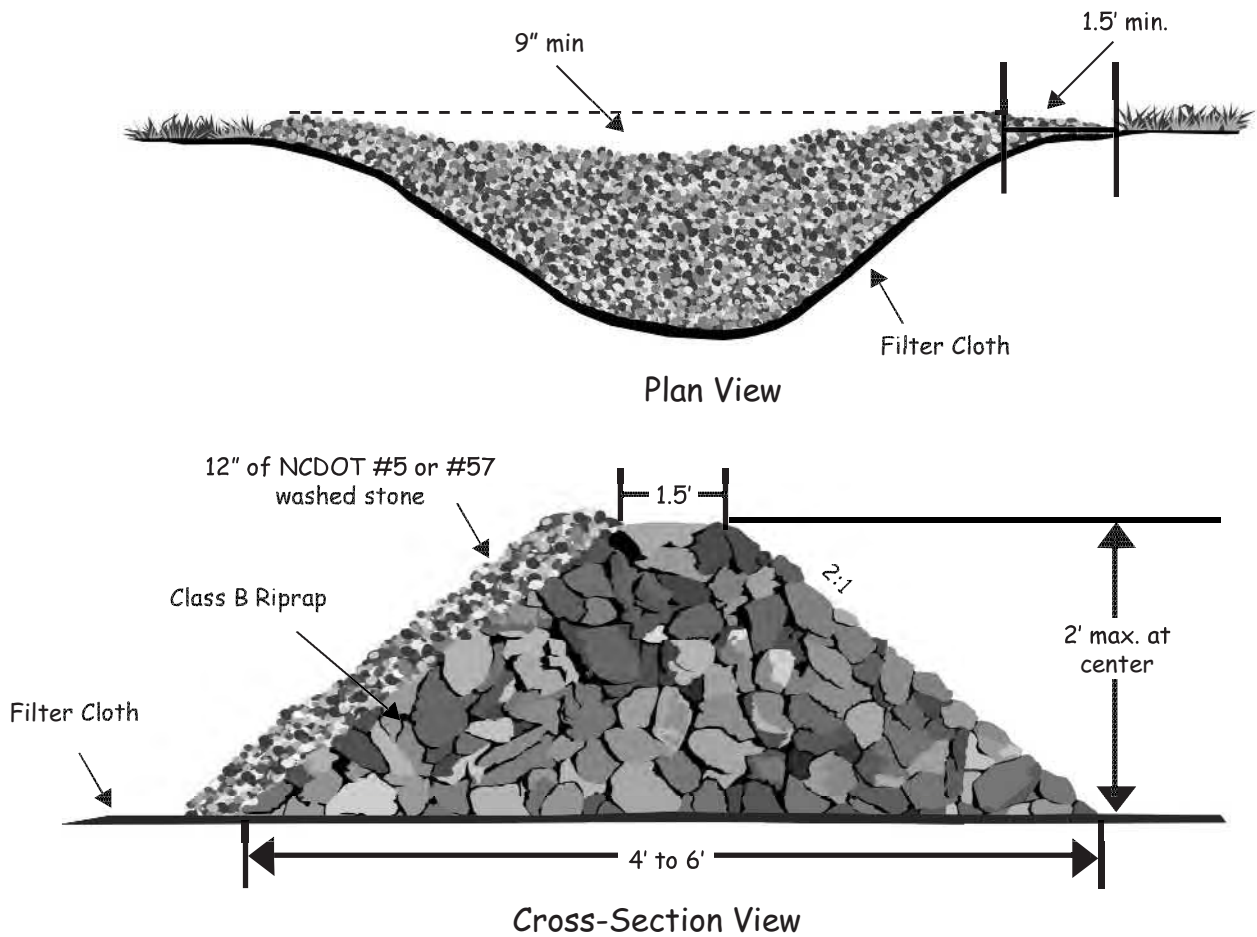


Figure 6.83b Stone check dam stone should be placed over the channel banks to keep water from cutting around the dam.

Maintenance Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel (Practice 6.31, *Riprap-lined and Paved Channels*).

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.

References *Runoff Conveyance Measures*
 6.30, Grass-lined Channels
 6.31, Riprap-lined and Paved Channels

North Carolina Department of Transportation
 Standard Specifications for Roads and Structures

6.10



TEMPORARY SEEDING

Definition Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.

Purpose To temporarily stabilize denuded areas that will not be brought to final grade for a period of more than 21 calendar days.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. In addition, it provides residue for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction.

Conditions Where Practice Applies On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than 1 year. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles.

Planning Considerations Annual plants, which sprout and grow rapidly and survive for only one season, are suitable for establishing initial or temporary vegetative cover. Temporary seeding preserves the integrity of earthen sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency of sediment basin cleanouts will be reduced if watershed areas, outside the active construction zone, are stabilized.

Proper seedbed preparation, selection of appropriate species, and use of quality seed are as important in this Practice as in Practice 6.11, *Permanent Seeding*. Failure to follow established guidelines and recommendations carefully may result in an inadequate or short-lived stand of vegetation that will not control erosion.

Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.

Specifications Complete grading before preparing seedbeds, and install all necessary erosion control practices such as, dikes, waterways, and basins. Minimize steep slopes because they make seedbed preparation difficult and increase the erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow.

SEEDBED PREPARATION

Good seedbed preparation is essential to successful plant establishment. A good seedbed is well-pulverized, loose, and uniform. Where hydroseeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

Liming—Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the

rate of 1 to 1 1/2 tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

Fertilizer—Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

Surface roughening—If recent tillage operations have resulted in a loose surface, additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding (Practice 6.03, *Surface Roughening*).

PLANT SELECTION

Select an appropriate species or species mixture from Table 6.10a for seeding in late winter and early spring, Table 6.10b for summer, and Table 6.10c for fall.

In the Mountains, December and January seedings have poor chances of success. When it is necessary to plant at these times, use recommendations for fall and a securely tacked mulch.

SEEDING

Evenly apply seed using a cyclone seeder (broadcast), drill, cultipacker seeder, or hydroseeder. Use seeding rates given in Tables 6.10a-6.10c. Broadcast seeding and hydroseeding are appropriate for steep slopes where equipment cannot be driven. Hand broadcasting is not recommended because of the difficulty in achieving a uniform distribution.

Small grains should be planted no more than 1 inch deep, and grasses and legumes no more than 1/2 inch. Broadcast seed must be covered by raking or chain dragging, and then lightly firmed with a roller or cultipacker. Hydroseeded mixtures should include a wood fiber (cellulose) mulch.

MULCHING

The use of an appropriate mulch will help ensure establishment under normal conditions, and is essential to seeding success under harsh site conditions (Practice 6.14, *Mulching*). Harsh site conditions include:

- seeding in fall for winter cover (wood fiber mulches are not considered adequate for this use),
- slopes steeper than 3:1,
- excessively hot or dry weather,
- adverse soils (shallow, rocky, or high in clay or sand), and
- areas receiving concentrated flow.

If the area to be mulched is subject to concentrated waterflow, as in channels, anchor mulch with netting (Practice 6.14, *Mulching*).

Maintenance Reseed and mulch areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible.

References *Site Preparation*
6.03, Surface Roughening
6.04, Topsoiling

Surface Stabilization
6.11, Permanent Seeding
6.14, Mulching

Appendix
8.02, Vegetation Tables

**Table 6.10a
Temporary Seeding
Recommendations for Late
Winter and Early Spring**

Seeding mixture	
Species	Rate (lb/acre)
Rye (grain)	120
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding dates
Mountains—Above 2500 feet: Feb. 15 - May 15
 Below 2500 feet: Feb. 1- May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

**Table 6.10b
Temporary Seeding
Recommendations for
Summer**

Seeding mixture	
Species	Rate (lb/acre)
German millet	40
<p>In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.</p>	
Seeding dates	
Mountains—May 15 - Aug. 15	
Piedmont—May 1 - Aug. 15	
Coastal Plain—Apr. 15 - Aug. 15	
Soil amendments	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.	

**Table 6.10c
Temporary Seeding
Recommendations for Fall**

Seeding mixture	
Species	Rate (lb/acre)
Rye (grain)	120
Seeding dates	
Mountains—Aug. 15 - Dec. 15	
Coastal Plain and Piedmont—Aug. 15 - Dec. 30	
Soil amendments	
Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extent temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.	

6.11



PERMANENT SEEDING

Definition Controlling runoff and erosion on disturbed areas by establishing perennial vegetative cover with seed.

Purpose To reduce erosion and decrease sediment yield from disturbed areas, to permanently stabilize such areas in a manner that is economical, adapts to site conditions, and allows selection of the most appropriate plant materials.

Conditions Where Practice Applies Fine-graded areas on which permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding may also be used on rough-graded areas that will not be brought to final grade for a year or more.

Areas to be stabilized with permanent vegetation must be seeded or planted within 15 working days or 90 calendar days after final grade is reached, unless temporary stabilization is applied.

Planning Considerations Vegetation controls erosion by protecting bare soil surfaces from raindrop impact and by reducing the velocity and volume of overland flow.

The most common and economical means of stabilizing disturbed soils is by seeding grasses and legumes. The advantages of seeding over other means of establishing plants include the smaller initial cost, lower labor input, and greater flexibility of method. The disadvantages of seeding include:

- potential for erosion during the establishment stage,
- the need to reseed areas that fail to establish,
- seasonal limitations on suitable seeding dates, and
- a need for water and appropriate temperatures during germination and early growth.

The probability of successful plant establishment can be maximized through good planning, knowledge of the soil characteristics (Table 6.11a), selection of suitable plant materials for the site, good seedbed preparation, adequate liming and fertilization, and timely planting and maintenance.

SELECTING PLANT MATERIALS

Climate, soils, and topography are the major factors affecting the suitability of plants for a particular site. All three of these factors vary widely across North Carolina, with the most significant contrasts occurring among the three major physiographic regions of the state—Mountains, Piedmont, and Coastal Plain (Figure 6.11a).

To simplify plant selection, a *Key to Permanent Seeding Mixtures* is presented in Table 6.11b. To find seeding specifications for a specific site, follow this key through the different steps—region, slope, soil, and maintenance level—to the appropriate seeding number. Seeding mixtures recommended here are designed for general use and are well proven in practical field situations

Table 6.11a
Suitability of Soil for Establishment of Low-maintenance Vegetation

Criteria	Suitability			Limiting Factors
	Good	Fair	Poor	
pH	5.6-7.8	4.5-5.5	<4.5	Too acid; possible Al, Mn, Fe toxicity
Available water capacity ¹	>.10	.05-.10	<0.5	Too dry
Texture ²	l, sil, si, sl	scl, sicl, cl	sc, sic, c	Too high in clay
		ls	s	Too high in sand
Coarse fragments ³	(3-10 in) <15% (>10 in) <3%	15-35	>35	Lg. stones restrict tillage; droughty
		3-10	>10	
Depth to bedrock (in.)	40	20-40	<20	Insufficient rooting depth
Salinity (mmhos/cm)		8-16	>16	Excess salt

¹in./in.

²Sandy clay loam (scl), silty clay loam (sicl), clay loam (cl), sandy loam (sl), silt loam (sil), loamy sand (ls), sandy clay (sc), silty clay (sic), clay (c), silt (si), sand (s), and loam (l).

³Percent by weight.

Source: *National Soils Handbook*, USDA-SCS, 1983.

(Tables 6.11c through 6.11v). They are designed to produce maximum stabilization and minimize the amount of maintenance and repair required.

Land use is a primary consideration in planning permanent seedings. For this purpose land use, whether residential, industrial, commercial, or recreational, can be divided into two general categories:

- **High-maintenance areas** are mowed frequently, limed and fertilized regularly, and either (1) receive intensive use (e.g., athletic fields) or (2) require maintenance to an aesthetic standard (e.g., home lawns). Grasses used for these situations are long-lived perennials that form a tight sod and are fine-leaved and attractive in appearance. They must be well-adapted to the geographic area where they are planted and able to endure the stress of frequent mowing. Sites where high-maintenance vegetative cover is desirable include homes, industrial parks, schools, churches, and recreational areas.
- **Low-maintenance areas** are mowed infrequently or not at all, and do not receive lime and fertilizer on a regular basis. Plants must persist with little maintenance over long periods of time. Grass and legume mixtures are favored for these sites because legumes are a source of soil nitrogen. Mixed stands are also more resistant to adverse conditions. Sites suitable for low-maintenance vegetation include steep slopes, stream or channel banks, some commercial properties, and “utility” turf areas such as roadbanks.

SEEDBED PREPARATION

The soil on a disturbed site must be amended to provide an optimum environment for seed germination and seedling growth. The surface soil must be loose enough for water infiltration and root penetration. The pH (acidity or alkalinity) of the soil must be such that it is not toxic and nutrients are available—preferably between 6.0 and 6.5. Sufficient nutrients—added as fertilizer—must be present.

It is as important to add lime as to add fertilizer. Lime is used primarily as a pH, or acidity modifier, but it also supplies calcium and magnesium, which are important plant nutrients. By increasing soil pH, it also makes other nutrients more available to plants. At the same time, it prevents aluminum toxicity by decreasing the solubility of soil aluminum. Many soils in North Carolina are high in aluminum, which stunts plant growth.

After seed is in place, it must be protected with a mulch to hold moisture and modify temperature extremes, while preventing erosion during seedling establishment.

STEEP SLOPES

The operation of equipment is restricted on slopes steeper than 3:1, severely limiting the quality of the seedbed that can be prepared. The soil cannot be sufficiently worked, and amendments cannot be thoroughly incorporated.

Provisions for establishment of vegetation on steep slopes can be made during final grading. In construction of fill slopes, for example, the last 4-6 inches might be left uncompacted. A loose, rough seedbed is essential. Large clods

and stones provide irregularities that hold seeds and fertilizer. Cut slopes should be roughened (Practice 6.03, *Surface Roughening*).

Where steepness prohibits the use of farm machinery, seeding methods are limited to broadcast or hydroseeding, with hydroseeding giving the most dependable results. Vegetation chosen for these slopes must not require mowing or other intensive maintenance. Using a hydraulic seeder, seed, fertilizer, wood fiber mulch, and a tacking agent can be applied in one operation.

Good mulching practices are critical to protect against erosion on steep slopes. When using straw, anchor with netting or asphalt. On slopes steeper than 2:1, a rolled erosion control product may be required to protect the slope.

Specifications **SEEDBED REQUIREMENTS**

Establishment of vegetation should not be attempted on sites that are unsuitable due to inappropriate soil texture (Table 6.11a), poor drainage, concentrated overland flow, or steepness of slope until measures have been taken to correct these problems.

To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. The existing soil should have these criteria:

- Enough fine-grained (silt and clay) material to maintain adequate moisture and nutrient supply (available water capacity of at least .05 inches of water to 1 inch of soil).
- Sufficient pore space to permit root penetration.
- Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans should be 12 inches or more, except on slopes steeper than 2:1 where the addition of soil is not feasible.
- A favorable pH range for plant growth, usually 6.0-6.5.
- Freedom from large roots, branches, stones, large clods of earth, or trash of any kind. Clods and stones may be left on slopes steeper than 3:1 if they are to be hydroseeded.

If any of the above criteria are not met—i.e., if the existing soil is too coarse, dense, shallow, or acidic to foster vegetation—special amendments are required. The soil conditioners described below may be beneficial or, preferably, topsoil may be applied in accordance with Practice 6.04, *Topsoiling*.

SOIL CONDITIONERS

In order to improve the structure or drainage characteristics of a soil, the following materials may be added. These amendments should only be necessary where soils have limitations that make them poor for plant growth or for fine turf establishment (see *Chapter 3, Vegetative Considerations*).

Peat—Appropriate types are sphagnum moss peat, hypnum moss peat, reed-sedge peat, or peat humus, all from fresh-water sources. Peat should be shredded and conditioned in storage piles for at least 6 months after excavation.

Sand—clean and free of toxic materials.

Vermiculite—horticultural grade and free of toxic substances.

Rotted manure—stable or cattle manure not containing undue amounts of straw or other bedding materials.

Thoroughly rotted sawdust—free of stones and debris. Add 6 lb of nitrogen to each cubic yard.

Sludge—Treated sewage and industrial sludges are available in various forms; these should be used only in accordance with local, State, and Federal regulations.

SPECIES SELECTION

Use the *Key to Permanent Seeding Mixtures* (Table 6.11b) to select the most appropriate seeding mixture based on the general site and maintenance factors. A listing of species, including scientific names and characteristics, is given in *Appendix 8.02*.

SEEDBED PREPARATION

Install necessary mechanical erosion and sedimentation control practices before seeding, and complete grading according to the approved plan.

Lime and fertilizer needs should be determined by soil tests. Soil testing is performed free of charge by the North Carolina Department of Agriculture soil testing laboratory. Directions, sample cartons, and information sheets are available through county Agricultural Extension offices or from NCDA. Because the NCDA soil testing lab requires 1–6 weeks for sample turn-around, sampling must be planned well in advance of final grading. Testing is also done by commercial laboratories.

When soil tests are not available, follow rates suggested on the individual specification sheet for the seeding mix chosen (Tables 6.11c through 6.11v). Application rates usually fall into the following ranges:

- Ground agricultural limestone:
 - Light-textured, sandy soils: 1- 1 1/2 tons/acre
 - Heavy-textured, clayey soils: 2-3 tons/acre
- Fertilizer:
 - Grasses: 800-1200 lb/acre of 10-10-10 (or the equivalent)
 - Grass-legume mixtures: 800-1200 lb/acre of 5-10-10 (or the equivalent)

Apply lime and fertilizer evenly and incorporate into the top 4–6 inches of soil by disking or other suitable means. Operate machinery on the contour. When using a hydroseeder, apply lime and fertilizer to a rough, loose surface.

Roughen surfaces according to Practice 6.03, *Surface Roughening*.

Complete seedbed preparation by breaking up large clods and raking into a smooth, uniform surface (slopes less than 3:1). Fill in or level depressions that can collect water. Broadcast seed into a freshly loosened seedbed that has not been sealed by rainfall.

SEEDING

Seeding dates given in the seeding mixture specifications (Table 6.11c through 6.11v) are designated as “best” or “possible”. Seedings properly carried out within the “best” dates have a high probability of success. It is also possible to have satisfactory establishment when seeding outside these dates. However, as you deviate from them, the probability of failure increases rapidly. Seeding on the last date shown under “possible” may reduce chances of success by 30-50%. Always take this into account in scheduling land-disturbing activities.

Use certified seed for permanent seeding whenever possible. Certified seed is inspected by the North Carolina Crop Improvement Association. It meets published North Carolina Standards and should bear an official “Certified Seed” label (Figure 6.11b).

Figure 6.11b Label displayed on all North Carolina certified seed.

Labeling of non-certified seed is also required by law. Labels contain important information on seed purity, germination, and presence of weed seeds. Seed must meet State standards for content of noxious weeds. Do not accept seed containing “prohibited” noxious weed seed.

Inoculate legume seed with the *Rhizobium* bacteria appropriate to the species of legume (*Chapter 3, Vegetative Considerations*).

Apply seed uniformly with a cyclone seeder, drop-type spreader drill, cultipacker seeder, or hydroseeder on a firm, friable seedbed.

When using a drill or cultipacker seeder, plant small grains no more than 1 inch deep, grasses and legumes no more than 1/2 inch. Equipment should be calibrated in the field for the desired seeding rate.

When using broadcast-seeding methods, subdivide the area into workable sections and determine the amount of seed needed for each section. Apply one-half the seed while moving back and forth across the area, making a uniform pattern; then apply the second half in the same way, but moving at right angles to the first pass (Figure 6.11c).

Figure 6.11c Suggested pattern for broadcasting seed and fertilizer (source: NCAES Bulletin AG-69).

Cover broadcast seed by raking or chain dragging; then firm the surface with a roller or cultipacker to provide good seed contact.

Mulch all plantings immediately after seeding (Practice 6.14, *Mulching*).

HYDROSEEDING

Surface roughening is particularly important when hydroseeding, as a roughened slope will provide some natural coverage for lime, fertilizer, and seed. The surface should not be compacted or smooth. Fine seedbed preparation is not necessary for hydroseeding operations; large clods, stones, and irregularities provide cavities in which seeds can lodge.

Rate of wood fiber (cellulose) application should be at least 2,000 lb/acre.

Apply legume inoculants at four times the recommended rate when adding inoculant to a hydroseeder slurry.

If a machinery breakdown of 1/2 to 2 hours occurs, add 50% more seed to the task, based on the proportion of the slurry remaining. This should compensate for damage to seed. Beyond 2 hours, a full rate of new seed may be necessary.

Lime is not normally applied with a hydraulic seeder because it is abrasive. It can be blown onto steep slopes in dry form.

SPRIGGING

Hybrid Bermudagrass cannot be grown from seed and must be planted vegetatively. Vegetative methods of establishing common and hybrid Bermudagrass, centipedegrass, and Bahiagrass include sodding, plugging and sprigging (*Chapter 3, Vegetative Considerations*). Sprigs are fragments of horizontal stems which include at least one node (joint). They are normally sold by the bushel and can either be broadcast or planted in furrows using a tractor-drawn tobacco or vegetable transplanter.

Furrows should be 4-6 inches deep and 2 ft apart. Place sprigs about 2 ft apart in the row with one end at or above ground level (Figure 6.11d).

Figure 6.11d Proper placement of grass sprigs. Each sprig should have at least one node (modified from NCAES Bulletin AG-69).

Broadcast sprigs at the specified rate (Tables 6.11r and 6.11s). Press into the top 1/2-2 inches of soil with a cultipacker or with a disk set nearly straight so that the sprigs are not brought back to the surface.

IRRIGATION

Moisture is essential for seed germination and seedling establishment. Supplemental irrigation can be very helpful in assuring adequate stands in dry seasons or to speed development of full cover. It is a requirement for fine turf establishment and should be used elsewhere when feasible. However, irrigation is rarely critical for low-maintenance vegetation planted at the appropriate time of the year.

Water application rates must be carefully controlled to prevent runoff. Inadequate or excessive amounts of water can be more harmful than no supplemental water.

Maintenance Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

Reseeding—If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding (Practice 6.10, *Temporary Seeding*).

If vegetation fails to grow, soil must be tested to determine if acidity or nutrient imbalance is responsible.

Fertilization—On the typical disturbed site, full establishment usually requires refertilization in the second growing season. Fine turf requires annual maintenance fertilization (Table 6.12b). Use soil tests if possible or follow the guidelines given for the specific seeding mixture. (Tables 6.11c through 6.11v).

References

Site Preparation

6.03, Surface Roughening

6.04, Topsoiling

Surface Stabilization

6.10, Temporary Seeding

6.12, Sodding

6.14, Mulching

Appendix

8.02, Vegetation Tables

Chapter 3, Vegetative Considerations

USDA Soil Conservation Service

National Soils Handbook

**Table 6.11b
Key to Permanent Seeding Mixtures Based on Site Characteristics**

Region and Site Characteristics ¹	Seeding Number	Table (6.11)
I. Mountains		
A. Steep slopes (steeper than 3:1); low maintenance		
1. Average soils	1M	c
2. Cold sites or rocky, rough, dry soils	2M or	d
.	7M (trees)	i
B. Gentle slopes (3:1 or less)		
1. Low maintenance		
a. Average soil	3M	e
b. Rough, rocky, dry soil	2M or	d
.	7M (trees)	i
2. High maintenance		
a. Full sun, soils with good moisture retention	4M	f
b. Full sun, drought-prone soils	5M	g
c. Sun or semi-shade, minimum care lawns	6M	h
C. Grass-lined channels		
	8M	j
II. Piedmont		
A. Low maintenance		
1. Steep slopes or stony, shallow or dry soils	1P	k
2. Gentle slopes with average or better soils	2P	l
B. High maintenance (slopes less than 3:1)		
1. Cool sites; soils with average or better moisture retention	3P	m
2. Warm sites; dry, poor soils	4P or 3CP	n,r
C. Grass-lined channels		
1. Soils with average or better moisture retention	5P or 8M	o,j
2. Full sun, drought-prone soils	7CP	v
III. Coastal Plain		
A. Well- to poorly-drained soils with good water-holding capacities		
1. Low maintenance	1CP	p
2. High maintenance	2CP	q
B. Well-drained, sandy loams to excessively well drained sands		
1. High maintenance, fine turf	3CP	r
2. Low- to medium-care lawns	4CP	s
3. Low maintenance	5CP	t
C. Intertidal zones of estuarine shorelines, dredged material, and graded areas in salt water		
	6CP	u
D. Grass-lined channels		
	7CP	v
E. Coastal sands exposed to salt spray and/or wind erosion		
	see Table 6.16a	
¹ Refer to Table 6.11a for soil suitability limitations.		

Table 6.11c
Seeding No. 1M for: Steep
Slopes, Average Soil; Low
Maintenance

Seeding mixture		
	Species¹	Rate (lb/acre)
	Tall fescue	100
	Sericea lespedeza	20
	Korean lespedeza	10
	Redtop	5
	Kentucky bluegrass	5
Seeding note		
After Aug. 1, use unscarified seed for sericea lespedeza.		
Nurse plants		
Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain). It may be beneficial to plant the grasses in late summer and overseed the lespedezas in March.		
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Complete seeding earlier in fall, and start later in spring on north- and east-facing slopes.		
Soil amendments		
Apply lime and fertilizer according to soil tests or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 5-10-10 fertilizer.		
Mulch		
Apply 4,000-5,000 lb/acre grain straw or equivalent cover of another suitable mulching material. Anchor mulch by tacking with asphalt, roving, or netting. Netting is the preferred anchoring method on steep slopes.		
Maintenance		
Mow no more than once a year. Refertilize in the second year unless growth is fully adequate. Reseed, fertilize, and mulch damaged areas immediately.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11d
Seeding No. 2M for: Gentle to Steep Slopes, Stony, Dry Soils; Low Maintenance

Seeding mixture		
	Species¹	Rate (lb/acre)
	Tall fescue	40
	Crown vetch	10
	Korean lespedeza	10
	Redtop	5
Seeding note		
If occasional mowing is desired, substitute 20 lb/acre sericea lespedeza for crown vetch.		
Nurse plants		
Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).		
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1	July 25 - Sept. 15
	Mar. 1 - Apr. 1	Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15	July 15 - Aug. 30
	Mar. 20 - Apr. 20	Mar. 5 - May 15
Complete seeding earlier in fall, and start later in spring on north- and east-facing slopes.		
Soil amendments		
Follow recommendations of soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 5-10-10 fertilizer.		
Mulch		
Apply 4,000-5,000 lb/acre grain straw or equivalent cover of another suitable mulching material. Anchor mulch by tacking with asphalt, roving, or netting. Netting is the preferred anchoring method on steep slopes.		
Maintenance		
Do not mow crown vetch. Refertilize in the second year unless growth is fully adequate. Reseed, fertilize and mulch damaged areas immediately.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11e
Seeding No. 3M for: Gentle
Slopes, Average Soils; Low
Maintenance

Seeding mixture		Rate (lb/acre)
Species¹		
Tall fescue		60
Kentucky bluegrass		10
Sericea lespedeza		15
Korean lespedeza		10
Seeding note		
1. After Aug. 15, use unscarified sericea seed.		
2. Where appearance is a consideration, omit sericea lespedeza and increase Korean lespedeza to 40 lb/acre.		
Nurse plants		
Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).		
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept. 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Soil amendments		
Apply lime and fertilizer according to soil tests or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.		
Mulch		
Apply 4,000 lb/acre grain straw. Anchor straw by tacking with asphalt, netting, roving, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.		
Maintenance		
Refertilize in the second year unless growth is fully adequate. May be mowed once or twice per year, but mowing is not necessary. Reseed, fertilize, and mulch damaged areas immediately.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11f
Seeding No. 4M for: Gentle
Slopes, Full Sun; High
Maintenance

Seeding mixture		Rate (lb/acre)
Species¹		
Kentucky bluegrass (mixture of at least three improved varieties and no companion plants)		75-100
Seeding note		
In shady locations, 40% by weight fine fescue, such as hard, red, or Chewings red fescue may be substituted.		
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept. 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Soil amendments		
Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.		
Mulch		
Apply 3,000-4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor mulch by tacking with asphalt, roving, netting, or by rolling and wetting.		
Maintenance		
Refertilize annually in late winter and again in the fall. Turf-type fertilizer is preferable, although more expensive and not essential. Reseed, fertilize, and mulch damaged areas immediately.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11g
Seeding No. 5M for: Gentle
Slopes, Full Sun,
Drought-prone Soils; High
Maintenance

Seeding mixture		Rate (lb/acre)
Species¹		
Tall fescue (KY-31 or a 50:50 blend of two turf-type tall fescues)		200-250
50:50 mix of two improved bluegrass varieties.		25-50
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept. 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Soil amendments		
Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,500 lb/acre 10-10-10 fertilizer.		
Mulch		
Apply 3,000-4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor mulch by tacking with asphalt, roving, netting, or by rolling and watering.		
Maintenance		
Refertilize annually in late winter and again in fall. Turf-type fertilizer is preferable but not essential. Seed, fertilize, and mulch bare spots immediately, and reseed poor stands with the same mixture in the fall.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11h
Seeding No. 6M for: Gentle
Slopes, Sun or Semi-Shade;
High Maintenance;
Minimum-care Lawns

Seeding mixture		Rate (lb/acre)
Species¹		
Tall fescue blend (equal parts of two or preferably three turf-type tall fescues)		200-250
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept. 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Soil amendments		
Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,200 lb/acre 10-10-10 fertilizer.		
Mulch		
Apply 3,000-4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor mulch by tacking with asphalt, roving, netting, or by rolling and wetting.		
Maintenance		
The bunch-type habit of tall fescue restricts its spread into damaged areas. Reseed bare spots in the fall. Refertilize annually in late winter and again in fall. Reseed, fertilize, and mulch damaged areas immediately.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11i
Seeding No. 7M for: Gentle
to Steep Slopes, Stony, Dry
Soils; Low Maintenance

Seeding mixture	
Species¹	Rate (lb/acre)
Black locust	3
Korean lespedeza	10
Weeping lovegrass	2
Redtop	1
Winter rye (grain)	15
Seeding dates	
Feb. 15 - Apr. 1	
<p>Fall seeding is impractical; the heavier rate of rye and fertilizer required to control erosion over winter would result in excessive competition with the tree seedlings.</p>	
Soil amendments	
<p>Apply lime and fertilizer according to soil tests, or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 5-10-10 fertilizer.</p>	
Mulch	
<p>Apply 4,000-5,000 lb/acre grain straw or equivalent cover of another suitable mulching material. Stabilize mulch by tacking with asphalt, roving, or netting. Netting is the preferred method on steep slopes.</p>	
Maintenance	
<p>Refertilize only if cover is too weak. Restrict amounts of fertilizer and seed to minimize competition with tree seedlings.</p>	
<p>¹Refer to <i>Appendix 8.02</i> for botanical names.</p>	

Table 6.11j
Seeding No. 8M for:
Grass-lined Channels;
Mountains and Upper
Piedmont

Seeding mixture		Rate (lb/acre)
Species¹		
	Tall fescue	175-200 (3 lb/1,000 ft ²)
	Kentucky bluegrass	20 (1 lb/1,000 ft ²)
Nurse plants		
Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).		
Seeding dates		
	Best	Possible
Below 2500 ft:	Aug. 15 - Sept. 1 Mar. 1 - Apr. 1	July 25 - Sept. 15 Mar. 1 - May 10
Above 2500 ft:	July 25 - Aug. 15 Mar. 20 - Apr. 20	July 15 - Aug. 30 Mar. 5 - May 15
Soil amendments		
Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,200 lb/acre 10-10-10 fertilizer.		
Mulch		
Use a rolled erosion control product to cover the bottom of channels and ditches. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary linings, apply 4,000 lb/acre grain straw and anchor straw by stapling netting over the top.		
Mulch and anchoring materials must not be allowed to wash down slope where they can clog drainage devices.		
Maintenance		
Inspect and repair mulch frequently. Refertilize in late winter according to soil tests or apply 150 lb/acre 10-10-10 fertilizer (3 lb/1,000 ft ²). Mow regularly to a height of 2-4 inches.		
¹ Refer to <i>Appendix 8.02</i> for botanical names.		

Table 6.11k
Seeding No. 1P for: Steep
Slopes or Poor Soils; Low
Maintenance

Seeding mixture		
Species¹	Rate (lb/acre)	
Tall fescue	100	
Sericea lespedeza	30	
Kobe lespedeza	10	
Seeding notes		
<p>1. In Eastern Piedmont, add 25 lb/acre Pensacola Bahiagrass or 10 lb/acre common Bermudagrass. Use common Bermudagrass only where it is unlikely to become a pest.</p> <p>2. After Aug. 15, use unscarified sericea seed.</p> <p>3. Where a neat appearance is desired, omit sericea and substitute 40 lb/acre Bahiagrass or 15 lb/acre Bermudagrass.</p> <p>4. To extend spring seeding dates into June, add 15 lb/acre hulled Bermudagrass. However, it is preferable to seed temporary cover and seed fescue in Sept.</p>		
Nurse plants		
<p>Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).</p>		
Seeding dates		
	Best	Possible
Fall:	Aug. 25 - Sept. 15	Aug. 20 - Oct. 25
Late Winter:	Feb. 15 - Mar. 21	Feb. 1 - Apr. 15
<p>Fall is best for tall fescue, and lespedezas in late winter. Overseeding of Kobe lespedeza over fall-seeded tall fescue is very effective. Use unhulled Bermudagrass seed in fall.</p>		
Soil amendments		
<p>Apply lime and fertilizer according to soil tests or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.</p>		
Mulch		
<p>Apply 4,000-5,000 lb/acre grain straw or equivalent cover of another suitable mulching material. Anchor mulch by tacking with asphalt, roving, or netting. Netting is the preferred anchoring method on steep slopes.</p>		
Maintenance		
<p>Refertilize in the second year unless growth is fully adequate. May be mowed once or twice a year, but mowing is not necessary. Reseed, fertilize, and mulch damaged areas immediately.</p>		
<p>¹Refer to <i>Appendix 8.02</i> for botanical names.</p>		

Table 6.111
Seeding No. 2P for: Gentle
Slopes, Average Soil; Low
Maintenance

Seeding mixture

Species¹	Rate (lb/acre)
Tall fescue	80
Sericea lespedeza	20
Kobe lespedeza	10

Seeding notes

1. After Aug. 15, use unscarified sericea seed.
2. Where periodic mowing is planned or a neat appearance is desired, omit sericea and increase Kobe lespedeza to 40 lb/acre.
3. To extend spring seeding dates into June, add 15 lb/acre hulled Bermudagrass. However, after mid-Apr. it is preferable to seed temporary cover.

Nurse plants

Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).

Seeding dates

	Best	Possible
Fall:	Aug. 25 - Sept. 15	Aug. 20 - Oct. 25
Late Winter:	Feb. 15 - Mar. 21	Feb. 1 - Apr. 15

Fall is best for tall fescue and late winter for lespedezas. Overseeding of Kobe lespedeza over fall-seeded tall fescue is very effective.

Soil amendments

Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or roving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

Refertilize in the second year unless growth is fully adequate. May be mowed once or twice a year, but mowing is not necessary. Reseed, fertilize, and mulch damaged areas immediately.

¹Refer to *Appendix 8.02* for botanical names.

**Table 6.11m
Seeding No. 3P for: Gentle
Slopes, Soils with Average
or Better Moisture
Retention,
Cooler Sites; High
Maintenance**

Seeding mixture		
	Species¹	Rate (lb/acre)
	Blend of two turf-type tall fescues (90%) and two or more improved Kentucky bluegrass varieties (10%)	200-250
Seeding dates		
	Best	Possible
Fall:	Aug. 25 - Sept. 15	Aug. 20 - Oct. 25
Winter:	—	Feb. 1 - Mar. 31
<p>For quality turf, avoid spring seeding. Where grading is completed during late winter or spring, an alternative is to seed 30 lb/acre Kobe lespedeza, keep mowed, prepare seedbed, and seed a permanent mixture in early fall.</p>		
Soil amendments		
<p>Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.</p>		
Mulch		
<p>Apply 4,000 lb/acre small grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, roving, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.</p>		
Maintenance		
<p>Fertilize according to soil tests or apply 40 lb/acre nitrogen in Jan. or Feb., 40 lb in Sept., and 40 lb in Nov., from a 12-4-8, 16-4-8, or similar turf fertilizer. Avoid fertilizer applications during warm weather, as this increases stand losses to disease. Mow to a height of 2.5-3.5 inches as needed. Reseed, fertilize, and mulch damaged areas immediately.</p>		
<p>¹Refer to <i>Appendix 8.02</i> for botanical names.</p>		

Table 6.11n
Seeding No. 4P for: Gentle
Slopes, Soils Somewhat
Warmer or Drier than 3P, or
with Physical Limitations;
High Maintenance

Seeding mixture		
	Species¹	Rate (lb/acre)
	Blend of 50% KY-31 tall fescue and 50% mixture of two or more turf-type tall fescues	200-250
	or	
	Blend of three or more turf-type tall fescues	200-250
Seeding dates		
	Best	Possible
Fall:	Aug. 25 - Sept. 15	Aug. 20 - Oct. 25
Winter:	—	Feb. 1 - Mar. 31
<p>For quality turf, avoid spring seeding. Where grading is completed during late winter or spring, an alternative is to seed 30 lb/acre Kobe lespedeza, keep mowed, prepare seedbed, and seed permanent mixture between Aug. 25 and Sept. 15.</p>		
Soil amendments		
<p>Apply lime and fertilizer according to soil tests or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.</p>		
Mulch		
<p>Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, roving, netting, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.</p>		
Maintenance		
<p>Fertilize according to soil tests or apply 40 lb/acre nitrogen in Jan. or Feb., 40 lb in Sept., and 40 lb in Nov., from a 12-4-8, 16-4-8, or similar turf fertilizer. Avoid fertilizer applications during warm weather, as this increases stand losses to disease. Reseed, fertilize, and mulch damaged areas immediately. Mow to a height of 2.5-3.5 inches as needed.</p>		
<p>¹Refer to <i>Appendix 8.02</i> for botanical names.</p>		

Table 6.11o
Seeding No. 5P for:
Grass-lined Channels

Seeding mixture	Rate (lb/acre)
<p>Species¹</p> <p>Tall fescue</p>	<p>200 (4-5 lb/1,000 ft²)</p>
<p>Nurse plants</p> <p>Between May 1 and Aug. 15, add 15 lb/acre Sudangrass or 15 lb/acre German millet. Prior to May 1 or after Aug. 15, add 40 lb/acre rye (grain).</p>	
<p>Seeding dates</p> <p>Best: Aug. 25 - Oct.</p> <p>Possible: Feb. - Apr. 15</p> <p>Avoid seeding from Nov. to Jan. If seeding must be done at this time, add 40 lb/acre rye grain and use a channel lining that offers maximum protection.</p>	
<p>Soil amendments</p> <p>Apply lime and fertilizer according to soil tests, or apply 4,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer. Operate tillage equipment across the waterway.</p>	
<p>Mulch</p> <p>Use a rolled erosion control product to cover the bottom of channels and ditches, and staple securely. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary linings, apply 4,000 lb/acre grain straw, and anchor straw by stapling netting over the top.</p> <p>Mulch and anchoring materials must not be allowed to wash down slopes where they can clog drainage devices.</p>	
<p>Maintenance</p> <p>Inspect and repair mulch frequently. Refertilize in late winter of the following year; use soil tests or apply 150 lb/acre 10-10-10. Mow regularly to a height of 2-4 inches.</p>	
<p>¹Refer to <i>Appendix 8.02</i> for botanical names.</p>	

Table 6.11p
Seeding No. 1CP for: Well-to
Poorly Drained Soils with
Good Moisture Retention;
Low Maintenance

Seeding mixture

Species¹	Rate (lb/acre)
Tall fescue	80
Pensacola Bahiagrass	50
Sericea lespedeza	30
Kobe lespedeza	10

Seeding notes

1. From Sept. 1 - Mar. 1, use unscarified sericea seed.
2. On poorly drained sites, omit sericea and increase Kobe to 30 lb/acre.
3. Where a neat appearance is desired, omit sericea and increase Kobe to 40 lb/acre.

Nurse plants

Between Apr. 15 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 25 lb/acre rye (grain).

Seeding dates

	Best	Possible
Early spring:	Feb. 15 - Mar. 20	Feb. 15 - Apr. 30
Fall:	Sept. 1 - Sept. 30	Sept. 1 - Oct. 31

Soil amendments

Apply lime and fertilizer according to soil tests, or apply 3,000-5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, roving, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

If growth is less than fully adequate, refertilize in the second year, according to soil tests or topdress with 500 lb/acre 10-10-10 fertilizer. Mow as needed when sericea is omitted from the mixture. Reseed, fertilize, and mulch damaged areas immediately.

¹Refer to *Appendix 8.02* for botanical names.

Table 6.11q
Seeding No. 2CP for: Well-to
Poorly Drained Soils with
Good Moisture Retention;
High Maintenance

Seeding mixture	Rate (lb/acre)
Species¹	
Tall fescue (blend of two or three improved varieties)	200
Rye (grain)	25
Seeding dates	
Best: Sept. 15 - Oct. 15	
Possible: Sept. 1 - Oct. 31 or Feb. 15 - Apr. 30	
Soil amendments	
Apply lime and fertilizer according to soil tests or apply 3,000-5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.	
Mulch	
Apply 4,000 lb/acre small straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, roving, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
Maintenance	
Fertilize according to soil tests or apply 40 lb/acre nitrogen in Jan. or Feb., 40 lb in Sept., and 40 lb in Nov., from a 12-4-8, 16-4-8, or similar turf fertilizer. Avoid fertilizer applications during warm weather, as this increases stand losses to disease. Reseed, fertilize, and mulch damaged areas immediately. Mow to a height of 2.5-3.5 inches as needed.	
¹ Refer to <i>Appendix 8.02</i> for botanical names.	

Table 6.11r
Seeding No. 3CP for: Dry
Sands to Sandy Loams;
High Maintenance, Fine Turf

Seeding mixture	Rate (bu/1,000 ft²)
Species¹	
Tifway or Tifway II hybrid Bermudagrass	Minimum: 3 Rapid cover: 10

Seeding notes:

1. Sprig or sod (Practice 6.12, *Sodding*). Moisture is essential during initial establishment. Sod must be kept well watered for 2-3 weeks, but can be planted earlier or later than sprigs.
2. Common Bermuda can be seeded or sprigged, but does not produce a high-quality turf. It is also less cold tolerant than the hybrids, more weed prone, and a pest in flower beds and specimen plantings.

Planting dates

Apr. - July

Soil amendments

Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer, or 50 lb/acre nitrogen from turf-type slow-release fertilizer. Add 25-50 lb/acre nitrogen at 2-to-3 week intervals through midsummer.

Sprigging

Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand.

Furrows should be 4-6 inches deep and 2 feet apart. Place sprigs about 2 feet apart in the row with one end at or above ground level (Figure 6.11d).

Broadcast at rates shown above, and press sprigs into the top 1/2-2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.

Mulch

Do not mulch.

Maintenance

Water as needed and mow to 3/4- to 1-inch height. Topdress with 40 lb/acre nitrogen in Apr., 50 lb in May, 50 lb in June, 30 lb in July, and 25-50 lb in Aug.

¹Refer to *Appendix 8.02* for botanical names.

Table 6.11s
Seeding No. 4CP for:
Well-Drained Sandy Loams to
Dry Sands, Coastal Plain and
Eastern Edge of Piedmont;
Low- to Medium-Care Lawns

Seeding mixture	Rate
Species¹ Centipedegrass	10-20 lb/acre (seed) or 33 bu/acre (sprigs)
Seeding dates Mar. - June (Sprigging can be done through July where water is available for irrigation.)	
Soil amendments Apply lime and fertilizer according to soil tests, or apply 300 lb/acre 10-10-10 fertilizer.	
Sprigging Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand.	
Furrows should be 4-6 inches deep and 2 feet apart. Place sprigs about 2 feet apart in the row with one end at or above ground level (Figure 6.11d).	
Broadcast at rates shown above, and press sprigs into the top 1/2-2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.	
Mulch Do not mulch.	
Maintenance Fertilize very sparingly—20 lb/acre nitrogen in spring with no phosphorus . Centipedegrass cannot tolerate high pH or excess fertilizer.	
¹ Refer to <i>Appendix 8.02</i> for botanical names.	

Table 6.11t
Seeding No. 5CP for:
Well-Drained Sandy Loams
to Dry Sands; Low
Maintenance

Seeding mixture	
Species¹	Rate (lb/acre)
Pensacola Bahiagrass	50
Sericea lespedeza	30
Common Bermudagrass	10
German millet	10

Seeding notes

1. Where a neat appearance is desired, omit sericea.
2. Use a common Bermudagrass only on isolated sites where it cannot become a pest. Bermudagrass may be replaced with 5 lb/acre centipedegrass.

Seeding dates

Apr.1 - July 15

Soil amendments

Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer.

Mulch

Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor by tacking with asphalt, roving, netting, or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance

Refertilize the following Apr. with 50 lb/acre nitrogen. Repeat as growth requires. May be mowed only once a year. Where a neat appearance is desired, omit sericea and mow as often as needed.

¹Refer to *Appendix 8.02* for botanical names.

**Table 6.11u
Seeding No. 6CP for:
Intertidal Zones of Estuarine
Shorelines, Dredged
Material, and Graded Areas
in Salt Water**

Seeding mixture Species¹	Planting Zone (Figure 6.11e)
Smooth cordgrass	mean sea level to mean high water
Saltmeadow cordgrass	mean high water to average high water of storm tides
Giant cordgrass	irregularly flooded areas where salinity does not exceed 10 (ppt)
Spacing 2x2 feet	
Planting dates Apr. - June	
Site suitability Periodic flooding and draining is necessary for good growth. In North Carolina, estuaries south of Cape Lookout, and areas near inlets where diurnal lunar tides range 2 to 5 feet provide a relatively wide intertidal zone for growth of smooth cordgrass. Larger estuaries north of Cape Lookout, where water level is determined primarily by wind and freshwater runoff, provide only a narrow intertidal zone in which plantings must be placed precisely according to elevation.	
Source of plants Greenhouse-grown seedlings may be obtained from commercial sources, but usually only by contract orders. Plants may be dug from existing stands. Select plants from recently established marshes with open stands or marsh edges where plants are vigorous and the root mat is not dense. Digging and separating is easier in sand. Disposal areas for sandy, dredged materials often provide a good source of plants. Care should be taken to minimize damage to existing marshes. Once plants are dug, prevent them from dying by packing the roots in moist sand in buckets or tubs.	
Planting methods Hand planting may be done by opening holes 4-6 inches deep with a dibble or shovel, inserting a single stem, and packing the soil around it. Large, firm areas may be planted with a tractor-drawn transplanter (tobacco or vegetable transplanter).	
(Table 6.11u continued)	

**Table 6.11u
(continued)**

Fertilization

Lime and fertilizer should be applied at rates recommended by a soil test (ask for recommendations for fescue). Without a soil test, apply 2 tons/acre lime, 100 lb/acre nitrogen (preferably an all-ammonium source), and 200 lb/acre P_2O_5 . Potassium is not required. Fertilizer may be broadcast and incorporated before planting if the site can be graded and planted before flooding occurs. Incorporate all amendments into the upper 4-6 inches of soil.

If the area to be planted is flooded regularly, apply fertilizer below the surface at planting. Slow-release fertilizers are more effective since they supply nitrogen over a longer period of time, and can be placed in the planting hole with little risk of damaging the roots. If soluble (quick-release) materials are used, cover with 2 inches of soil before inserting plant. Osmocote (14-14-14 or 18-6-12) is an effective slow-release material that can be placed in the planting hole at the rate of 0.5 to 1.0 oz (2-4 teaspoons) per plant.

Maintenance

Where plantings are exposed to wave action, replace plants that are washed out. In the second and third growing seasons, broadcast nitrogen and P_2O_5 at 150 lb/acre split into three equal applications in Apr., June, and Aug. Always apply fertilizer at low tide.

**Table 6.11v
Seeding No. 7CP for:
Grass-lined Channels;
Coastal Plain, Lower
Piedmont, and Dry Soils in
the Central Piedmont**

Seeding mixture Species¹	Rate (lb/acre)
Common Bermudagrass	40-80 (1-2 lb/1,000 ft ²)
Seeding dates	
Coastal Plain: Apr. - July	
Piedmont: Apr. 15 - June 30	
Soil amendments	
Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer	
Mulch	
Use a rolled erosion control product to cover the bottom of channels and ditches. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height and in drainages not requiring temporary linings, apply 4,000 lb/acre grain straw, and anchor straw by stapling netting over the top.	
Mulch and anchoring materials must not be allowed to wash down slopes where they can clog drainage devices.	
Maintenance	
A minimum of 3 weeks is required for establishment. Inspect and repair mulch frequently. Refertilize the following Apr. with 50 lb/acre nitrogen.	
¹ Refer to <i>Appendix 8.02</i> for botanical names.	

6.55



ROCK PIPE INLET PROTECTION

Definition A horseshoe shaped rock dam structure at a pipe inlet with a sediment storage area around the outside perimeter of the structure.

Purpose To prevent sediment from entering, accumulating in and being transferred by a culvert or storm drainage system prior to stabilization of the disturbed drainage area. This practice allows early use of the storm drainage system.

Conditions Where Practice Applies Rock pipe inlet protection may be used at pipes with a maximum diameter of 36 inches. This inlet protection may be used to supplement additional sediment traps or basins at the pipe outlet, or used in combination with an excavated sediment storage area to serve as a temporary sediment trap. Pipe inlet protection should be provided to protect the storm drainage system and downstream areas from sedimentation until permanent stabilization of the disturbed drainage area.

Do not install this measure in an intermittent or perennial stream.

Planning Considerations When construction on a project reaches a stage where culverts and other storm drainage structures are installed and many areas are brought to the desired grade, there is a need to protect the points where runoff can leave the site through culverts or storm drains. Similar to drop and curb inlets, culverts receiving runoff from disturbed areas can convey large amounts of sediment to lakes or streams. Even if the pipe discharges into a sediment trap or basin, the pipe or pipe system itself may clog with sediment.

Design Criteria When used in combination with an excavated sediment storage area to serve as a temporary sediment trap, the design criteria for temporary sediment traps must be satisfied. The maximum drainage area should be 5 acres, and 3600 cubic feet of sediment storage per acre of disturbed drainage area should be provided.

The minimum stone height should be 2 feet, with side slopes no steeper than 2:1. The stone “horseshoe” around the pipe inlet should be constructed of Class B or Class I riprap, with a minimum crest width of 3 feet. The outside face of the riprap should be covered with a 12-inch thick layer of #5 or #57 washed stone.

In preparing plans for rock pipe inlet protection, it is important to protect the embankment over the pipe from overtopping. The top of the stone should be a minimum of 1 foot below the top of the fill over the pipe. The stone should tie into the fill on both sides of the pipe. The inside toe of the stone should be no closer than 2 feet from the culvert opening to allow passage of high flows.

The sediment storage area should be excavated upstream of the rock pipe inlet protection, with a minimum depth of 18 inches below grade.

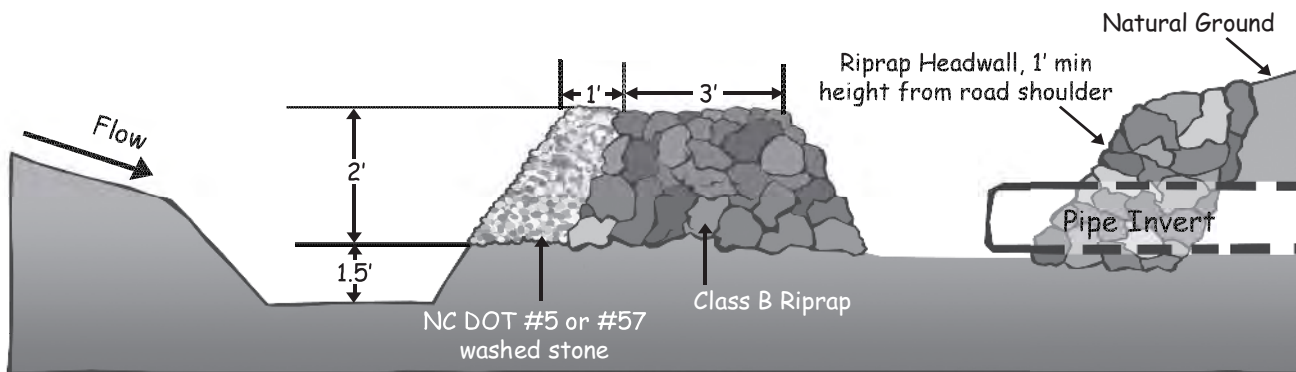
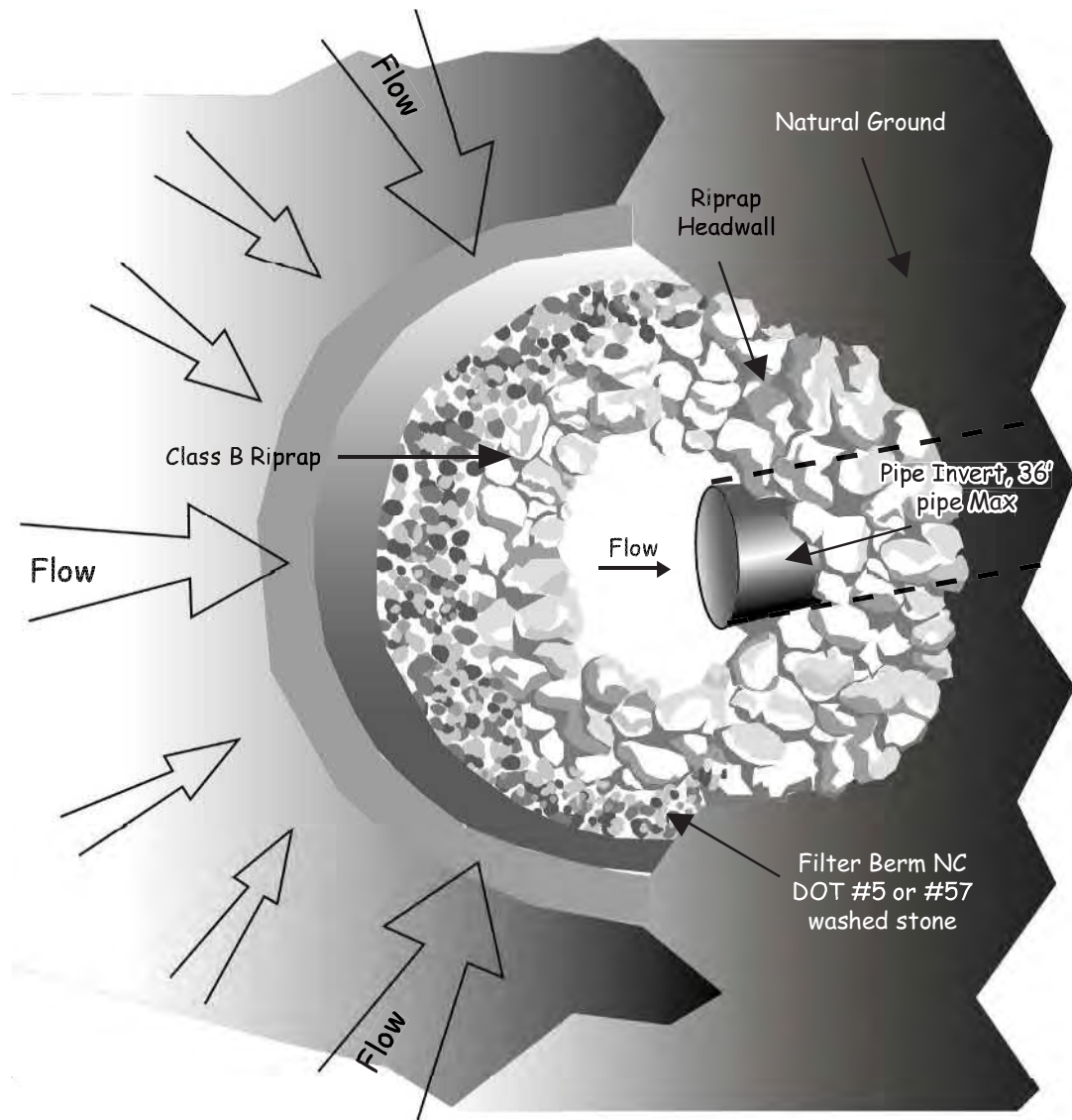


Figure 6.55a Rock pipe inlet protection plan view and cross-section view

Construction Specifications

1. Clear the area of all debris that might hinder excavation and disposal of spoil.
2. Install the Class B or Class I riprap in a semi-circle around the pipe inlet. The stone should be built up higher on each end where it ties into the embankment. The minimum crest width of the riprap should be 3 feet, with a minimum bottom width of 11 feet. The minimum height should be 2 feet, but also 1 foot lower than the shoulder of the embankment or diversions.
3. A 1 foot thick layer of NC DOT #5 or #57 stone should be placed on the outside slope of the riprap.
4. The sediment storage area should be excavated around the outside of the stone horseshoe 18 inches below natural grade.
5. When the contributing drainage area has been stabilized, fill depression and establish final grading elevations, compact area properly, and stabilize with ground cover.

Maintenance

Inspect rock pipe inlet protection at least weekly and after each significant ($\frac{1}{2}$ inch or greater) rainfall event and repair immediately. Remove sediment and restore the sediment storage area to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in the designated disposal area and replace the contaminated part of the gravel facing.

Check the structure for damage. Any riprap displaced from the stone horseshoe must be replaced immediately.

After all the sediment-producing areas have been permanently stabilized, remove the structure and all the unstable sediment. Smooth the area to blend with the adjoining areas and provide permanent ground cover (*Surface Stabilization*).

References

Inlet protection

6.52, Block and Gravel Inlet Protection (Temporary)

Sediment Trap and Barriers

6.60, Temporary Sediment Trap

Surface Stabilization

6.15, Riprap

North Carolina Department of Transportation

Erosion & Sedimentation Guidelines for Division Maintenance Operation, 1993.

Virginia Erosion and Sediment Control Handbook. 1992. STD & SPEC 3.08, Culvert Inlet Protection. pages III-46 - III-51 (Culvert Inlets Sediment Trap).

The permissible velocity procedure is recommended for the design of vegetative channels because of common usage and the availability of reliable design tables. The tractive force approach is recommended for design of channels with temporary synthetic liners or riprap liners. The tractive force procedure is described in full in the U.S. Department of Transportation, Federal Highway Administration Bulletin, *Design of Roadside Channels with Flexible Linings*.

Permissible Velocity Procedure

The permissible velocity procedure uses two equations to calculate flow: Manning's equation,

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

where:

- V = average velocity in the channel in ft/sec.
- n = Manning's roughness coefficient, based upon the lining of the channel
- R = hydraulic radius, wetted cross-sectional area/wetted perimeter in ft
- S = slope of the channel in ft/ft

and the continuity equation,

$$Q = AV$$

where:

- Q = flow in the channel in cfs
- A = cross-sectional area of flow within the channel in ft²
- V = average velocity in the channel in ft/sec.

Manning's equation and the continuity equation are used together to determine channel capacity and flow velocity. A nomograph for solving Manning's equation is given in Figure 8.05a.

Selecting Permanent Channel Lining

Channel lining materials include such flexible materials as grass, riprap and gabions, as well as rigid materials such as paving blocks, flag stone, gunite, asphalt, and concrete. The design of concrete and similar rigid linings is generally not restricted by flow velocities. However, flexible channel linings do have maximum permissible flow velocities beyond which they are susceptible to erosion. The designer should select the type of liner that best fits site conditions.

Table 8.05a lists maximum permissible velocities for established grass linings and soil conditions. Before grass is established, permissible velocity is determined by the choice of temporary liner. Permissible velocities for riprap linings are higher than for grass and depend on the stone size selected.

Table 8.05a
Maximum Allowable Design Velocities¹
for Vegetated Channels

Typical Channel Slope Application	Soil Characteristics ²	Grass Lining	Permissible Velocity ³ for Established Grass Lining (ft/sec)
0-5%	Easily Erodible Non-plastic (Sands & Silts)	Bermudagrass	5.0
		Tall fescue	4.5
		Bahiagrass	4.5
		Kentucky bluegrass	4.5
		Grass-legume mixture	3.5
	Erosion Resistant Plastic (Clay mixes)	Bermudagrass	6.0
		Tall fescue	5.5
		Bahiagrass	5.5
		Kentucky bluegrass	5.5
		Grass-legume mixture	4.5
5-10%	Easily Erodible Non-plastic (Sands & Silts)	Bermudagrass	4.5
		Tall fescue	4.0
		Bahiagrass	4.0
		Kentucky bluegrass	4.0
		Grass-legume mixture	3.0
	Erosion Resistant Plastic (Clay mixes)	Bermudagrass	5.5
		Tall fescue	5.0
		Bahiagrass	5.0
		Kentucky bluegrass	5.0
		Grass-legume mixture	3.5
>10%	Easily Erodible Non-plastic (Sands & Silts)	Bermudagrass	3.5
		Tall fescue	2.5
		Bahiagrass	2.5
		Kentucky bluegrass	2.5
	Erosion Resistant Plastic (Clay mixes)	Bermudagrass	4.5
		Tall fescue	3.5
		Bahiagrass	3.5
		Kentucky bluegrass	3.5

Source: USDA-SCS Modified

NOTE: ¹Permissible Velocity based on 10-year storm peak runoff
²Soil erodibility based on resistance to soil movement from concentrated flowing water.
³Before grass is established, permissible velocity is determined by the type of temporary liner used.

**Selecting Channel
Cross-Section
Geometry**

To calculate the required size of an open channel, assume the design flow is uniform and does not vary with time. Since actual flow conditions change throughout the length of a channel, subdivide the channel into design reaches, and design each reach to carry the appropriate capacity.

The three most commonly used channel cross-sections are “V”-shaped, parabolic, and trapezoidal. Figure 8.05b gives mathematical formulas for the area, hydraulic radius and top width of each of these shapes.

Design Procedure- Permissible Velocity

The following is a step-by-step procedure for designing a runoff conveyance channel using Manning's equation and the continuity equation:

Step 1. Determine the required flow capacity, Q , by estimating peak runoff rate for the design storm (*Appendix 8.03*).

Step 2. Determine the slope and select channel geometry and lining.

Step 3. Determine the permissible velocity for the lining selected, or the desired velocity, if paved. (see Table 8.05a, page 8.05.4)

Step 4. Make an initial estimate of channel size—divide the required Q by the permissible velocity to reach a “first try” estimate of channel flow area. Then select a geometry, depth, and top width to fit site conditions.

Step 5. Calculate the hydraulic radius, R , from channel geometry (Figure 8.05b, page 8.05.5).

Step 6. Determine roughness coefficient n .

Structural Linings—see Table 8.05b, page 8.05.6.

Grass Lining:

- a. Determine retardance class for vegetation from Table 8.05c, page 8.05.8. To meet stability requirement, use retardance for newly mowed condition (generally C or D). To determine channel capacity, use at least one retardance class higher.
- b. Determine n from Figure 8.05c, page 8.05.7.

Step 7. Calculate the actual channel velocity, V , using Manning's equation (Figure 8.05a, pg. 8.05.3), and calculate channel capacity, Q , using the continuity equation.

Step 8. Check results against permissible velocity and required design capacity to determine if design is acceptable.

Step 9. If design is not acceptable, alter channel dimensions as appropriate. For trapezoidal channels, this adjustment is usually made by changing the bottom width.

Table 8.05b
Manning's n for Structural
Channel Linings

Channel Lining	Recommended n values
Asphaltic concrete, machine placed	0.014
Asphalt, exposed prefabricated	0.015
Concrete	0.015
Metal, corrugated	0.024
Plastic	0.013
Shotcrete	0.017
Gabion	0.030
Earth	0.020

Source: American Society of Civil Engineers (modified)

Step 10. For grass-lined channels once the appropriate channel dimensions have been selected for low retardance conditions, repeat steps 6 through 8 using a higher retardance class, corresponding to tall grass. Adjust capacity of the channel by varying depth where site conditions permit.

NOTE 1: If design velocity is greater than 2.0 ft/sec., a temporary lining may be required to stabilize the channel until vegetation is established. The temporary liner may be designed for peak flow from the 2-year storm. If a channel requires a temporary lining, the designer should analyze shear stresses in the channel to select the liner that provides protection and promotes establishment of vegetation. For the design of temporary liners, use tractive force procedure.

NOTE 2: Design Tables—Vegetated Channels and Diversions at the end of this section may be used to design grass-lined channels with parabolic cross-sections.

Step 11. Check outlet for carrying capacity and stability. If discharge velocities exceed allowable velocities for the receiving stream, an outlet protection structure will be required (Table 8.05d, page 8.05.9).

Sample Problem 8.05a illustrates the design of a grass-lined channel.

Table 8.05c
Retardance Classification for Vegetal Covers

Retardance	Cover	Condition
A	Reed canarygrass Weeping lovegrass	Excellent stand, tall (average 36") Excellent stand, tall (average 30")
B	Tall fescue Bermudagrass Grass-legume mixture (tall fescue, red fescue, sericea lespedeza) Grass mixture (timothy, smooth bromegrass or orchardgrass) Sericea lespedeza Reed canarygrass Alfalfa	Good stand, uncut, (average 18") Good stand, tall (average 12") Good stand, uncut Good stand, uncut (average 20") Good stand, not woody, tall (average 19") Good stand, cut, (average 12-15") Good stand, uncut (average 11")
C	Tall fescue Bermudagrass Bahigrass Grass-legume mixture-- summer (orchardgrass, redtop and annual lespedeza) Centipedegrass Kentucky bluegrass Redtop	Good stand (8-12") Good stand, cut (average 6") Good stand, uncut (6-8") Good stand, uncut (6-8") Very dense cover (average 6") Good stand, headed (6-12") Good stand, uncut (15-20")
D	Tall fescue Bermudagrass Bahigrass Grass-legume mixture-- fall-spring (orchardgrass, redtop, and annual lespedeza) Red fescue Centipedegrass Kentucky bluegrass	Good stand, cut (3-4") Good stand, cut (2.5") Good stand, cut (3-4") Good stand, uncut (4-5") Good stand, uncut (12-18") Good stand, cut (3-4") Good stand, cut (3-4")
E	Bermudagrass Bermudagrass	Good stand, cut (1.5") Burned stubble

Modified from: USDA-SCS, 1969. Engineering Field Manual.

**Table 8.05d
Maximum Permissible
Velocities for Unprotected
Soils in Existing Channels.**

Materials	Maximum Permissible Velocities (fps)
Fine Sand (noncolloidal)	2.5
Sand Loam (noncolloidal)	2.5
Silt Loam (noncolloidal)	3.0
Ordinary Firm Loam	3.5
Fine Gravel	5.0
Stiff Clay (very colloidal)	5.0
Graded, Loam to Cobbles (noncolloidal)	5.0
Graded, Silt to Cobbles (colloidal)	5.5
Alluvial Silts (noncolloidal)	3.5
Alluvial Silts (colloidal)	5.0
Coarse Gravel (noncolloidal)	6.0
Cobbles and Shingles	5.5

**Sample Problem 8.05a
Design of a
Grass-lined Channel.**

Given:
 Design $Q_{10} = 16.6$ cfs
 Proposed channel grade = 2%
 Proposed vegetation: Tall fescue
 Soil: Creedmoor (easily erodible)
 Permissible velocity, $V_p = 4.5$ ft/s (Table 8.05a)
 Retardance class: "B" uncut, "D" cut (Table 8.05c).
 Trapezoidal channel dimensions:
 designing for low retardance condition (retardance class D)
 design to meet V_p .

Find:
 Channel dimensions

Solution:
 Make an initial estimate of channel size
 $A = Q/V$, $16.6 \text{ cfs}/4.5 \text{ ft/sec} = 3.69 \text{ ft}^2$
 Try bottom width = 3.0 ft w/side slopes of 3:1
 $Z = 3$
 $A = bd + Zd^2$
 $P = b + 2d\sqrt{Z^2 + 1}$
 $R = AP$

An iterative solution using Figure 8.05a to relate flow depth to Manning's n proceeds as follows: Manning's equation is used to check velocities.
 *From Fig. 8.05c, pg. 8.05.7, Retardance Class d ($VR=4.5 \times 0.54=2.43$)

d (ft)	A (ft ²)	R (ft)	*n	V _t (fps)	Q (cfs)	Comments
0.8	4.32	0.54	0.043	3.25	14.0	$V < V_p$, OK, $Q < Q_{10}$
(too small, try deeper channel)						
0.9	5.13	0.59	0.042	3.53	18.10	$V < V_p$, OK, $Q > Q_{10}$, OK

Now design for high retardance (class B):
 For the ease of construction and maintenance assume and try $d = 1.5$ ft and trial velocity $V_t = 3.0$ ft/sec

d (ft)	A (ft ²)	R (ft)	V _t (fps)	n	V (fps)	Q (cfs)	Comments	
1.5	11.25	0.90	3.0	0.08	2.5	28	reduce V_t	
					0.11	1.8	20	reduce V_t
					0.12	1.6	18	
			**1.5	0.13	1.5	17	$Q > Q_{10}$ OK	

** These assumptions = actual V (fps.) (chart continued on next page)

(continued)
Sample Problem 8.05a
Design of a
Grass-lined Channel.

Channel summary:
 Trapezoidal shape, $Z = 3$, $b = 3$ ft, $d = 1.5$ ft, grade = 2%
 Note: In Sample Problem 8.05a the “n-value” is first chosen based on a permissible velocity and not a design velocity criteria. Therefore, the use of Table 8.05c may not be as accurate as individual retardance class charts when a design velocity is the determining factor.

Tractive Force
Procedure

The design of riprap-lined channels and temporary channel linings is based on analysis of tractive force.

NOTE: This procedure is for uniform flow in channels and is *not* to be used for design of deenergizing devices and may not be valid for larger channels.

To calculate the required size of an open channel, assume the design flow is uniform and does not vary with time. Since actual flow conditions change through the length of a channel, subdivide the channel into design reaches as appropriate.

PERMISSIBLE SHEAR STRESS

The permissible shear stress, T_p , is the force required to initiate movement of the lining material. Permissible shear stress for the liner is not related to the erodibility of the underlying soil. However, if the lining is eroded or broken, the bed material will be exposed to the erosive force of the flow.

COMPUTING NORMAL DEPTH

The first step in selecting an appropriate lining is to compute the design flow depth (the normal depth) and determine the shear stress.

Normal depths can be calculated by Manning’s equation as shown for trapezoidal channels in Figure 8.05d. Values of the Manning’s roughness coefficient for different ranges of depth are provided in Table 8.05e for temporary linings and Table 8.05f for riprap. The coefficient of roughness generally decreases with increasing flow depth.

Table 8.05e
Manning’s Roughness
Coefficients for Temporary
Lining Materials

n value for Depth Ranges*			
	0-0.5 ft	0.5-2.0 ft	>2.0 ft
Lining Type			
Woven Paper Net	0.016	0.015	0.015
Jute Net	0.028	0.022	0.019
Fiberglass Roving	0.028	0.021	0.019
Straw with Net	0.065	0.033	0.025
Curled Wood Mat	0.066	0.035	0.028
Synthetic Mat	0.036	0.025	0.021

* Adapted from: FHWA-HEC 15, Pg. 37 - April 1988

Table 8.05f Manning's Roughness Coefficient

Lining Category	Lining Type	<i>n</i> - value		
		<i>n</i> value for Depth Ranges		
		0-0.5 ft (0-15 cm)	0.5-2.0 ft (15-60 cm)	2.0 ft (>60 cm)
Rigid	Concrete	0.015	0.013	0.013
	Grouted Riprap	0.040	0.030	0.028
	Stone Masonry	0.042	0.032	0.030
	Soil Cement	0.025	0.022	0.020
	Asphalt	0.018	0.016	0.016
Unlined	Bare Soil	0.023	0.020	0.020
	Rock Cut	0.045	0.035	0.025
Gravel Riprap	1-inch (2.5-cm) D_{50}	0.044	0.033	0.030
	2-inch (5-cm) D_{50}	0.066	0.041	0.034
Rock Riprap	6-inch (15-cm) D_{50}	0.104	0.069	0.035
	12-inch (30-cm) D_{50}	--	0.078	0.040

Note: Values listed are representative values for the respective depth ranges. Manning's roughness coefficients, *n*, vary with the flow depth.

DETERMINING SHEAR STRESS

Shear stress, T , at normal depth is computed for the lining by the following equation:

$$T = yds$$

$$T_d = \text{Permissible shear stress}$$

where:

- T = shear stress in lb/ft²
- y = unit weight of water, 62.4 lb/ft³
- d = flow depth in ft
- s = channel gradient in ft/ft

If the permissible shear stress, T_d , given in Table 8.05g is greater than the computed shear stress, the riprap or temporary lining is considered acceptable. If a lining is unacceptable, select a lining with a higher permissible shear stress and repeat the calculations for normal depth and shear stress. In some cases it may be necessary to alter channel dimensions to reduce the shear stress.

Computing tractive force around a channel bend requires special considerations because the change in flow direction imposes higher shear stress on the channel bottom and banks. The maximum shear stress in a bend, T_b , is given by the following equation:

$$T_b = K_b T$$

where:

- T_b = bend shear stress in lb/ft²
- K_b = bend factor
- T = computed stress for straight channel in lb/ft²

The value of K_b is related to the radius of curvature of the channel at its center line, R_c , and the bottom width of the channel, B , Figure 8.05e. The length of channel requiring protection downstream from a bend, L_p , is a function of the roughness of the lining material and the hydraulic radius as shown in Figure 8.05f.

Table 8.05g
Permissible Shear Stresses
for Riprap and Temporary
Liners

Lining Category	Permissible Unit Shear Stress, T_d	
	Lining Type	(lb/ft ²)
Temporary	Woven Paper Net	0.15
	Jute Net	0.45
	Fiberglass Roving:	
	Single	0.60
	Double	0.85
	Straw with Net	1.45
	Curled Wood mat	1.55
	Synthetic Mat	2.00
	d_{50} Stone Size (inches)	
Gravel Riprap	1	0.33
	2	0.67
Rock Riprap	6	2.00
	9	3.00
	12	4.00
	15	5.00
	18	6.00
	21	7.80
	24	8.00

Adapted From: FHWA, HEC-15, April 1983, pgs. 17 & 37.

Design Procedure- Temporary Liners

The following is a step-by-step procedure for designing a temporary liner for a channel. Because temporary liners have a short period of service, the design Q may be reduced. For liners that are needed for six months or less, the 2-year frequency storm is recommended.

Step 1. Select a liner material suitable for site conditions and application. Determine roughness coefficient from manufacturer's specifications or Table 8.05e, page 8.05.10.

Step 2. Calculate the normal flow depth using Manning's equation (Figure 8.05d). Check to see that depth is consistent with that assumed for selection of Manning's n in Figure 8.05d, page 8.05.11. For smaller runoffs Figure 8.05d is not as clearly defined. Recommended solutions can be determined by using the Manning equation.

Step 3. Calculate shear stress at normal depth.

Step 4. Compare computed shear stress with the permissible shear stress for the liner.

Step 5. If computed shear is greater than permissible shear, adjust channel dimensions to reduce shear, or select a more resistant lining and repeat steps 1 through 4.

Design of a channel with temporary lining is illustrated in Sample Problem 8.05b, page 8.05.14.

Sample Problem 8.05b
Design of a Temporary Liner
for a Vegetated Channel

Given:

$Q_2 = 16.6$ cfs
 Bottom width = 3.0 ft
 $Z = 3$
 $n = 0.02$ (Use basic n value for channels cut in earth (Table 8.05b))
 $V_p = 2.0$ ft/sec maximum allowable velocity for bare soil (pg. 6.30.1)
 Channel gradient = 2%

Find:

Suitable temporary liner material

Solution:

Using Manning's equation:

b(ft)	d(ft)	A(ft ²)	R(ft)	V(fps)	Q(cfs)	Comments
3.0	0.59	2.82	0.42	5.88	16.60	$V > V_p$, (needs protection) $Q \geq Q_2$, OK

Velocity > 2.0 fps channel requires temporary liner.*

Calculate channel design with straw with net as temporary liner.

$n = 0.033$ (Table 8.05e). $T_d = 1.45$ (Table 8.05g, pg. 8.05.13)

b(ft)	d(ft)	A(ft ²)	R(ft)	V(fps)	Q(cfs)	Comments
3.0	0.76	4.05	1.94	4.10	16.60	$V < T_d$, OK

Calculate shear stress for Q_2 conditions:

$T = \gamma ds$ where: γ = unit weight of water (62.4 lb/ft³)
 d = flow depth in ft
 s = channel gradient in ft/ft

$T = (62.4)(0.76)(0.02) = 0.95$ $T < T_d$, OK

Temporary liner: straw with net.

*In some cases the solution is not as clearly defined; the use of a more conservative material is recommended.

DESIGN OF RIPRAP LINING-MILD GRADIENT

The mild gradient channel procedure is applicable for channel grades less than 10%. The method assumes that the channel cross section has been designed properly, including undercut and that the remaining problem is to provide a stable riprap lining.

Side slope stability. As the angle of the side slope approaches the angle of repose of the channel lining, the lining material becomes less stable. The stability of a side slope is given by the tractive force ratio, K_2 , a function of the side slope and the angle of repose of the rock lining material.

The rock size to be used for the channel lining can be determined by comparing the tractive force ratio, an indicator of side slope stability, to the shear stress on the sides and shear stress on the bottom of the channel. The angle of repose for different rock shapes and sized is shown in Figure 8.05g. The required rock size (mean diameter of the gradation, d_{50}) for the side slopes is determined from the following equation:

$$d_{50(\text{sides})} = \frac{K_1}{K_2} d_{50(\text{bottom})}$$

where:

K_1 = ratio of shear stress on the sides, T_s , and bottom, T , of a trapezoidal channel (Figure 8.05h),

K_2 = tractive force ratio (Figure 8.05i).

Depth-Duration-Frequency Table

Location: → Raleigh-Durham, NC

Duration	Return Period →					
	2-yr [in]	5-yr [in]	10-yr [in]	25-yr [in]	50-yr [in]	100-yr [in]
5 min	0.48	0.55	0.60	0.68	0.75	0.81
10 min	0.79	0.92	1.02	1.17	1.28	1.40
15 min	1.01	1.18	1.31	1.51	1.66	1.81
30 min	1.35	1.64	1.85	2.16	2.40	2.64
60 min	1.70	2.12	2.41	2.84	3.17	3.50
2 hr	1.91	2.40	2.74	3.23	3.61	4.00
3 hr	2.12	2.68	3.07	3.62	4.06	4.49
6 hr	2.65	3.38	3.90	4.62	5.19	5.75
12 hr	3.13	4.02	4.64	5.52	6.20	6.88
24 hr	3.60	4.65	5.38	6.41	7.21	8.00

Intensity-Duration-Frequency Table

Location: → Raleigh-Durham, NC

Duration	Return Period →					
	2-yr [in/hr]	5-yr [in/hr]	10-yr [in/hr]	25-yr [in/hr]	50-yr [in/hr]	100-yr [in/hr]
5 min	5.76	6.58	7.22	8.19	8.96	9.72
10 min	4.76	5.54	6.13	7.01	7.71	8.40
15 min	4.04	4.74	5.25	6.03	6.64	7.24
30 min	2.70	3.28	3.71	4.32	4.80	5.28
60 min	1.70	2.12	2.41	2.84	3.17	3.50
2 hr	0.95	1.20	1.37	1.62	1.81	2.00
3 hr	0.71	0.89	1.02	1.21	1.35	1.50
6 hr	0.44	0.56	0.65	0.77	0.86	0.96
12 hr	0.26	0.33	0.39	0.46	0.52	0.57
24 hr	0.15	0.19	0.22	0.27	0.30	0.33

Input Data:				IDF Equations: $I = g/(h+T)$ for $5 < T < 120$ min		
Location: → Raleigh-Durham, NC				R	g	h
Duration	2-yr P [in]	100-yr P [in]	Source	2	132	18
5 min	0.48	0.81	NOAA HYDRO-35	5	169	21
15 min	1.01	1.81	NOAA HYDRO-35	10	195	22
60 min	1.70	3.50	NOAA HYDRO-35	25	232	23
24 - hr	3.60	8.00	USWB TP-40	50	261	24
				100	290	25

Exhibit 1

Table of Rational runoff coefficients

Description	C	Source
Roof, inclined	1.00	Malcom
Street, driveway, sidewalk	0.95	Chow, 1964
Parking lot	0.90	Malcom
Roof, flat	0.90	Malcom
Commercial, generalized	0.85	Malcom
Apartments, schools, churches	0.60	WSSC, c.1968
Residences, 10 dwellings/acre	0.60	Malcom
Residences, 6 dwellings/acre	0.55	Malcom
Residences, 4 dwellings/acre	0.50	Malcom
Residences, 2 dwellings/acre	0.40	Malcom
Unimproved cleared area	0.35	Malcom
Lawn, dense soil, steep >7%	0.35	Chow, 1964
Playground	0.35	Chow, 1964
Park, cemetery	0.25	Chow, 1964
Lawn, dense soil, avg 2-7%	0.22	Chow, 1964
Wooded, sparse ground litter	0.20	Malcom
Lawn, dense soil, flat 2%	0.17	Chow, 1964
Lawn, sandy, avg 2-7%	0.15	Chow, 1964
Lawn, sandy, flat <2%	0.10	Chow, 1964
Wooded, deep ground litter	0.10	Malcom

**D. EROSION AND SEDIMENTATION CONTROL PLAN
CHECKLIST FORM (ATTACHED)**

EROSION and SEDIMENTATION CONTROL PLAN PRELIMINARY REVIEW CHECKLIST

The following items shall be incorporated with respect to specific site conditions, in an erosion & sedimentation control plan:

NPDES Construction Stormwater General Permit NCG010000

- N/A Designation on the plans where the 7 or 14 day ground stabilization requirements apply per Part II.E.1 of the permit.
 N/A Design of basins with one acre or more of drainage area for surface withdrawal as per Part II.B.8 of the permit.

LOCATION INFORMATION

- Project location & labeled vicinity map (roads, streets, landmarks)
 North arrow and scale
 Identify River Basin.
 Provide a copy of site located on applicable USGS quadrangle and NRCS Soils maps if it is in a River Basin with Riparian Buffer requirements.

GENERAL SITE FEATURES (Plan elements)

- Property lines & ownership ID for adjoining properties
 Existing contours (topographic lines)
 Proposed contours
 Limits of disturbed area (provide acreage total, delineate limits, and label). Be sure to include all access to measures, lots that will be disturbed, and utilities that may extend offsite.
 Planned and existing building locations and elevations
 Planned & existing road locations & elevations, including temporary access roads
 Lot and/or building numbers
 Hydrogeologic features: rock outcrops, seeps, springs, wetland and their limits, streams, lakes, ponds, dams, etc. (include all required local or state buffer zones and any DWQ Riparian Buffer determinations)
 Easements and drainageways, particularly required for offsite affected areas. Include copies of any recorded easements and/or agreements with adjoining property owners.
 Profiles of streets, utilities, ditch lines, etc.
 N/A Stockpiled topsoil or subsoil locations
 N/A If the same person conducts the land-disturbing activity & any related borrow or waste activity, the related borrow or waste activity shall constitute part of the land-disturbing activity unless the borrow or waste activity is regulated under the Mining Act of 1971, or is a landfill regulated by the Division of Waste Management. If the land-disturbing activity and any related borrow or waste activity are not conducted by the same person, they shall be considered separate land-disturbing activities and must be permitted either through the Sedimentation Pollution Control Act as a one-use borrow site or through the Mining Act.
 N/A Location and details associated with any onsite stone crushing or other processing of material excavated. If the affected area associated with excavation, processing, stockpiles and transport of such materials will comprise 1 or more acres, and materials will be leaving the development tract, a mining permit will be required. Required Army Corps 404 permit and Water Quality 401 certification (e.g. stream disturbances over 150 linear feet)

PENDING APPROVAL

EROSION & SEDIMENT CONTROL MEASURES (on plan)

- Legend (provide appropriate symbols for all measures and reference them to the construction details)
 Location of temporary measures
 Location of permanent measures
 Construction drawings and details for temporary and permanent measures. Show measures to scale on plan and include proposed contours where necessary. Ensure design storage requirements are maintained through all phases of construction.
 Maintenance requirements for measures
 Contact person responsible for maintenance

SITE DRAINAGE FEATURES

- Existing and planned drainage patterns (include off-site areas that drain through project and address temporary and permanent conveyance of stormwater over graded slopes)
 Method used to determine acreage of land being disturbed and drainage areas to all proposed measures (e.g. delineation map)
 Size, pipe material and location of culverts and sewers
 Soil information: type, special characteristics
 Soil information below culvert storm outlets

- Name and classification of receiving water course or name of municipal operator (only where stormwater discharges are to occur)

STORMWATER CALCULATIONS

- N/A Pre-construction runoff calculations for each outlet from the site (at peak discharge points). Be sure to provide all supporting data for the computation methods used (rainfall data for required storm events, time of concentration/storm duration, and runoff coefficients).
 N/A Design calculations for peak discharges of runoff (including the construction phase & the final runoff coefficients for the site)
 N/A Design calcs for culverts and storm sewers (include HW, TW and outlet velocities)
 N/A Discharge and velocity calculations for open channel and ditch flows (easement & rights-of-way)
 N/A Design calcs for cross sections and method of stabilization for existing and planned channels (include temporary linings). Include appropriate permissible velocity and/or shear stress data.
 N/A Design calcs and construction details for energy dissipaters below culvert and storm sewer outlets (include stone/material specs & apron dimensions). Avoid discharges on fill slopes.
 N/A Design calcs and dimension of sediment basins (note current surface area and dewatering standards as well as diversion of runoff to the basins). Be sure that all surface drains, including ditches and berms, will have positive drainage to the basins.

VEGETATIVE STABILIZATION

- Area & acreage to be stabilized with vegetation
 Method of soil preparation
 Seed type & rates (temporary & permanent)
 Fertilizer type and rates
 Mulch type and rates (include mulch anchoring methods)

NOTE: Plan should include provisions for groundcover in accordance with NPDES Construction Stormwater General Permit NCG010000.

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM

- Completed, signed & notarized FR/O Form
 Accurate application fee payable to NCDEQ (\$65.00 per acre rounded up the next acre with no ceiling amount)
 Certificate of assumed name, if the owner is a partnership
 Name of Registered Agent (if applicable)
 Copy of the most current Deed for the site. Please make sure the deed(s) and ownership information are consistent between the plan sheets, local records and this form.
 Provide latitude & longitude (in decimal degrees) at the project entrance.
 Two hard-copies of the plans (some regional offices require additional plans or multiple sizes; please contact the regional coordinator prior to such submittal.)

NOTE: For the Express Permitting Option, inquire at the local Regional Office for availability. Express Reviews are performed by appointment only.

NARRATIVE AND CONSTRUCTION SEQUENCE

- Narrative describing the nature & purpose of the construction activity.
 Construction sequence related to erosion and sediment control (including installation of critical measures prior to the initiation of the land-disturbing activity & removal of measures after areas they serve are permanently stabilized). Address all phases of construction and necessary practices associated with temporary stream bypasses and/or crossings.
 Bid specifications related only to erosion control

E. PROJECT SPECIFICATIONS

SECTION 02230 – CLEARING AND GRUBBING

SECTION 02300 – EARTHWORK

SECTION 02315 – TRENCHING FOR UTILITIES

SECTION 02370 – EROSION CONTROL

SECTION 02920 – LAWNS AND GRASSES

SECTION 02230

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Perform clearing and grubbing. Work shall include, but not be limited, to the following:
 - 1. Access roads.
 - 2. Clearing and grubbing.
 - 3. Removal of surface debris.
 - 4. Demolition and removal of existing paving and structures.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02370 Erosion Control
 - 2. Section 02920 Lawns and Grasses.

1.03 WARRANTY AND FINES

- A. Contractor is liable for damages to public and private property and fines as may be placed on the Project by the governing agencies due to failure to provide erosion control devices in accordance with the approved erosion control plan and as may become necessary due to actual site conditions.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PROTECTION

- A. Take reasonable care during construction to avoid damage to vegetation outside of the construction limits. Temporarily tie back ornamental shrubbery and tree branches, where appropriate, to minimize damage. Trees that receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Treat tree trunks damage by equipment with a tree dressing.
- B. Locate and protect property corners and survey control monuments and stakes prior to start of clearing operations. Disturbed property corners or survey control monuments shall be surveyed and reset by a Professional Land Surveyor licensed in the State of North Carolina. The Contractor shall be responsible for the cost to survey and reset.
- C. Provide temporary gates and fences as necessary to prevent unauthorized vehicular access to the site.
- D. Mark clearing limits (e.g., flag right-of-way, easements, etc.).
- E. Provide tree protection fencing at the outer edge of easements and rights-of-way as indicated on the plans or as directed by the Engineer/Owner. Tree protection

fencing along easements and rights-of-way shall be placed around individual vegetation or groupings of vegetation (e.g., large tree, flower bushes, etc.), and along entire easement (both sides) where clearing through woods. Tree protection fencing shall also be provided where vegetation, within easement and rights-of-way, is indicated as not to be disturbed on Drawings. Where silt fence is provided, it may serve as tree protection fencing if indicated as combination fencing on the drawings. The fencing shall be as detailed on the drawings.

- F. Refer to paragraph 4.04 of the General Conditions and 4.04.A.2 of the Supplementary Conditions concerning the protection of Underground Facilities.

3.02 ACCESS ROADS AND STAGING AREA

- A. Clear for access roads.
- B. Limit clearing and grubbing for access roads to a maximum width for two-way traffic of 30 feet for 20-foot drive and 5 foot shoulders. Contractor shall flag the clearing limits on access roads for the Engineer and Owner to review in the field prior to clearing.
- C. Access roads shall have the following:
 - 1. Provide "Temporary Construction Entrance" per the standard detail on the Drawings at connection to State Roads or other roads as shown on the drawings.
 - 2. 6 inches of ABC stone unless shown otherwise on the drawings.
 - 3. Provide temporary seeding of shoulders as access drives are installed.
 - 4. Provide storm pipes under drives at points of concentrated water flow.
 - 5. Tire wash rack at locations and as detailed on the drawings.
- D. Clear for a staging area as indicated on the Drawings. Total area to be cleared shall be approved by the Engineer. Area for parking and storage of material shall have 6 inches of ABC stone.
- E. Allow reasonable use of access drive by other Contractors, Owner, Engineer, and others authorized to be on the site by the Owner.
- F. When no longer required remove stone and restore access drives and staging area to original contours. Scarify and seed access drives and staging areas.

3.03 INSTALL EROSION CONTROL DEVICES

- A. Clear areas required to install erosion control devices, which shall be in place and operational prior to other land disturbing activity. Install erosion control devices in accordance with Section 02370, Erosion Control.

3.04 STAGING, BORROW, AND DISPOSAL AREAS

- A. Obtain and pay for erosion control permit for staging, borrow, and disposal areas as required by Contractor and not already permitted by Owner.
- B. Install and maintain erosion control devices in accordance with Contractor's approved plan.

3.05 CLEARING AND GRUBBING

- A. Clear and grub the total width of permanent easement and right-of-way unless indicated otherwise on the Drawings. Clear and grub within temporary construction easement only as necessary for construction. Avoid disturbance to vegetation in temporary construction easements where possible, and as noted on the Drawings.

- B. Clearing shall consist of cutting, grinding and removal of vegetation to the existing ground surface and removal of debris. Debris shall include, but not be limited to, fences, steps, walls, chimneys, footings, foundation slabs, basements, signs, junked vehicles, and other rubble.
- C. Grubbing shall consist of the removal of roots over 3 inches in diameter, matted roots, stumps, and other vegetable matter to 12 inches below existing grade.
- D. For areas outside of the right of way and outside of residential yards, grinding of stumps and roots in place is acceptable.
- E. Fill holes and depressions and bring cleared and grubbed area to a uniform contour to match existing grade. Provide positive drainage.
- F. Remove and properly dispose of cleared and grubbed material from the site. Make reasonable effort to channel timber resulting from clearing operations into a beneficial use.
- G. Burning shall not be permitted at the site.
- H. All material from clearing and grubbing shall be maintained within designated limits of disturbance/construction in accordance with the approved Erosion Control Plan until such material is removed and taken offsite for disposal or another use.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provide labor, equipment, and material to perform site preparation and earthwork as specified herein and indicated on the Drawings. Work shall include, but is not limited to, the following:
 - 1. Survey staking as required for construction.
 - 2. Topsoil stripping and stockpiling.
 - 3. Dewatering.
 - 4. Protection of existing facilities.
 - 5. Site grading.
 - 6. Excavation, trenching, and backfilling for structures and foundation including stone base as indicated on the Drawings.
 - 7. Borrow material including, but not limited to, material, excavating, hauling, placing, and compacting.
 - 8. Maintenance and stability of site.
 - 9. Disposal of waste and surplus material.
 - 10. Soil testing.
 - 11. Tunneling for pipeline installations.
- B. Examine the site to determine the extent of excavating, grading, and related items necessary to complete the work.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02315 Trenching for Utilities
 - 3. Section 02370 Erosion Control
 - 4. Section 02410 Microtunneling
 - 5. Section 02445 Bore and Jack of Conduits
 - 6. Section 02920 Lawns and Grasses

1.03 REFERENCES

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - 1. American Society of Testing Materials (ASTM)
 - a. C33 Concrete Aggregates.
 - b. D698 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49 Kg) Rammer and 12-inch Drop (Standard Proctor).
 - c. D1556 Density of Soil in Place by the Sand-Cone Method.
 - d. D1586 Penetration Test and Spilt-Barrel Sampling of Soils.
 - e. D2167 Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

- f. D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
- g. D2487 Classification of Soils for Engineering Purposes.
- h. D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.04 DEFINITIONS

- A. Backfill: A specified material used in refilling a cut, trench, or other excavation, placed at a specified degree of compaction.
- B. Capillary Water Barrier: A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity, which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of water to the area immediately below the slab.
- C. Compaction: Process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of compaction" shall be expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698 (Standard Proctor).
- D. Excavation: The removal of soil or rock to obtain a specified depth or elevation.
- E. Fill: Specified material placed at a specified degree of compaction to obtain an indicated grade or elevation.
- F. Lift: Layer of soil placed on top of a previously prepared or placed soil.
- G. Rock: Solid, homogeneous material which cannot be removed without the systematic drilling and blasting exceeding 1 cubic yard in volume. Material having a standard penetration resistance as determined by ASTM D1586 greater than 150 blows per foot is defined as "rock." Rock is further defined as materials and obstructions encountered that cannot be practically excavated with a large track mounted backhoe, such as a CAT-325 or larger, equipped with new rock teeth. Practical excavation is defined as the ability to remove at least 10 cubic yards during one (1) hour of continuous digging. Removal of "hard material" will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.
- H. Soil classification shall be in accordance with ASTM D2487.
 - 1. Satisfactory materials: Soils classified as GW, GP, GC, GM, SP, SC, SM, SW, ML, and CL.
 - 2. Unsuitable materials: Soils considered as unsatisfactory shall be materials that do not comply with the requirements of satisfactory above and include, but shall not be limited to, the following:
 - a. Soil containing organic matter, debris, stones larger than 12 inches, or frozen material. Stones greater than 4 inches will not be permitted in the top 12 inches.
 - b. Soils classified as Pt, CH, MH, OH, and OL.
 - 3. Cohesionless: Classified as GW, GP, SW, and SP. Soils classified as GM and SM shall be classified as cohesionless only when the fines have a plasticity index of less than 10.
 - 4. Cohesive: Classified as GC, SC, ML, CL, MH, and CH. Soils classified as GM and SM shall be classified as cohesive only when the fines have a plasticity index greater than 10.

- I. Subgrade: Lowest elevation upon which fill or other work will be placed in the absence of unsuitable material.
- J. Topsoil: Natural, friable soil, representative of productive soils in the vicinity of the site. Topsoil shall be free from roots, stones larger than 1 inch, objectionable weed seeds, toxic substances, and materials that hinder grading, planting, and maintenance operations.
- K. Tunnel: Confined excavation below ground generally a horizontal direction for the installation of a structure or pipeline by means of manual excavation or by specific equipment designed to penetrate soil or rock and remove material.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Capillary water barrier: A clean crushed stone, crushed gravel, or uncrushed gravel conforming to ASTM C33 coarse aggregate grading size 57, 67, or 78M.
- B. Stone Base: A clean crushed stone, crushed gravel, or uncrushed gravel conforming to ASTM C33 coarse aggregate grading size ABC
- C. Structural Fabric: Provide structural fabric specifically designed and manufactured to stabilize soft soils under an aggregate base for roads and parking areas. Fabric shall provide a permeable layer, planar flow, and tensile reinforcement for retaining the soil matrix. Fabric shall be inert to commonly encountered chemicals, hydrocarbons, resistant to mildew, rot, and ultraviolet light exposure, and meet or exceed the following test standards:

1. Test	ASTM	
2. Fabric weight (oz / sq yd)	D-1910	6
3. Grab tensile strength (lbs.)	D-1682	200
4. Mullen burst strength (psi)	D-3786	320
5. Puncture strength (lbs.)	D-751	80

PART 3 EXECUTION

3.01 GENERAL

- A. Provide erosion control measures as specified in Section 02370, Erosion Control, clearing and grubbing as specified in Section 02230, Clearing and Grubbing and seeding as specified in Section 02920, Lawns and Grasses.
- B. Protect existing structures and features designated to remain.
- C. Dispose of excavated material in such a manner that it will not obstruct the water flow, endanger existing improvements or Work in progress, impair the use or appearance of the existing facilities, or be detrimental to the completed Work.
- D. Weather Limitations: Proceed with fill and backfill operations based on the following weather conditions:
 - 1. Temperature must be above freezing.
 - 2. In windy, hot, or arid conditions with a high rate of evaporation add moisture to the material to maintain the optimum moisture content.
 - 3. Do not proceed in rain or on saturated subgrade.

- E. Repair or undercut and backfill soils that become damaged by construction activity or unsuitable due to being left exposed to the weather at no additional cost.
- F. Do not place material on surfaces that are muddy, frozen, or contain frost.
- G. Excavation carried below the elevation indicated on the Drawings shall be backfilled and compacted in accordance with these specifications.
- H. Remove and properly dispose of unsatisfactory and excess material from the site.

3.02 CONSTRUCTION STAKING

- A. Provide construction staking as indicated in paragraph 4.05 of the General Conditions. Engineer will only provide electronic design files for Contractor's surveyor and key reference points and benchmarks as shown on the Drawings.
- B. Contractor shall report to Engineer whenever a reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations. Contractor shall be responsible for the accurate replacement or relocation of such reference points or property monuments by a registered professional surveyor in the State of North Carolina.

3.03 PROTECTION OF UNDERGROUND FACILITIES

- A. Approximate locations of existing underground facilities at the site are indicated on the Drawings based on information available to the Engineer. Engineer and Owner do not take responsibility for the accuracy of the information.
- B. Prior to beginning any excavation work or boring, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that an interference exists that was not apparent from the Contract Documents, or could not have been identified during a site visit during bidding, he shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. An interference shall be defined for these purposes as a conflict with an existing utility or structure that prevents the proposed utility from being installed where shown or specified after existing utilities and structures are adequately supported by the Contractor. In the event the Contractor fails to complete adequate field evaluations to identify conflicts, or bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project and could have been avoided with diligent utility location efforts shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the Owner. Repair damage to existing facilities at no additional cost to the Owner.
- C. A change in conditions may be considered due to the location of the existing facilities as allowed in the General Conditions. This does not include the cost for repair of damaged facilities not properly located in advance of construction.

3.04 WATER CONTROL

- A. Inspect the site prior to mobilizing to determine the appropriate equipment for site grading and foundation work.

- B. Perform work to prevent surface water from accumulating in excavations, tunnels and unfinished fill areas. Perform grading and excavation so the work area and affected operations shall be continually and effectively drained.
- C. Install a dewatering system prior to excavating beneath the ground water table. Maintain the water table approximately 2 feet below the bottom of the excavation.
- D. Maintain dewatering until backfilling has proceeded above the natural ground water level and the structural weight is sufficient to prevent "floating" of the structure. Provide a job superintendent experienced in dewatering work.
- E. Water from dewatering operations must be disposed of in accordance with the North Carolina Sedimentation Pollution Control Act.

3.05 USE OF EXPLOSIVES

- A. Blasting is allowable for the removal of rock, as defined herein unless specifically prohibited by the Owner, Engineer or a Utility Owner with an existing utility within the proximity of the proposed blast site. The contractor shall review the Drawings for specific areas where blasting is prohibited..
- B. Obtain required permits for blasting (e.g., from City of Greenville Fire Marshall's Office) prior to blasting, 24 hours minimum.
- C. Store, handle, and use explosives in accordance with all applicable local, state, and federal regulations and in accordance with the provisions of the "Manual of Accident Prevention and Construction" of the Associated General Contractors of America, Inc. Federal regulations include, but are not limited to, Title 27, Chapter 11, Part 555 of the Code of Federal Regulations (CFR) and OSHA Standards – Part 1926, Subpart U.
- D. Provide seismographic monitoring during progress of blasting operations.
- E. Take all necessary precautions to protect life and property, including the use of an approved blasting mat where there exists the danger of throwing rock or overburden. Keep the explosive materials that are on the job site in specially constructed boxes provided with locks. Failure to comply with this specification shall be grounds for suspension of blasting operations until full compliance is made. No blasting shall be allowed unless a galvanometer is employed to check cap circuits. Where blasting takes place within 500 feet of a utility, structure, or property which could be damaged by vibration, concussion or falling rock, keep a blasting log containing the following information for each and every shot. This log shall be kept in an orderly manner and made available to the Engineer and Owner upon request.
 1. Date of shot
 2. Time of shot
 3. Crew supervisor
 4. Number and depth of holes
 5. Approximate depth of overburden
 6. Amount and type of explosive used in each hole
 7. Type of caps used (instant or delay)
 8. The weather
 9. Seismograph instrument and readings
- F. Use explosives in such a way to minimize vibration to existing utilities and structures.

- G. Provide only experienced personnel for blasting in accordance with accepted practices.
- H. Contractor is responsible for safety of life and damage to property resulting from the use of explosives. The Owner and Engineer shall be made aware of all blasting activities prior to their occurrence.
- I. Provide services of a testing firm experienced in monitoring vibrations resulting from blasting operations as specified in Section 01450, Quality Control.
- J. In addition to the above testing/monitoring requirements required, Contractor shall provide the services of a "third party" geotechnical testing firm experienced in monitoring vibrations resulting from blasting operation as specified in Section 01450, Quality Control. The firm selected shall be evaluated by the Engineer and Owner for approval as the official "third party".
- K. Third Party testing/monitoring as related to blasting operations shall include the following:
 - 1. Pre-Construction Condition Assessment
 - a. Prior to beginning construction, the third party testing firm shall perform a pre-construction condition assessment to document the conditions of buildings and other sensitive structures within ***Distance for Blast Assessment*** feet of the proposed blasting area. The assessment shall be performed on all adjacent properties and any other properties as directed by the Engineer or Owner. The assessment should include video and photographic documentation of all exteriors including building foundations, and installation of crack monitors on cracks that might occur or expand due to construction vibrations. Provide all documentation described above to the Owner and Engineer prior to construction.
 - 2. Crack Monitoring During Construction:
 - a. During construction, the third party testing firm shall perform periodic readings of the crack monitors installed prior to construction. Provide readings to the Engineer and Owner within 48 hours of taking the reading. If crack readings monitoring confirm that vibrations are not contributing to crack width, crack monitors may be read once per week. More frequent readings may be required by Owner or Engineer if construction activities could result in greater earthborne vibrations. Testing firm shall notify the Engineer and Owner immediately if monitoring indicates that construction operations have contributed to crack widening. The testing firm shall prepare a detailed plan for repaired the structure and the Contractor shall repair the structure at no cost to the Owner. Contractor shall submit a plan for review that proposes alternate construction methods to address the vibration problems and minimize further damage.
 - 3. Vibration Monitoring During Construction:
 - a. The third party testing firm shall monitor vibrations at no less than four locations along the perimeter of the project during all blasting activities. The locations shall be based on the location of construction activities and their relative position to offsite structures. Prior to construction, a plan showing the proposed monitoring locations shall be submitted to the Engineer and Owner for approval. Adjustments may be made to the locations upon approval. The sensitivity range of the seismograph shall be selected such that the recording is initiated below the maximum allowable particle velocity of 1 in/sec and extends above the highest expected

- intensity. Specific activities of the vibration source (i.e., blasting) shall be indexed in time to allow correlation with the arrivals on the vibration.
- b. The maximum allowable particle velocity is 1 in/sec. The contractor shall notify the Engineer and Owner immediately if monitors indicate that the vibrations are above the criteria established. Activities causing the vibrations shall be suspended until a revised construction plan has been developed by the testing firm to alleviate the problem. The problem shall be resolved by the Contractor at no additional cost to the Owner.
 - c. The vibration monitors shall consist of digital seismographs that display the particle velocities and associated frequencies plotted against the criteria established for this project. Each seismograph shall contain geophones with response capability in three mutually perpendicular axes or components; one vertical and two horizontal (radial and transverse). The frequency response of the geophones shall be linear from at least 4 Hz to more than 200 Hz. The sensitivity shall range from less than 0.02 in/sec to more than 5.0 in/sec. The BlastMate III by InstanTel is one type of seismograph that is suitable for this project.
 - d. Vibration monitors shall be field calibrated by the testing firm before each recording period. The transducer shall be positioned with the longitudinal axis toward the vibration source. Transducers must be adequately coupled with the ground. Operation and calibration of all equipment shall be per manufacturer's recommendations. Vibration records shall be collected in waveform plot or strip chart plot. The peak vector sum of the particle velocity in longitudinal, transverse, and vertical planes shall be shown along with the respective dominant or principle frequencies. The highest recorded particle velocity (i.e., the vector sum of the three orthogonal directions), when indexed to a particle vibration event, shall be reported as the peak particle velocity. The recorded peak particle velocity shall be compared to criteria appropriate for the subject of concern.
 - e. The Engineer and Owner shall be notified immediately of any complaint received by the Contractor. The Contractor shall immediately review those construction activities inducing the vibration and prepare a report documenting all relevant data such as the time and date of the complaint, a description of the construction activities, data from the monitoring instruments for the subject time/date, complaint information (including photographs, if possible) of the alleged damage. The Contractor shall submit for review a detailed plan for repair and revised construction plan to address the vibration problems to minimize further damage and complaints. The Contractor shall perform necessary repairs at no additional cost to the Owner.
 - f. The testing firm shall provide monthly reports containing the results of the crack monitors and vibration monitors during those activities that generate earthborne vibrations, including but not limited blasting operations. The reports shall document that the firm is provided the work described herein.
- L. Submit monitoring reports in accordance with Section 01450, Quality Control.
 - M. Allowance established in Section 01270, Unit Prices, shall be utilized to pay for costs of the third party monitoring.
 - N. The Owner reserves the right to require the removal of rock by other means if blasting operations result in possible hazardous conditions.

3.06 TOPSOIL

- A. Where indicated on the drawings, strip topsoil from areas to be disturbed to a depth of 8 inches or greater and stockpile separate from other excavated material. Locate topsoil so that the material can be used readily for the finished grading. Protect and maintain topsoil until needed. Place topsoil after completion of work in accordance with Section 02920, Lawns and Grasses. If topsoil cannot be stockpiled due to limited construction work area, offsite topsoil may be placed as indicated in the bid.

3.07 SITE GRADING

- A. Proofroll exposed soils following topsoil stripping with a partially loaded tandem axle dump truck to identify unsuitable subgrade areas as determined by the Engineer. Unsuitable areas will be repaired in place or undercut to firm soils as directed by the Engineer. Payment for in place repair or undercutting and backfilling of unsuitable areas shall be as indicated in Section 01270, Unit Prices.
- B. Perform undercutting of unsuitable soils with appropriate equipment defined in soils report or approved by engineer. Backfill undercut areas immediately.
- C. At the direction of the Engineer provide a structural fabric for stabilization of unsuitable soil areas. Install fabric in accordance with the manufacturer's recommendation and the following minimum requirements.
 - 1. Provide a fabric overlap of 24 inches.
 - 2. Back dump and spread aggregate over fabric at the aggregate specified thickness.
 - 3. Compact aggregate with vibratory roller prior to allowing additional construction traffic.
- D. Site grading shall be unclassified except as specifically indicated otherwise. Perform grading within the limits of the Project. Finished surface shall conform to the grades and cross sections indicated on the Drawings and be uniformly sloped for a positive drainage away from structures.
- E. Excavate rock encountered in cut sections to a depth of 6 inches below finished subgrade and backfill with satisfactory material.
- F. Scarify the existing subgrade surface to a minimum depth of 6 inches and recompact if subgrade density is less than the degree of compaction for the proposed fill material. Plow or bench existing ground surfaces steeper than one vertical to four horizontal in such a manner that the fill material will bond with or be keyed to the existing surface. Use compaction equipment suitable for the soil being compacted. Moisten or aerate material as necessary to obtain the optimum moisture content within plus or minus one percent to obtain specified compaction.
- G. Soils used for fill and backfill shall be satisfactory soils classified SP, SM, or SW as shown in soils report in accordance with ASTM D2487. Dry or wet soil as necessary to maintain optimum moisture.
- H. Place backfill and fill material in accordance with the following:
 - 1. Maximum uniform loose lifts: 8 inches
 - 2. Optimum moisture content: 11 - 14 percent
 - 3. Percent compaction at optimum moisture content:
 - a. From ex. grade to within one (1) foot of struc. subgrade: 95
 - b. Final foot to subgrade under floor slabs and pavements: 98
 - c. Under sidewalks 90
 - d. Grassy Areas 85

- I. Approved compacted subgrade that is disturbed by construction or adverse weather shall be scarified and re-compacted as specified previously. Re-compaction over utilities shall be by hand tamping.

3.08 FILL AND BACKFILL

- A. Place and compact fill and backfill material adjacent to structures in a manner that prevents wedging and eccentric loading on or against structures. Do not use equipment adjacent to structures that may overload structure. Backfill against structure only after concrete has attained the specified 28-day compressive strength.
- B. Stone Base: Structures shall have a compacted crushed stone subgrade to the depth of 12 inches.

3.09 EXCAVATION FOR STRUCTURES

- A. Provide shoring or side slopes of excavations as necessary to protect workmen, and existing and new structures. Use, install, and remove shoring in accordance with State and Federal OSHA regulations.
- B. Furnish, erect, and maintain required guardrails at exposed boundaries of excavation.
- C. Perform excavation for utilities in accordance with Section 02315, Trenching for Utilities. Install utilities to a minimum distance of five (5) feet beyond the face of the structure.
- D. Make excavation to the dimensions and elevations for the structures as indicated on the Drawings. Extend excavation a sufficient distance from walls and footings to allow for placing and removal of forms.
- E. Remove unsatisfactory material below required grade and replace with select backfill material as directed by Engineer.
- F. Excavation carried below the depths indicated, without specific directions, shall be backfilled and compacted as specified herein to the proper grade. In excavations for footings the concrete shall be extended to the bottom of the over excavation. Work caused by over excavation that has not been approved shall be at the Contractor's expense.
- G. The upper 9-inches of the subgrade after excavating for each structure should be compacted in place to at least 98% standard Proctor maximum dry density. The subgrade should be proof-rolled using a vibratory roller weighing a minimum of 10 tons (static load) until settlement from the last four complete passes does not exceed 1/8 inch. Any soft, unsuitable or unacceptable soils encountered in the subgrade should be replaced with structural fill placed and compacted to 98% of the standard Proctor maximum dry density.

3.10 ROCK EXCAVATION

- A. Notify Engineer immediately in the event that rock is encountered when the Contract requires payment by the unit price.

3.11 BORROW MATERIAL

- A. Provide borrow material required for fill and backfill to bring the site to the elevations indicated on the Drawings. Borrow material shall be subject to the approval of the Engineer. Notify Engineer as to the site selected for inspection and approval prior to transporting borrow material to the site.

- B. Obtain erosion control permit as necessary for borrow pit grading operations.
- C. Provide soil analysis for each type of material from proposed borrow pit(s) for Engineer's approval prior to placing borrow material. Contractor shall do necessary work to bring the borrow material to within plus or minus 1-1/2 percent of the optimum moisture content. A minimum of one sample per structure shall be obtained for analysis.

3.12 MAINTENANCE AND STABILITY

- A. Maintain fills and embankments to the grade and cross section indicated on the Drawings until the final completion and acceptance of the Project. Repair areas that are damaged.

3.13 DISPOSAL OF SURPLUS MATERIAL

- A. Dispose of surplus material not required or unsuitable for filling, backfilling, or grading in an approved spoil area in accordance with local ordinances.
- B. Obtain erosion control permit as necessary for disposal site(s).

3.14 SOIL TESTING

- A. Provide the services of a soil-testing firm as specified in Section 01450, Quality Control.
- B. The testing laboratory soil specialist, as a minimum, shall be at the project site, upon request of the Owner, to perform the following:
 - 1. Monitor proofrolling of existing soils to determine requirements for undercutting unsuitable soils
 - 2. Monitor grading for the separation and wasting of unacceptable soils.
 - 3. Providing tests in accordance with the following schedule:
 - a. Optimum moisture and laboratory maximum density: Provide one (1) test per type of material to determine optimum moisture and maximum density values in accordance with ASTM D698.
 - b. Moisture content: Provide two (2) tests per day per type of material in accordance with ASTM D2216.
 - 4. Provide in-place field density in accordance with ASTM D1556 or other approved test and the following schedule:
 - a. Provide a minimum of one (1) in-place bearing capacity test for every 1,200 sq ft of subgrade area under structures prior to the start of foundation work.
 - b. While filling activities are in progress for structures and paved areas. Provide a minimum of one (1) in-place density test for every 1,200 sq ft of lift with a minimum of one (1) test for every lift.
 - c. Provide a minimum of one (1) in-place bearing capacity test for every 100 feet of foundation trench.

END OF SECTION

SECTION 02315

TRENCHING FOR UTILITIES

PART 1 GENERAL

1.01 SCOPE

- A. Provide labor, equipment, and material to perform required excavating, backfilling, and compacting for utilities and related structures as specified herein and indicated on the Drawings. Work shall include, but not be limited to, the following:
1. Survey staking as required for construction.
 2. Protection of existing improvements.
 3. Location of existing utilities.
 4. Use of explosives.
 5. Dewatering.
 6. Excavating, backfilling, and compacting for utilities.
 7. Installation of warning / identification tape and tracer wire.
 8. Borrow material.
 9. Disposal of surplus material.
 10. Demolition and removal of existing structures.
 11. Soil Testing.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
1. Section 02230 Clearing and Grubbing
 2. Section 02370 Erosion Control
 3. Section 02510 Water Distribution System
 4. Section 02530 Sanitary Sewer System
 5. Section 02540 Reclaimed Water System
 6. Section 02920 Lawns and Grasses
- B. The City of Greenville Public Utilities Handbook, as it relates to this Section, shall be used in conjunction with this specification. All aspects of the project construction shall conform to this handbook unless specifically noted otherwise herein. It is the Contractors responsibility to obtain this document from the City's Public Utilities Department. It can be obtained by phone at 252-551-1587 or on the internet at <https://www.greenvillenc.gov/> under departments and public utilities.
- C. In the event of a discrepancy between this specification and the Handbook, the Contractor shall use the more stringent of the two documents. Notify the Owner immediately of the discrepancy.

1.03 REFERENCED STANDARDS

- A. The latest revision, at the time of bidding, of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
1. N.C. Department of Transportation - Standard Specifications for Roads and Structures (NCDOT).
 2. American Society of Testing Materials (ASTM)

- a. D698 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49 Kg) Rammer and 12-inch Drop (Standard Proctor).
 - b. D1556 Density of Soil in Place by the Sand-Cone Method.
 - c. D1586 Penetration Test and Spilt-Barrel Sampling of Soils.
 - d. D2049 Test for Relative Density of Cohesionless Soils.
 - e. D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
 - f. D2487 Classification of Soils for Engineering Purposes.
 - g. D3839 Standard Guide for Underground Installation of "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe and Fittings.
- 3. American Water Works Association (AWWA)
 - a. Fiberglass Pipe Design Manual of Water Supply Practices M45
 - b. PVC Pipe Design and Installation Manual for Water Supply Practices M23
 - c. Ductile Iron Pipe and Fittings Manual for Water Supply Practices M41
 - 4. Uni-Bell PVC Pipe Association
 - a. B-5-89 Recommended Practice for the Installation of Polyvinyl Chloride (PVC) Sewer Pipe.
 - 5. Ductile Iron Pipe Research Association (DIPRA)
 - a. 8-08/5M Design of Ductile Iron Pipe

1.04 DEFINITIONS

- A. Backfill: A specified material used in filling the excavated trench and placed at a specified degree of compaction.
 - 1. Materials: Materials listed herein include processed materials plus the soil classifications listed under the Unified Soil Classification System, (USCS) (Method D2487 and Practice D2488). The soil materials are grouped into five broad categories according to their suitability for this application.
 - a. Class I: Angular, 6 to 40-mm (1/4 to 1-1/2-in), graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shell.
 - b. Class II: Coarse sands and gravels with maximum particle size of 40 mm (1-1/2 in.), including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class.
 - c. Class III: Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil Types GM, GC, SM, and SC are included in this class.
 - d. Class IV: Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. These materials shall not be used for bedding, haunching, or initial backfill.
 - e. Class V: This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rock larger than 40 mm (1 1/2 in.) in diameter, and other foreign materials. These materials shall not be used for bedding, haunching, or initial backfill.
 - 2. Backfill Zones: Each backfill zone shall extend the full width of the trench bottom.
 - a. Foundation: Extending down from the bottom of bedding zone as defined below.

- b. Pipe Embedment
 - 1) Bedding: Extending from 4 inches below the pipe bottom to the pipe bottom for 30-inch diameter and smaller and 6 inches below the pipe bottom for pipes larger than 30 inches in diameter.
 - 2) Haunching: Extending from the bedding (bottom of the pipe) to the pipe spring line.
 - 3) Initial Backfill: Extending from the haunching (pipe spring line) to 1 foot above the top of the pipe.
 - c. Final Backfill: Extending from the initial backfill to the finish ground elevation.
- B. Laying Conditions:
- 1. Type 1: Flat bottom trench with loose backfill.
 - 2. Type 2: Flat bottom trench with backfill lightly consolidated to centerline of pipe.
 - 3. Type 3: Pipe bedded in 4 inches minimum of loose soil and backfill lightly consolidated to top of pipe.
 - 4. Type 4: Pipe bedded on Class I material to 1/8 pipe diameter (4 inch minimum) Backfill compacted to top of pipe a minimum of 80 percent of standard proctor.
 - 5. Type 5: Pipe bedded in compacted Class I material to pipe centerline with 4-inch minimum under pipe. Backfill to top of pipe with Class I, II, or III and compact to 90 percent of standard proctor.
- C. Compaction: Process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of compaction" shall be expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698 (Standard Proctor).
- D. Excavation: The removal of soil or rock to obtain a specified depth or elevation.
- E. Lift: Layer of soil placed on top of a previously prepared or placed soil.
- F. Rock: Solid, homogeneous material which cannot be removed without the systematic drilling and blasting exceeding 1 cubic yard in volume. Material having a standard penetration rate less than 1-inch of penetration over 50 blows across continuous materials is defined as "rock." Rock is further defined as materials and obstructions encountered that cannot be practically excavated with a large track mounted backhoe, such as a CAT-325 or larger, equipped with a 42-inch rock bucket and new rock teeth. Practical excavation is defined as the ability to remove at least 10 cubic yards during one (1) hour of continuous digging. Removal of "hard material" will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.
- G. Pipe Springline: A line running horizontally through the center of the pipe.
- H. Topsoil: Natural, friable soil, representative of productive soils in the vicinity of the site. Topsoil shall be free from roots, stones larger than 1 inch, objectionable weed seeds, toxic substances, and materials that hinder grading, planting, and maintenance operations.

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01330, Submittal Procedures:
 - 1. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Clearly indicate equipment to be furnished for the Project including options to be provided.
 - a. Warning / Identification tape.

- b. Geofabric for trench stone wrap.
- 2. Test Reports: Submit for the following:
 - a. Moisture-density relations of soils.
 - b. Field moisture content.
 - c. Soil classification.
 - d. In-place field density.
 - e. Geotechnical engineer's daily field reports.
 - f. Third-party test reports for pre-construction condition assessments, crack monitoring and vibration monitoring per Section 02300, Earthwork.

PART 2 PRODUCTS

2.01 STONE

- A. Class I material shall be #67 or #78M stone in accordance with NCDOT specifications Section 1005, General Requirements for Aggregate.
- B.

2.02 WARNING AND IDENTIFICATION TAPE

- A. Tape shall be a minimum 3-inch wide polyethylene plastic tape manufactured specifically for identification of buried utilities with means of enabling detection by a metal detector to a minimum depth of 3 feet. Tape shall be color coded and continuously imprinted with warning and identification markings in bold black letters to read "CAUTION - BURIED (utility) LINE BELOW." Color and printing shall be permanent, unaffected by moisture or soil and shall be as follows:

Utility	Color	Marking
1. Reclaimed Water	Purple	Caution – Buried Reclaimed Water Line Below
2. Sewer	Green	Caution - Buried Gravity Sewer Main Below Buried Pressure Sewer Line Below
3. Water	Blue	Caution – Buried Water Line Below

- B. Tape shall be by Blackburn Manufacturing, Joseph G. Pollard Co., or Reef Industries Inc or approved equal.
- C. Warning tape shall only be installed for pressure mains constructed of PVC materials.

2.03 TRACER WIRE AND INDICATION POSTS

- A. All non-ferrous pressure mains shall be provided tracing wire and test ports in such a manner as to be able to properly trace all mains without loss or deterioration of signal or without the transmitted signal migrating off the trace wire.
- B. Tracer wire shall be #12 gauge solid (bare) copper and continuous to the greatest extent possible. The tracer wire shall be securely bonded together at all wire joints with an approved industrial crimp connector to provide electrical continuity. It shall be accessible at all tracer wire test ports.
- C. Test ports with marker posts shall be located at bends and no further than 500 feet apart. The test port shall consist of a standard valve box (as specified in Section 02530), shall be H-20 traffic load rated flush with grade in non-paved areas and flush with final asphalt or concrete pavement elevation and shall be located over the

downstream or outgoing main. The valve box shall be equipped with a lid stamped "TS" and painted green for sewer mains, blue for water mains, and Pantone 522C for reuse mains. At each test port, a loop of wire shall be brought up and looped inside the box. The loop of wire inside the box shall be a minimum of three feet.

2.04 TRACER WIRE FOR NONMETALLIC WATER SERVICE PIPE

- A. Where nonmetallic water service pipe is allowed, all new nonmetallic water service pipes shall be provided tracing wire in such a manner as to be able to properly trace all mains and service laterals without loss or deterioration of signal or without the transmitted signal migrating off the trace wire.
- B. Tracing shall be #12 gauge solid (bare) copper and continuous to the greatest extent possible. The tracer wire shall be securely bonded together at all wire joints with an approved industrial crimp connector to provide electrical continuity.
- C. The meter box at or near the right of way and or easement shall serve as the test port with the tracing wire brought up into the meter box with the service lateral and looped in the meter box. The loop wire inside the meter box shall be a minimum of three feet.
- D. For new nonmetallic water service laterals where no tracer is installed on the main, provide an anode (1 pound minimum) for the tracing wire termination at the point of the new tap on the main.
- E. For nonmetallic service lateral installations less than 8 feet, the tracing wire shall be attached to the pipe. For nonmetallic service lateral installations deeper than 8 feet, the tracing wire shall be installed at a depth of 7 to 8 feet. For nonmetallic service laterals that are installed in encasement pipe, the tracing wire shall be routed through the encasement pipe.
- F. For nonmetallic service lateral that installed by directional drilling, the tracer wire shall be attached to and pulled through with the service pipe.
- G. The wire shall be protected from damage during the execution of the work. No breaks or cuts in the tracer wire shall be permitted. Spliced connections shall only be allowed between the main liner tracer wire (if applicable) and the lateral tracer wire. Industrial crimps shall be used to provide electrical continuity and the crimps shall be similar metal to eliminate galvanic corrosion.
- H. Contractor shall perform a continuity test on all tracer wire in the presence of the Owner or Owner's representative. If the tracer wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of wire at his own expense.
- I. Copper clad steel tracer wire (#12) as manufactured by Copperhead Industries, or approved equal is an approved alternative to #12 bare solid copper tracer wire.

2.05 TRACER WIRE FOR GRAVITY SEWERS AND LATERALS AND MANHOLE MARKERS

- A. In accordance with General Statute 87-121(g), gravity sewers and laterals installed after October 1, 2014 shall be electronically locatable.
- B. All new gravity sewer main and sanitary sewer lateral shall be provided tracing wire in such a manner as to be able to properly trace all mains without loss or deterioration of signal or without the transmitted signal migrating off the trace wire.

- C. Tracing shall be #12 gauge solid (bare) copper and continuous to the greatest extent possible. Copper clad steel tracer wire (#12) as manufactured by Copperhead Industries, or approved equal is an approved alternative to #12 bare solid copper tracer wire. The tracer wire shall be securely bonded together at all wire joints with an approved industrial crimp connector to provide electrical continuity. It shall be accessible at all tracer wire test ports.
- D. For gravity mains, test ports shall be provided at frequency of 500 feet or at every manhole, whichever is the shorter of the distance. The test port shall consist of a standard valve box (as specified in Section 02530), shall be H-20 traffic load rated flush with grade in non-paved areas with concrete collar as shown on Detail W-17, and flush with final asphalt or concrete pavement elevation and shall be located over the downstream or outgoing main. The valve box shall be equipped with a lid stamped "TS" and painted green. At each test port, a loop of wire shall be brought up and looped inside the box. The loop of wire inside the box shall be a minimum of three feet. All tracing wire for branch mains and laterals that terminate into the manhole shall be routed around the circumference of the manhole and spliced to the main tracing line.
- E. For sanitary sewer laterals, the cleanout at the right of way and or easement shall serve as the test port with the tracing wire brought up outside the cleanout assembly and wrapped around the assembly stack twice at a depth of approximately 12-inches below grade. Extend a loop of the wire to the top of cleanout.
- F. For new sanitary sewer laterals where no tracer is installed on the main, provide an anode (1 pound minimum) for the tracing wire termination at the point of the new tap on the existing main.
- G. For gravity main and or lateral installations less than 8 feet, the tracing wire shall be attached to the pipe. Tracer wire shall be laid flat and securely affixed to the pipe at 10 foot intervals. Where lateral taps are made by service saddles, the tracer wire shall not be allowed to be placed between the saddle and main. For gravity main and or lateral installation deeper than 8 feet, the tracing wire shall be installed at a depth of 7 to 8 feet. The wire shall be protected from damage during the execution of the work. No breaks or cuts in the tracer wire shall be permitted.
- H. Spliced connections shall only be allowed between the main line tracer wire and branch main and lateral tracer wire. Industrial crimps shall be used to provide electrical continuity and the crimps shall be similar metal to eliminate galvanic corrosion.
- I. Contractor shall perform a continuity test on all tracer wire in the presence of the Owner or Owner's representative. If the tracer wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of wire at their own expense.
- J. Where existing branch mains are reconnected to a main line that is replaced or realigned, tracing wire is not required for the section of branch main that is reconnected unless it is replaced from manhole to manhole. All main lines that are replaced or realigned shall be provided tracing wire.
- K. For gravity sewer mains and laterals that are installed in encasement pipe, the tracing wire shall be routed through the encasement pipe.
- L. Manhole markers shall be placed adjacent to manholes at the discretion of Owner or Owner's representative.

2.06 TRACER WIRE FOR REUSE MAINS

- A. Tracer wire to be installed on all PVC reuse pipe in such a manner as to be able to properly trace all mains without loss or deterioration of signal or without the transmitted signal migrating off the trace wire.
- B. Tracer wire shall be #12 gauge solid (bare) copper and continuous to the greatest extent possible. Copper clad steel tracer wire (#12) as manufactured by Copperhead Industries, or approved equal is an approved alternative to #12 bare solid copper tracer wire. The tracer wire shall be securely bonded together at all wire joints with an approved industrial crimp connector to provide electrical continuity. It shall be accessible at all tracer wire test ports.
- C. Test ports with marker posts shall be located at bends and no further than 300 feet apart. The test port shall consist of a standard valve box with a concrete collar, shall be H-20 traffic load rated flush with grade in non-paved areas with concrete collar as shown on detail W-17, and flush with final asphalt or concrete pavement elevation and shall be located over the downstream or outgoing main. The valve box shall be equipped with a lid stamped "TS" and painted Pantone 522C for reuse mains.
- D. At each test port, a loop of wire shall be brought up and looped inside the box. The loop of wire inside the box shall be a minimum of three feet.
- E. The wire shall be protected from damage during the execution of the work. No breaks or cuts in the tracer wire shall be permitted. Industrial crimps shall be used to provide electrical continuity and the crimps shall be similar metal to eliminate galvanic corrosion.
- F. Contractor shall perform a continuity test on all tracer wire in the presence of the Owner or Owner's representative. If the tracer wire is found to be not continuous after testing, Contractor shall repair or replace the failed segment of wire at their own expense.
- G. All main lines that are replaced or realigned shall be provided tracing wire.
- H. For reuse mains that are installed in encasement pipe, the tracing wire shall be routed through the encasement pipe.

PART 3 EXECUTION

3.01 PROJECT SAFETY

- A. Contractor is responsible for Project safety.
- B. Perform work in conformance with applicable State and Federal safety regulations including, but not limited, to the following:
 - 1. North Carolina Safety and Health Standards for the Construction Industry (29CFR 1926 Subpart P and U).
 - 2. NC OSHA Industry Guide No. 14, Excavations.
 - 3. NC OSHA Industry Guide No. 20, Crane Safety.
- C. Provide barriers, warning lights, and other protective devices at excavations as necessary for safety of workers and the public.
- D. Provide sloping of bank, shoring, sheeting, or other means of maintaining the stability of the trench in accordance with the requirements of the Associated Contractor's Manual of Accident Prevention OSHA, Part 1926.P.

- E. In trench depths of 22 feet or greater, provide certification sealed by Structural Engineer certifying that trench box, sheeting and shoring meets OSHA requirements.

3.02 VIDEO AND PHOTOGRAPHIC INSPECTIONS

- A. Provide pre and post construction video inspections of the project area in accordance with Section 01320, Video and Photographic Documentation.
- B. Submittal shall be in accordance with Section 01330, Submittal Procedures.

3.03 PROTECTION OF UNDERGROUND FACILITIES

- A. Refer to paragraph 4.04 of the General Conditions and SC-4.04.A.2 of the Supplementary Conditions concerning the protection of Underground Facilities.
- B. Prior to beginning any excavation work or boring, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that an interference exists that was not apparent from the Contract Documents, or could not have been identified during a site visit during bidding, he shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. An interference shall be defined for these purposes as a conflict with an existing utility or structure that prevents the proposed utility from being installed where shown or specified after existing utilities and structures are adequately supported by the Contractor. In the event the Contractor fails to complete adequate field evaluations to identify conflicts, or bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project and could have been avoided with diligent utility location efforts shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the Owner.
- C. A change in conditions may be considered due to the location of the existing facilities as allowed in the General Conditions. This does not include the cost for repair of damaged facilities not properly located in advance of construction.
- D. Separation distances shall be in accordance with utilities requirements.

3.04 CONSTRUCTION STAKING

- A. Provide construction staking as indicated in paragraph 4.05 of the General Conditions. Engineer will only provide electronic design files for Contractor's surveyor and key reference points and benchmarks as shown on the Drawings.
- B. Contractor shall report to Engineer whenever a reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations. Contractor shall be responsible for the accurate replacement or relocation of such reference points or property monuments by a registered professional surveyor in the State of North Carolina.

3.05 LOCATION OF INSTALLED UTILITIES

- A. Contractor shall be responsible for locating contract installed utilities as requested by third parties proposing to dig in the contract area until the date that the entire contract is recommended for final payment by Engineer to Owner.

3.06 WATER CONTROL

- A. Prevent surface water from entering the trench.
- B. When trench bottom is below the existing ground water table, install a dewatering system to maintain water table a minimum of two (2) feet below trench bottom. Provide personnel experienced in dewatering work at the job site.
- C. Maintain dewatering until backfilling has proceeded above the existing ground water level.
- D. Dispose of water from dewatering operations in accordance with the North Carolina Sedimentation Pollution Control Act.
- E. In no case shall trench water or groundwater be pumped into or allowed to enter the sanitary sewer system.

3.07 USE OF EXPLOSIVES

- A. Blasting is allowable for the removal of rock, as defined herein, unless specifically prohibited by the Owner, Engineer or a Utility Owner with an existing utility within the proximity of the proposed blast site. The contractor shall review the drawings for specific areas where blasting is prohibited.
- B. Obtain required permits for blasting (e.g., from City of Greenville Fire Marshall's Office) prior to blasting, 24 hours minimum.
- C. Store, handle, and use explosives in accordance with all applicable local, state, and federal regulations, and in accordance with the provisions of the "Manual of Accident Prevention and Construction" of the Associated General Contractors of America, Inc. Federal regulations include, but are not limited to, Title 27, Chapter 11, Part 555 of the Code of Federal Regulations (CFR) and OSHA Standards – Part 1926, Subpart U.
- D. Provide seismographic monitoring during progress of blasting operations.
- E. Take all necessary precautions to protect life and property, including the use of an approved blasting mat where there exists the danger of throwing rock or overburden. Keep the explosive materials that are on the job site in specially constructed boxes provided with locks. Failure to comply with this specification shall be grounds for suspension of blasting operations until full compliance is made. No blasting shall be allowed unless a galvanometer is employed to check cap circuits. Where blasting takes place within 500 feet of a utility, structure, or property which could be damaged by vibration, concussion or falling rock, keep a blasting log containing the following information for each and every shot. This log shall be kept in an orderly manner and made available to the Engineer and Owner upon request.
 - 1. Date of shot
 - 2. Time of shot
 - 3. Crew supervisor
 - 4. Number and depth of holes
 - 5. Approximate depth of overburden
 - 6. Amount and type of explosive used in each hole

7. Type of caps used (instant or delay)
 8. The weather
 9. Seismograph instrument and readings
- F. Use explosives in such a way to minimize vibration to existing utilities and structures.
 - G. Provide only experienced personnel for blasting in accordance with accepted practices.
 - H. Contractor is responsible for safety of life and damage to property resulting from the use of explosives. The Owner and Engineer shall be made aware of all blasting activities prior to their occurrence.
 - I. Provide services of a testing firm experienced in monitoring vibrations resulting from blasting operations as specified in Section 01450, Quality Control.
 - J. In addition to the above testing/monitoring requirements required, Contractor shall provide the services of a "third party" geotechnical testing firm experienced in monitoring vibrations resulting from blasting operation as specified in Section 01450, Quality Control. The firm selected shall be evaluated by the Engineer and Owner for approval as the official "third party".
 - K. Third Party testing/monitoring as related to blasting operations shall include the following:
 1. Pre-Construction Condition Assessment
 - a. Prior to beginning construction, the third party testing firm shall perform a pre-construction condition assessment to document the conditions of buildings and other sensitive structures within ***Distance for Blast Assesment*** feet of the proposed blasting area. The assessment shall be performed on all adjacent properties and any other properties as directed by the Engineer or Owner. The assessment should include video and photographic documentation of all exteriors including building foundations, and installation of crack monitors on cracks that might occur or expand due to construction vibrations. Provide all documentation described above to the Owner and Engineer prior to construction.
 2. Crack Monitoring During Construction:
 - a. During construction, the third party testing firm shall perform periodic readings of the crack monitors installed prior to construction. Provide readings to the Engineer and Owner within 48 hours of taking the reading. If crack readings monitoring confirm that vibrations are not contributing to crack width, crack monitors may be read once per week. More frequent readings may be required by Owner or Engineer if construction activities could result in greater earthborne vibrations. Testing firm shall notify the Engineer and Owner immediately if monitoring indicates that construction operations have contributed to crack widening. The testing firm shall prepare a detailed plan for repaired the structure and the Contractor shall repair the structure at no cost to the Owner. Contractor shall submit a plan for review that proposes alternate construction methods to address the vibration problems and minimize further damage.
 3. Vibration Monitoring During Construction:
 - a. The third party testing firm shall monitor vibrations at no less than four locations along the perimeter of the project during all blasting activities. The locations shall be based on the location of construction activities and their relative position to offsite structures. Prior to construction, a plan

showing the proposed monitoring locations shall be submitted to the Engineer and Owner for approval. Adjustments may be made to the locations upon approval. The sensitivity range of the seismograph shall be selected such that the recording is initiated below the maximum allowable particle velocity of 1 in/sec and extends above the highest expected intensity. Specific activities of the vibration source (i.e., blasting) shall be indexed in time to allow correlation with the arrivals on the vibration.

- b. The maximum allowable particle velocity is 1 in/sec. The contractor shall notify the Engineer and Owner immediately if monitors indicate that the vibrations are above the criteria established. Activities causing the vibrations shall be suspended until a revised construction plan has been developed by the testing firm to alleviate the problem. The problem shall be resolved by the Contractor at no additional cost to the Owner.
 - c. The vibration monitors shall consist of digital seismographs that display the particle velocities and associated frequencies plotted against the criteria established for this project. Each seismograph shall contain geophones with response capability in three mutually perpendicular axes or components; one vertical and two horizontal (radial and transverse). The frequency response of the geophones shall be linear from at least 4 Hz to more than 200 Hz. The sensitivity shall range from less than 0.02 in/sec to more than 5.0 in/sec. The BlastMate III by InstanTel is one type of seismograph that is suitable for this project.
 - d. Vibration monitors shall be field calibrated by the testing firm before each recording period. The transducer shall be positioned with the longitudinal axis toward the vibration source. Transducers must be adequately coupled with the ground. Operation and calibration of all equipment shall be per manufacturer's recommendations. Vibration records shall be collected in waveform plot or strip chart plot. The peak vector sum of the particle velocity in longitudinal, transverse, and vertical planes shall be shown along with the respective dominant or principle frequencies. The highest recorded particle velocity (i.e., the vector sum of the three orthogonal directions), when indexed to a particle vibration event, shall be reported as the peak particle velocity. The recorded peak particle velocity shall be compared to criteria appropriate for the subject of concern.
 - e. The Engineer and Owner shall be notified immediately of any complaint received by the Contractor. The Contractor shall immediately review those construction activities inducing the vibration and prepare a report documenting all relevant data such as the time and date of the complaint, a description of the construction activities, data from the monitoring instruments for the subject time/date, complaint information (including photographs, if possible) of the alleged damage. The Contractor shall submit for review a detailed plan for repair and revised construction plan to address the vibration problems to minimize further damage and complaints. The Contractor shall perform necessary repairs at no additional cost to the Owner.
 - f. The testing firm shall provide monthly reports containing the results of the crack monitors and vibration monitors during those activities that generate earthborne vibrations, including but not limited to blasting operations. The reports shall document that the firm is provided the work described herein.
- L. Submit monitoring reports in accordance with Section 01450, Quality Control.

- M. Allowance established in Section 01270, Unit Prices, shall be utilized to pay for costs of the third party monitoring.
- N. The Owner reserves the right to require the removal of rock by other means if blasting operations result in possible hazardous conditions.
- O. The Contractor shall provide as contingency, on-site, by-pass pumping capability when blasting within 100 feet of existing sanitary sewer infrastructure or where required otherwise as noted on the Drawings or specified in other sections of the project manual.

3.08 EXCAVATING

- A. Excavation shall be by open cut, unless otherwise indicated on the Drawings or specified herein. Other than where specifically indicated on the Drawings, short sections of trench may be tunneled or direct bored with the approval of the Engineer.
- B. Stockpile excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger Work, impair the use or appearance of existing facilities, or be detrimental to the completed Work.
- C. Contractor shall segregate excavated material so as to maintain material suitable for backfill separate from material that is unsuitable.
- D. Trench dimensions at the pipe embedment and foundation zone, shall be as detailed on the drawings.
- E. Shape trench bedding to provide uniform bearing for the full pipe length. Bottom shall be free of protrusions that could cause point loading on pipe. Provide bell holes as required for properly making pipe joint.
- F. Do not over excavate. Excavation below grade without approval of Engineer shall be backfilled with Class I material at no additional cost.
- G. Undercut soils that become unsatisfactory by construction activity or by being left exposed to the weather shall be replaced with Class I backfill material at no additional cost.
- H. Remove shoring, bracing, and sheeting, unless otherwise noted, as the trench is backfilled. Engineer shall have the authority to require that the sheeting be left in place. Once the trench box has been removed to the top of the pipe (or initial backfill zone), the stone shall be replenished to have the required stone over the pipe for the entire width of the excavation. This includes area displaced by the trench boxes and any voids outside the box.
- I. Excavation of trench shall not advance more than 100 feet ahead of the installation. In no case should the excavation extend beyond that which can be backfilled by the end of the workday.
- J. Correct unstable soil conditions encountered at trench foundation by the following method:
 - 1. Excavate below grade as approved by Engineer and backfill with Class I material or approved substitute material at unit price bid as indicated in Section 01270, Unit Prices.
- K. Rock and Hard Material
 - 1. Excavate rock and hard material to a minimum depth of 6 inches below the pipe. Excavation shall be backfilled with Class I material.

2. Mechanical removal of rock (i.e., no blasting) may be necessary along portions of the project, as noted on the Drawings or as required by the applicable regulatory agencies, where blasting could result in complications with surrounding infrastructure. This method of rock excavation will be used only when approved by the Owner, as the blasting method shall be the typical method.
- L. Pressure Lines:
1. Provide a minimum 3 feet of cover, unless indicated otherwise on the Drawings.
 2. Excavate trenches to provide vertical curve chords that will not exceed the pipe manufacturer's recommended joint deflection.
 3. Provide concrete thrust blocks having a compressive strength of 3,000 psi at 28 days at change in horizontal and vertical direction and reduction in the pipe size, unless other restraint systems are indicated otherwise on the Drawings. Cut trench sides vertical and square to receive concrete. Provide bearing area against trench wall as indicated on the Drawings.
- M. Gravity Lines:
1. Excavate trench to the alignment and grade indicated on the Drawings.
- N. Utility Structures: Provide a minimum of 9 inches below subgrade and backfill with Class I compacted to 95 percent maximum density. If the soil conditions are found to be unsuitable for structural stability of the structure, Engineer may require additional depth of Class I material. The additional Class I material will be paid for under the appropriate bid item as indicated in the Bid Form.

3.09 BACKFILLING

- A. Weather Limitations: Proceed with backfill operations based on the following weather conditions:
1. Temperature must be above freezing and rising.
 2. In windy, hot, or arid conditions with a high rate of evaporation add moisture to the material to maintain the optimum moisture content.
 3. Do not proceed in rain or on saturated subgrade.
 4. Do not place material on surfaces that are muddy, frozen, or contain frost.
- B. General
1. Maintain backfill operation within 100 feet from pipe laying operation.
 2. Backfill trench to existing ground surface with select excavated material at the specified compaction.
 3. If excavated material is unsuitable to obtain specified compaction, provide suitable off-site borrow material for backfill as approved by Engineer.
 4. Re-excavate trenches improperly compacted. Backfill and compact as specified.
 5. Provide appropriate tamping equipment, and water to obtain proper moisture content, to achieve specified compaction of backfill.
 6. Conduct operation of heavy equipment above pipe installation in such a manner as to prevent damage to pipe.
 7. Install warning / identification tape over utilities. Bury tape one foot below finished grade above the utility.
 8. Install tracer wire for non-metallic pressure pipe. Bury tracer wire one foot below finished grade over the pipe. Wire shall be looped into valve boxes and indication posts to allow access for direct contact location.

- C. Backfill in pipe embedment zone (bedding, haunching, and initial backfill).
1. General:
 - a. Backfill with material as specified below. Material shall be free from objects larger than 2 inches.
 - b. Where rock and hard material has been excavated below pipe bottom, backfill and compact bedding with Class I material. Class II or III material may be used for bedding with Engineer's approval unless specified otherwise below.
 - c. Place backfill material to assure placement of material under pipe haunches.
 - d. Take care during placement and compacting of material to avoid movement of pipe.
 2. Place backfill in bedding and haunching zones in 6 inch maximum lifts in traffic areas and 12 inch maximum lifts in non-traffic areas and compact to 90 percent density. Provide backfill material in pipe embedment zone as specified below.
 - a. Pressure Lines (Flexible and Rigid Pipe)
 - 1) Excavation in Class I, Class II, Class III, and stable Class IV soils suitable for bedding, the bedding surface shall provide a firm foundation of uniform density. Backfill with select excavated material.
 - 2) Excavation in Class V, unstable Class IV soils, running water, and other unstable soil conditions, excavate a minimum of 6 inches below pipe bottom and provide Class I material for bedding and haunch zone. Backfill with Class I, II, or III material in initial backfill.
 - b. Gravity Sewer Lines, Rigid pipe (ductile iron)
 - 1) Excavation in Class I, Class II, Class III, and stable Class IV soils suitable for bedding, the bedding surface shall provide a firm foundation of uniform density. Backfill with select excavated material.
 - 2) Excavation in Class V, unstable Class IV soils, running water, and other unstable soil conditions, excavate a minimum of 4 inches below pipe bottom and provide Class I material for bedding and haunch zone. Backfill with Class I, II, or III material in initial backfill.
 - c. Gravity Sewer Lines, Flexible (CCFRPM)
 - 1) Depth of cover 0 to 40 ft:
 - i) Provide Class I material for bedding and through embedment zone to 12" above the top of pipe.
 - d. Gravity Sewer Lines, Flexible (PVC SDR 35)
 - 1) Depth 0 to 12 ft: Provide Class I material for bedding and haunching. Backfill with Class I, II, or III material in initial backfill.
 - e. Gravity Sewer Lines, C900/C905
 - 1) Refer to Drawings.
- D. Final Backfill
1. Backfill with materials free of stones and debris larger than 6 inches in dimension. Place backfill in lifts not exceeding the thickness and compacted to the minimum density specified below.
 2. Lifts and density:
 - a. Undeveloped areas (i.e., forests, fields, and, croplands): Trench may be filled with bulldozer blade provided material fall will not damage pipe. Mound soil over the trench area sufficiently to settle level over time. Degree of compaction shall be 85 percent.
 - b. Lawns: Backfill in 12-inch lifts and compact to 90 percent. Top 12 inches shall be free of material with a dimension over 2 inches.

- c. Roads (including Rights-of-way), drives, parking areas (including areas within 20 feet), and adjacent to existing utilities: Backfill in 6 inch lifts compact to 95 percent. Compact the final 8 inches below finished subgrades beneath pavements/sidewalks to at least 100% of the soil's Standard Proctor maximum dry density within 2% of optimum moisture.
 - d. Within 20 feet of foundations: Backfill in 6-inch lifts compacted to 95 percent.
- E. Utility Structures: Bring backfill to grade in even lifts on all sides. Lift depths and compaction densities shall be as specified according to area of installation for pipe above. Backfill against cast-in-place concrete structure only after concrete has attained the specified 28-day compressive strength.

3.10 ANTI-SEEP COLLARS

- A. Anti-seep Collars: Provide anti-seep collars to prevent groundwater flow along pipe in wetlands as indicated on the Drawings. Collars shall extend past trench walls and bear against undisturbed soils. Dimension of collars shall be as indicated on the Drawings. Do not place stone in area of anti-seep collars.
- B. Concrete Collar: Provide Class B concrete with minimum cement content of 5 sacks per cubic yard (5.5 sacks for angular course aggregate); 6.8 gallons of water per sack water-cement ratio; 2-4 inch slump range; and 28-day strength of 2,500 psi.
- C. Clay Collar: Provide clay of medium to high plasticity with a soil classification of CL or CH and a permeability of 10-5 cm / second. Place clay in 6-inch lifts and compact by use of a mechanical hydraulic tamper to 95 percent.

3.11 SOIL TESTING

- A. Provide services of a soil-testing firm as specified in Section 01450, Quality Control.
- B. Testing laboratory soil specialist shall be at the project site, upon request of the Owner, to perform inspection and in-place density testing as specified in Section 02300 Earthwork.
- C. Density tests shall be made in accordance with ASTM D-698, Standard Proctor Method.
- D. Submit test reports and soil specialist daily logs in accordance with Section 01450, Quality Control.
- E. Allowance established in Section 01270, Unit Prices, shall be utilized to pay for costs of the initial tests.
- F. For each test that fails the compaction requirements, the testing firm, at the direction of the Engineer, shall make two additional tests. Contractor shall pay for cost of additional tests due to failure of compaction/density test.
- G. Based on test results, make corrections, adjustments, and modifications of methods, materials, and moisture content for proper trench compaction.

3.12 PAVEMENT REMOVAL AND PATCHING

- A. Repair damaged pavement structure.
- B. Cut existing pavement for utility installation in straight lines generally parallel to the utility. Properly dispose of removed pavement structure.
- C. Extend pavement patch 1 foot beyond each side of trench on firm subgrade. Slope new surface to drain.

- D. Asphalt Pavements: Replace asphalt pavement with a pavement structure equal to existing but no less than as detailed on the Drawings or as indicated in the Encroachment Agreement, whichever is more stringent.
- E. Concrete Pavements: Replace concrete pavement with pavement structure equal to existing but no less than as detailed as Drawings. Concrete shall be minimum 3,000 psi. When existing concrete joint is within 5 feet of trench remove existing concrete to joint. Provide expansion joint at edge of existing concrete. Surface treatment shall match existing. For overlays, as indicated on Drawings, set new driveway elevation at overlay depth and transition to existing driveway elevation.
- F. Curbs, Gutters, and Sidewalks: Replace curbs and gutters, and sidewalks removed or damaged with similar sections to match the existing. Remove to nearest existing joint.
- G. Approval of Other Authorities: Pavements under the jurisdiction of the NC Division of Highways shall be subject to the approval of a representative of that Division.
- H. For overlays, coordinate final limits with Owner, Engineer, and NC Division of Highways. Perform in accordance with NCDOT Encroachment Agreement.
- I. For overlays, as indicated on Drawings, raise existing and new manholes and valve boxes to finished pavement grade. Excavate around top of existing manhole and valve box as necessary. Remove existing top ring, and install new grade ring(s) as necessary. Install existing cover. Raise existing valve box. Provide concrete collar around manhole ring and valve box per details on the Plans.
- J. See Section 02700, Pavement and Appurtenances for additional requirements.

3.13 GRADING AND CLEAN-UP:

- A. Provide for testing and clean up as soon as practicable, so these operations do not lag far behind the pipe installation. Perform preliminary clean up and grading as soon as backfill is complete.
- B. Provide positive drainage of finished grade and drain away from structures. Finished grade shall be reasonably smooth, compacted, free from irregular surface changes and comparable to the adjacent existing ground surface.
- C. Seed disturbed areas in accordance with Section 02920, Lawns and Grasses.
- D. Upon completion of backfilling, remove and properly dispose of excess material and waste. Surplus materials shall be disposed in an Owner-approved facility. A list of approved facilities is available from City of Greenville Public Utilities Department. The Contractor may submit an alternate facility for Owner approval, prior to utilization, in accordance with the Contract Documents.

END OF SECTION

SECTION 02370

EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provide erosion control work. Work shall include, but not be limited to, the following:
 - 1. Erosion control at project site.
 - 2. Erosion control at borrows and disposal areas as required by Contractor. Cost shall include erosion control permits as necessary for borrow and disposal areas.
 - 3. Removal of surface debris.
 - 4. Maintain and remove erosion control devices.

1.02 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02300 Earthwork
 - 3. Section 02315 Trenching For Utilities
 - 4. Section 02410 Microtunneling
 - 5. Section 02920 Lawns and Grasses

1.03 REFERENCED STANDARDS

- A. "Erosion and Sediment Control Planning and Design Manual," issued by the N. C. Sedimentation Control Commission.

1.04 QUALITY ASSURANCE

- A. Conform to rules and regulations of the Erosion Control Laws of the State of North Carolina, specifically the Sedimentation Pollution Control Act of 1973 (G.S. 113A) as amended, and the local jurisdiction where the project is located.
- B. Post a copy of the approved erosion control permit, furnished by Owner, at the site prior to starting work. Maintain a copy of the approved erosion control plan at the site.
- C. Provide permanent ground cover as soon as possible, and no later than the number of days after completion of work in accordance with Section 02920, Lawns and Grasses.

1.05 WARRANTY

- A. Contractor is liable for damages to public and private property and fines as may be placed on the Project by the governing agencies due to failure to provide erosion control devices in accordance with approved erosion control plan.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Matting / Erosion Control Fabric (ECF): Matting and ECF shall be an excelsior, jute, and or 100% straw mulch fabric encased in a medium weight no plastic matting (both sides) with a minimum permissible shear stress of 1.75 lbs/ft². Matting shall be 100% biodegradable but suitable until vegetation has been established. Installation of ECF shall be done with staples per temporary liner detail in the Drawings. Commercially available ECFs may be used upon approval of the engineer. Approval of fabrics will require manufacturer's design data regarding velocity, shear strength, ditch slopes, method of installation, decay cycle, repair techniques, and grass growth enhancement characteristics.
- B. Wire Staples: 16 gauge steel wire, with minimum of 3" top and 4" long legs.
- C. Gravel for Stone Filters: #57 crushed stone.
- D. Filter Fabric: 7-1/2 oz. burlap fabric or other silt filtering fabric.
- E. Riprap:
 - 1. Class A: Stone shall conform to NCDOT standards and shall range in size from 2 to 6-inches with the stone gradation being equally distributed within the required size range.
 - 2. Class B: Stone shall conform to NCDOT standards and shall range in size from 5 to 12-inches with the stone gradation being equally distributed within the required size range.
 - 3. Type 1: Stone shall conform to NCDOT standards and shall range in size from 5 to 17-inches with the stone gradation being equally distributed within the required size range.
 - 4. Type 2: Stone shall conform to NCDOT standards and shall range in size from 9 to 23-inches with the stone gradation being equally distributed within the required size range.
- F. Silt Fence
 - 1. Line Wires shall be minimum 10 gauge, and intermediate wires to be minimum 12-1/2 gauge.
 - 2. Silt fence to be geotextile fabric at a height of 26-inches above grade.
 - 3. Posts to be constructed of 5' steel, buried 2' deep with 3' above grade.

PART 3 EXECUTION

3.01 INSTALL EROSION CONTROL DEVICES

- A. Install erosion control devices, which shall be in place and operational prior to other land disturbing activity.
- B. After installing erosion control devices as indicated on the Drawings, verify that reasonable measures have been taken to prevent the sedimentation of nearby watercourses, existing and new facilities, and adjacent property.
- C. Should Contractor believe that additional measures are necessary to adequately prevent erosion, immediately notify Engineer. If rain is predicted before the Engineer can be notified, take measures as necessary to prevent siltation of nearby water courses and work will be paid for as provided in the General Conditions.

- D. After installing erosion control devices, request an inspection by the local agency having jurisdiction and the Engineer.
- E. Incorporate permanent erosion control work into the project at the earliest practicable time. Coordinate temporary erosion control measures with permanent erosion control measures and other work on the project to assure effective and continuous erosion control throughout the construction and post construction period.
- F. Maintain erosion control devices during construction until the disturbed areas are stabilized and the agency having jurisdiction and the Engineer have approved the removal of the erosion control devices.

3.02 BORROW AND DISPOSAL AREAS:

- A. Obtain and pay for erosion control permit for borrow and disposal areas as required by Contractor.
- B. Install and maintain erosion control devices in accordance with Contractor's approved plan.

3.03 MAINTENANCE

- A. Make required repairs immediately. Remove sediment deposits when deposits reach approximately one-half of the capacity of the erosion control device.
- B. Respread accumulated sediments on the project site in a manner that will not adversely affect erosion control facilities and permanent ground cover.
- C. Silt Fence/Inlet Protection: Should the filter fabric decompose or become ineffective before approval of its removal by the Engineer, replace fabric immediately at no additional cost to the Owner.
- D. Temporary Construction Entrance: Maintain entrance in a condition that will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with 2 inches of stone, as conditions require, at no additional cost to the Owner.

3.04 INSPECTIONS AND REPORTING

- A. Inspect erosion control devices within 24 hours after each rainfall and as required by the Erosion Control permit.
- B. Inspect all stormwater discharge outfalls within 24 hours after each rainfall and as required by the Erosion Control permit.
- C. Generate and submit inspection reports as required by the Erosion Control permit.
- D. Inspection reports shall be submitted to the City and review agency for approval, as applicable.

3.05 SEEDING

- A. Disturbed areas not covered by new construction shall be seeded.
- B. Provide temporary and permanent seeding in accordance with Section 02920, Lawns and Grasses.

3.06 STABILIZATION AND CLEAN-UP

- A. Remove erosion control devices upon the approval of the permanent stabilization of this site by the agency having jurisdiction of the area and the Engineer. Dress

sediment deposits remaining in place after the erosion control devices are removed to conform to the existing grade. Seed disturbed area in accordance with Section 02920, Lawns and Grasses. Include cost of removal and cleanup in the unit cost of the installation of the device.

3.07 MODIFICATIONS

- A. If the Contractor needs additional area outside the allowable construction limits as indicated in the contract documents, he or she shall notify the Owner and Engineer as soon as possible. Any additional area requested must be approved by the Owner prior to use and an amended Erosion and Sedimentation Control Plan will be required to be submitted to NCDENR Land Quality for approval. The Contractor shall be responsible for all engineering costs associated with submittal, review and approval of the amended plan including review fees. The Contractor shall not proceed with any work in the additional area prior to receiving a written copy of the modified Erosion and Sedimentation Control Plan approval.**
- B. The Contractor shall be responsible for any fees or fines issued by regulatory agencies due to non-compliant erosion and sedimentation control work.**

END OF SECTION

SECTION 02920

LAWNS AND GRASSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work shall include, but not be limited to, the following:
 - 1. Surface preparation of subsoil.
 - 2. Placing topsoil.
 - 3. Addition of lime and fertilizer.
 - 4. Seeding.
 - 5. Maintenance to produce a permanent stand of grass.

1.02 PAYMENT PROCEDURES

- A. Base bid for the work on the specified quantities of lime, fertilizer, and seed. After the specified soil tests have been made, Engineer may vary specified quantities. Should the actual quantities applied in the field vary appreciably from those specified, an adjustment in the contract price may be made.

1.03 RELATED SECTIONS

- A. The following Sections have work that is directly related to this Section. This does not relieve the Contractor of his responsibility of proper coordination of all the work:
 - 1. Section 02230 Clearing and Grubbing
 - 2. Section 02300 Earthwork
 - 3. Section 02315 Trenching for Utilities
 - 4. Section 02510 Water Distribution System
 - 5. Section 02530 Sanitary Sewer System
 - 6. Section 02540 Reuse Water System

1.04 REFERENCES

- A. N.C. Department of Agriculture - NCDA
- B. U.S. Department of Agriculture - USDA

1.05 PERFORMANCE REQUIREMENT

- A. Grassed area shall be considered established when it presents a green appearance from eye level 50 feet away and the grass is vigorous and growing well in each square foot of seeded area. It is not required that the seeded area be thick and heavy as an old established lawn.
- B. Should the permanent seed not germinate and produce a strand of grass, reseed affected areas until a permanent stand is established.

1.06 SUBMITTALS

- A. Not less than 6 weeks prior to seeding, obtain representative soil samples from areas to be seeded and deliver the properly packaged samples with an information sheet for each sample properly filled out to the Soils Division of the NC Department of Agriculture or a private laboratory. Based on the test results, submit to the Engineer a recommendation as to the quantity and type of lime, fertilizer and seed for the area covered by the test.

1.07 QUALITY ASSURANCE

- A. Quality of fertilizer, lime, and seed, and operations in connection with the furnishing of this material, shall comply with the requirements of the N.C. Fertilizer, Lime and Seed Law; and with the requirements of the rules and, regulations adopted by the NC Department of Agriculture in accordance with the provisions of the said law.
- B. Seed containers shall bear an official "Certified Seed" label as inspected by the N.C. Crop Improvement Association.
- C. Packages for soil conditioners and fertilizer shall bear manufacturer's guaranteed analysis.
- D. Do not apply lime, fertilizer or seed in strong wind, when the soil is extremely wet, or otherwise unworkable. No rolling shall be done if precipitation after seeding would make the operation detrimental to the seed bed.

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver grass seed mixture in sealed containers showing percentage of seed mix, year of production, net production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.09 MAINTENANCE SERVICE

- A. Maintain seeded areas until grass is well established and exhibits a vigorous growing condition for a minimum of two cuttings. Mow grass at regular intervals to a maximum height of 3 inches. Hand clip where necessary.
- B. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.
- C. Water areas seeded between May 1 and July 15 at such intervals as to maintain the seeded area in a moist condition until the grass is established and accepted by the Engineer. Provide equipment to transport and distribute the water to the seeded areas. Areas seeded between September 1 and November 1 need not be irrigated beyond the initial watering specified above except that the Contractor may apply water at his own discretion.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds, and roots; pH value of minimum 5.4 and maximum of 7.0.
- B. Lime: Ground Dolomitic agricultural limestone, not less than 85 percent total carbonates, ground so that 50 percent passes 100 mesh sieve and 90 percent passes 30 mesh sieve. Coarser material will be acceptable, provided the specified rates of application are increased proportionately on the basis of quantities passing No. 100 mesh sieve.
- C. Fertilizer: Mixed, commercial, fertilizer containing 10-10-10 percentages of available nitrogen, phosphoric acid, and potash respectively, plus superphosphate with 20 percent P₂O₅ content. Fertilizer shall be dry, in granular (pellet) form, shall be

delivered to the site in the manufacturer's original bag or container which shall be plainly marked as to formula.

- D. Seed: Fresh seed guaranteed 95 percent pure with a minimum germination rate of 85 percent within one year of tests. Provide the following seed mixtures with lime and fertilizer in disturbed areas including NCDOT Rights-of-Way:

1. Permanent Seeding (Maximum slope 3:1)

Planting Dates	Grass Type	Pounds/Acre
Aug. 15 - Nov. 1	Tall Fescue	300
Nov. 1 -Mar. 1 & Mar. 1 - Apr. 15	Tall Fescue Abruzzi Rye Tall Fescue	300 25 300
Apr. 15 - Jun. 30	Hulled Common Bermudagrass	25
Jul. 1 - Aug. 15**	Tall Fescue & Browntop Millet & Sorghum-Sudan Hybrids	120 35 30

Lime		4,000
Fertilizer	10-10-10	1,000
Mulch	Straw	4,000

** Temporary seeding, reseed according to optimum season for permanent seeding.

2. Permanent Seeding (Slopes from 3:1 to 2:1)

Planting Dates	Grass Type	Pounds/Acre
Mar. 1 - June 1	Sericea Lespedeza &	50
Mar. 1 - Apr. 15	Add Tall Fescue	120
Mar. 1 - Jun. 30	Add Weeping Lovegrass Or Add Hulled Common Bermudagrass	10 25
Jun. 1 - Sept. 1	Tall Fescue & Browntop Millet & Sorghum-Sudan Hybrids	120 35 30
Sept. 1 - Mar. 1	Sericea Lespedeza (unhulled-unscarified) & Tall Fescue &	70 120
Nov. 1 - Mar. 1	Add Abruzzi Rye	25
Lime		4,000
Fertilizer	10-10-10	1,000
Mulch	Straw	4,000

** Temporary seeding, reseed according to optimum season for permanent seeding.

3. The Contractor shall provide seeding and follow fertilizing methods as required by the U.S. Army Corps of Engineers to reestablish disturbed areas in designated wetlands.

- E. Matting / Erosion Control Fabric (ECF): Matting and ECF shall be a 100% straw mulch encased in a medium weight plastic netting (both sides) with a minimum permissible shear stress of 1.75 lbs/ft². Matting shall be fully degradable but suitable until vegetation has been established. Installation of ECF shall be done with staples per temporary liner detail in the Drawings. Commercially available ECFs may be used upon approval of the engineer. Approval of fabrics will require manufacturer's design data regarding velocity, shear strength, ditch slopes, method of installation, decay cycle, repair techniques, and grass growth enhancement characteristics.
- F. Wire Staples: 16 gauge steel wire, with minimum of 3" top and 4" long legs.
- G. Mulch: Threshed straw of oats, wheat, or rye; free from seed of obnoxious weeds; or clean salt hay. Straw which is fresh and excessively brittle or straw which is in such an advanced stage of decomposition as to smother or retard growth of grass will not be acceptable.
- H. Water: Water shall be free from substances harmful to growth of grass.

PART 3 EXECUTION

3.01 PREPARATION OF SUBSOIL

- A. Complete operations in the area to be seeded and prepare subsoil to eliminate uneven areas and low spots. Bring surface to the approximate design contours.
- B. Scarify subsoil to a depth of 3 inches. Remove weeds, roots, stones and foreign materials 1-1/2 inches in diameter and larger.

3.02 PLACING TOPSOIL

- A. Place topsoil during dry weather and on dry unfrozen subsoil where indicated on Drawings.
- B. Spread topsoil to a minimum depth of 4 inches. Remove vegetable matter and foreign non-organic material from topsoil while spreading. Grade surface to provide positive drainage and prevent water ponding. Lightly compact topsoil with at least one pass of a cultipacker or similar equipment
- C. Maintain the finished surfaces by protecting, and replacing topsoil and subsoil as necessary until the area is accepted under the contract.

3.03 APPLICATION OF LIME

- A. Liming shall be done immediately after grading has reached the fine grading stage, even though actual seeding may not be done until several months later.
- B. Spread lime evenly by means of a mechanical distributor.
- C. When lime is distributed by commercial liming dealers, sales slips showing the tonnage delivered shall be filed with the Engineer and shall show the full tonnage required for the acres treated.
- D. Incorporate lime in the top 2 to 3 inches of soil by harrowing, disking, or other approved means.

3.04 APPLICATION OF FERTILIZER

- A. Spread fertilizer not more than 2 weeks in advance of seeding.
- B. To verify application rate, determine acreage to be fertilized and provide Engineer with total weight of fertilizer applied to the area.
- C. Provide mechanical spreader for even distribution and spread half of the rate in one direction, and the other half at right angles to the first. Mix thoroughly into upper 2 to 3 inches of soil by disking, harrowing or other approved methods.

3.05 SEEDING

- A. Accomplish seeding by means of an approved power-drawn seed drill, combination corrugated roller-seeder, approved hand operated mechanical seeder, or other approved methods to provide even distribution of seed.
- B. Do not seed when ground is excessively wet or excessively dry. After seeding, roll area with a roller, not less than 18 inches in diameter and weighing not more than 210 pounds per foot of width. Upon completion of rolling, water area with a fine spray.
- C. Immediately following seeding apply mulch or matting as listed below. Do not seed areas in excess of that which can be mulched on same day.
- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil depth

3.06 MULCHING AND MATTING

- A. Apply mulch or matting as required to retain soil and grass, but no less than the following:
 - 1. Slopes from 0 to 20 percent by spreading a light cover of mulch over seeded area at the rate of not less than 85 lbs. per 1000 sq. ft. Use tack to prevent disruption of mulch.
 - 2. Slopes greater than 20 percent mulch with matting. Pin matting to the ground with wire staples at 5 foot intervals, immediately after seeding.
- B. For tack use an asphalt tie-down of emulsified asphalt grade AE-3 or cut-back asphalt grade RC-2 or other approved equal. The application rate shall be 0.10 gal/sy (11 gal / 1000 sq ft). An approved jute mesh or net may be used in lieu of tacking straw mulch.
- C. Other types of mulch and anchoring methods may be used upon approval by the Engineer.

3.07 PROTECTION

- A. Protect seeded areas from damage by barricades, signs, and other appropriate means. Maintain and protect slopes from weather damage.

3.08 STABILIZATION TIMELINE

- A. All disturbed areas must be vegetated or otherwise stabilized after being disturbed in accordance with the table below:

GROUND STABILIZATION*		
SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
Perimeter Dikes, Swales, Ditches and Slopes	7 Days	None
High Quality Water (HQW) Zones	7 Days	None
Slopes Steeper than 3:1	7 Days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 or Flatter	14 Days	7 days for slopes greater than 50 feet in length
All Other Areas with Slopes Flatter than 4:1	14 Days	None (except for perimeters and HQW zones)
**EXTENSIONS OF TIME MAY BE APPROVED BY THE PERMITTING AUTHORITY BOASED ON WEATHER OR OTHER SITE-SPECIFIC CONDITIONS THAT MAKE COMPLIANCE IMPRACTICABLE." (SECTION II.B (2)(B))		

END OF SECTION

Exhibit 3

Contract Drawing Sheets

December 15, 2020 - 10:18am By: Kevin.VanOrd

Sheet List Table	
Sheet Number	Sheet Title
000-000	COVER
000-001	GENERAL NOTES
600-001	PLAN & PROFILE
600-002	PLAN & PROFILE
600-003	PLAN & PROFILE
600-004	PLAN & PROFILE
600-005	PLAN & PROFILE
800-001	DETAILS
800-002	E&SC DETAILS
800-003	E&SC DETAILS CONT.
800-004	NCG01 GROUND STABILIZATION AND MATERIALS HANDLING
800-005	NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING
900-001	WORK ZONE ADVANCE WARNING
900-002	TEMPORARY LANE CLOSURE
900-003	TRAFFIC CONTROL DESIGN LENGTHS
900-004	TRAFFIC CONTROL BUFFER & SIGHT DISTANCE
900-005	TRAFFIC CONTROL BARRIER FLARE RATES
900-006	TRAFFIC CONTROL SIGN SPACING



GAS DISTRIBUTION SYSTEM IMPROVEMENTS MEMORIAL DRIVE BRIDGE GAS MAIN RELOCATION

CONTACTS	
OWNER:	GREENVILLE UTILITIES COMMISSION 401 SOUTH GREENE STREET GREENVILLE, NC 27834 PHONE: (252) 551-1594 CONTACT: DILLON WADE, P.E.
CIVIL ENGINEER:	KIMLEY-HORN AND ASSOCIATES, INC. 4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462 PHONE: (757) 548-7353 CONTACT: RYAN CLARK, P.E.
24-HOUR CONTACT:	GUC EMERGENCY HOTLINE PHONE: (855) 767-2482

SITE INFO
5525' X 8" STEEL PIPE
MAOP = 60 PSIG



NOT TO SCALE
PROJECT LOCATION

PREPARED IN THE OFFICE OF:
Kimley»Horn

4525 MAIN STREET, SUITE 1000, VIRGINIA BEACH, VA 23462
PHONE: (757) 213-8600

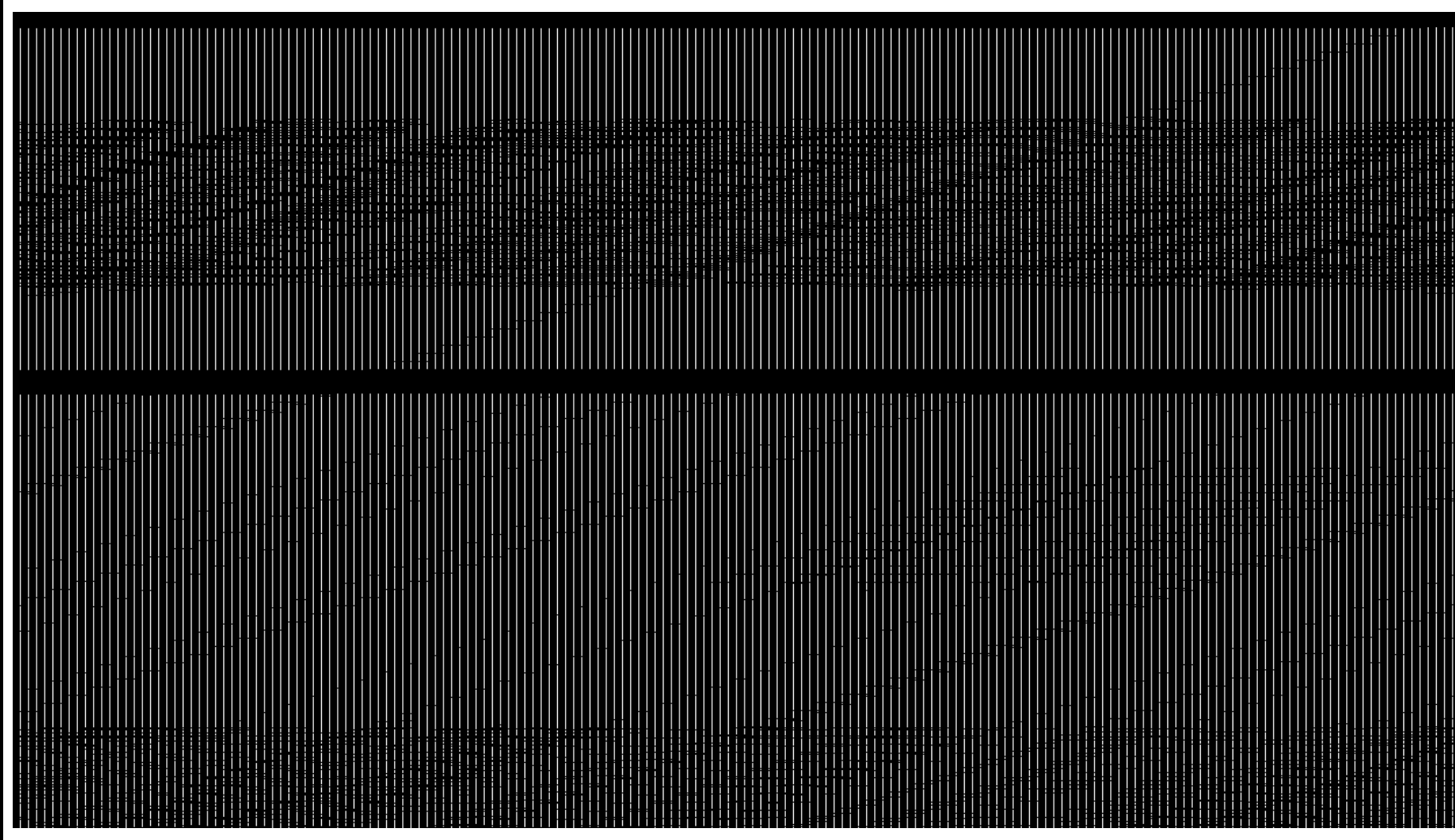
REVISIONS				ISSUED FOR CONSTRUCTION BY	DATE
NO.	DATE	DESCRIPTION	BY		

This document, together with the concepts and designs presented herein, as an instrument of services, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.		
Copyright Kimley-Horn and Associates, Inc., 2020	SEAL:	
DRAWING:	DATE: DECEMBER 14, 2020	JOB NUMBER: 116780000

K:\VAB_Civil\116780000 - GUC Memorial Bridge\CADD\Plan Sheets\000-000 Cover & Notes.dwg

SITE PLAN ABBREVIATIONS

AB	ANCHOR BOLT	FAB	FABRICATE	MAINT	MAINTENANCE	S	SOUTH/SLOPE
AC	ALTERNATING CURRENT/ ASBESTOS CEMENT	F&C	FRAME AND COVER	MATL	MATERIAL	SAN	SANITARY
ACT	ACOUSTIC TILE	F&G	FRAME AND GRATE	MAX	MAXIMUM	SBL	SURVEY BASELINE
AD	ADDITIONAL	FC	FLUSHING CONNECTION	MECH	MECHANICAL	SCH	SCHEDULE
ADDL	ADJUSTABLE	FD	FLOOR DRAIN	MEMB	MEMBRANE	SD	STORM/SITE DRAIN
ADJ	ADJUSTABLE	FDN	FOUNDATION	MET	METAL	SECT	SECTION
AFF	ABOVE FINISHED FLOOR	FE	FIRE EXTINGUISHER	MFR	MANUFACTURER	SERV	SERVICE
AGGR	AGGREGATE	FF	FINISH FLOOR	MG	MILLION GALLONS	SEW	SEWER
AL	ALUMINUM	FH	FIRE HYDRANT	MGD	MILLION GALLONS PER DAY	SF	SQUARE FEET
ALLOW	ALLOWANCE/ALLOWABLE	FIN	FINISH	MH	MANHOLE	SHT	SHEET
ALT	ALTERNATE	FIX	FIXTURE	MIN	MINIMUM	SI	SQUARE INCH
APPROX	APPROXIMATE	FL	FLASHING/FLOOR	MISC	MISCELLANEOUS	SIM	SIMILAR
ARCH	ARCHITECTURAL	FLEX	FLEXIBLE	MJ	MECHANICAL JOINT	SJ	STEEL JOIST
ASB	ASBESTOS	FLG	FLANGE	MLDG	MOLDING	SPEC	SPECIFICATION
ASPH	ASPHALT	FLUOR	FLUORESCENT	MO	MASONRY OPENING	SQ	SQUARE
AT	ASPHALT TILE	FLXC	FLEXIBLE CONNECTION	MOD	MODIFY/MODIFIED	SS	SANITARY SEWER
		FM	FORCE MAIN	MON	MONUMENT	SST	STAINLESS STEEL
		FPRF	FIREPROOF	MOT	MOTOR	ST	STREET
		FRP	FIBERGLASS REINFORCED POLYESTER LAMINATE	MTD	MOUNTED	STA	STATION
B	BORING	FT	FEET	MTG	MOUNTING	STD	STANDARD
BD	BOARD	FTG	FOOTING/FITTING	MULT	MULTIPLE	STG	STORAGE
BFE	BOTTOM OF FITTING ELEV	FURR	FURRING/FURRED			STR	STIRRUP
BFV	BUTTERFLY VALVE					STL	STEEL
BITUM	BITUMINOUS					STR	STRUCTURAL
BL	BUILDING LINE					SUB	SUBSTITUTE
BLDG	BUILDING					SUP	SUPPLY
BLK	BLOCK					SUPT	SUPERINTENDENT
BM	BENCH MARK					SUR	SURFACE
BOC	BACK OF CURB	G	GAS/GAS LINE	N	NORTH	SUSP	SUSPENDED
BOT	BOTTOM	GA	GAUGE	NA	NOT APPLICABLE	SW	SWITCH
BRG	BEARING	GAL	GALLON	NF	NEAR FACE	SWBD	SWITCHBOARD
BRK	BRICK	GALV	GALVANIZED	NGD	NATIONAL GEODETIC	SWD	SIDE WATER DEPTH
BRZ	BRONZE	GC	GENERAL CONTRACTOR	NIC	NOT IN CONTRACT	SYM	SYMMETRICAL
BSMT	BASEMENT	GEN	GENERATOR	NO	NUMBER		
BT	BOLT	GC	GENERAL CONTRACTOR	NOM	NOMINAL		
BUR	BUILT-UP ROOFING	GI	GALVANIZED IRON	NPW	NON POTABLE WATER		
BV	BALL VALVE	GL	GLASS	NTS	NOT TO SCALE		
		GPM	GALLONS PER MINUTE			T	TREAD
		GR	GRADE			T&B	TOP AND BOTTOM
		GRV	GRAVEL			T&G	TONGUE AND GROOVE
		GV	GATE VALVE			TAN	TANGENT
C	CLOSET/CARPET/CHANNEL CABINET	GW	GUY WIRE	OC	ON CENTER	TBM	TEMPORARY BENCH MARK
CB	CATCH BASIN	GWB	GYPSPUM WALL BOARD	O.D.	OUTSIDE DIAMETER	TC	TOP OF CURB
C/C	CENTER TO CENTER	GWF	GLAZED WALL FINISH	O.F.	OUTSIDE FACE	TCHH	TRAFFIC CONTROL HAND HOLD
CE	CONSTRUCTION EASEMENT	GYP	GYPSPUM	OFF	OFFICE	TDH	TOTAL DYNAMIC HEAD
CEM	CEMENT			OPER	OPERATOR	TECH	TECHNICAL
CER	CERAMIC			OPER	OPERATOR	TEL	TELEPHONE
CF	CUBIC FEET			OPNG	OPENING	TEMP	TEMPERATURE
CFM	CUBIC FEET PER MINUTE			OPP	OPPOSITE	TER	TERRAZZO
CI	CAST IRON/CUBIC INCHES			ORIG	ORIGINAL	TERMO	THERMOSTAT
CIP	CAST IRON PIPE			OT	OPEN TRUSS	THK	THICK
C	CENTER LINE	H	HEIGHT	OVHD	OVERHEAD	THRU	THROUGH
CL	CHLORINE	HDW	HARDWARE			TOD	TOP OF DECK
CLG	CEILING	HEX	HEXAGONAL			TOF	TOP OF FOOTING
CLKG	CAULKING	HM	HOLLOW METAL			TOM	TOP OF MASONRY/MANHOLE
CLR	CLEAR	HORZ	HORIZONTAL			TOS	TOP OF SLAB
CMP	CORRUGATED METAL PIPE	HP	HORSEPOWER			TOW	TOP OF WALL
CMU	CONCRETE MASONRY UNIT	HPT	HIGH POINT	PAR	PARALLEL	TOL	TOLERANCE
CO	CLEANOUT	HTR	HEATER	PC	POINT OF CURVE/PIECE	TPS	TWISTED PAIR SHIELDED
COL	COLUMN	HVAC	HEATING, VENTILATION AND AIR CONDITIONING	PCC	POINT OF COMPOUND CURVE	TRANS	TRANSFORMER
CONC	CONCRETE			PCF	POUNDS PER CUBIC FOOT	TYP	TYPICAL
CONST	CONSTRUCTION	HW	HOT WATER	PE LINING	POLYETHYLENE LINING		
CONT	CONTINUOUS	HWL	HIGH WATER LEVEL	PERF	PERFORATED		
CONTR	CONTRACTOR	HWY	HIGHWAY	PERP	PERPENDICULAR		
CORP	CORPORATION	HYD	HYDRAULIC	PI	POINT OF INTERSECTION	UG	UNDERGROUND
CORR	CORRIDOR			PL	PROPERTY LINE/PLATE	UH	UNIT HEATER
CP	CONCRETE PLANK			PNL	PANEL	UNFIN	UNFINISHED
CRS	COURSE			PP	POWER POLE	UR	URINAL
CT	CERAMIC TILE			PREFAB	PREFABRICATED	UTIL	UTILITY
CTJ	CONTROL JOINT			PRV	PRESSURE RELIEF VALVE		
CU	COPPER			PS	PUMPING STATION		
CV	CHECK VALVE	I	IRON	PSF	POUNDS PER SQUARE FOOT		
CW	COLD WATER	ID	INSIDE DIAMETER	PSI	POUNDS PER SQUARE INCH		
CY	CUBIC YARD	IF	INSIDE FACE	PT	POINT OF TANGENT/POINT	VAC	VACUUM
		IN	INCH	PTN	PARTITION	VAT	VINYL ASBESTOS TILE
DC	DIRECT CURRENT	INCL	INCLUDED	PV	PLUG VALVE	VCP	VITRIFIED CLAY PIPE
DET	DETAIL	INF	INFLUENT	PVC	POLYVINYL CHLORIDE	VEL	VELOCITY
DF	DRINKING FOUNTAIN	INS	INSULATION	PVC	POINT OF VERTICAL CURVE	VENT	VENTILATING/VENTILATION
DIA (Ø)	DIAMETER	INT	INTERIOR	PVI	POINT OF VERTICAL INTERSECTION	VERT	VERTICAL
DIAG	DIAGONAL	INV	INVERT	PVMT	PAVEMENT	VOL	VOLUME
DIM	DIMENSION			PVT	POINT OF VERTICAL TANGENCY	VP	VENT PIPE
DIP	DUCTILE IRON PIPE			PW	POTABLE WATER	VWC	VINYL WALL COVERING
DISCH	DISCHARGE						
DIST	DISTRIBUTION						
DJ	DOUBLE JOIST						
DL	DEAD LOAD	J	JOIST	QTY	QUANTITY		
DN	DOWN	JB	JUNCTION BOX			W	WEST/WIDTH
DOZ	DOZEN	JCT	JUNCTION			W/	WITH
DR	DOOR	JT	JOINT			WC	WATER CLOSET
DWG	DRAWING					WF	WIDE FLANGE
DWL	DOWEL					WH	WALL HYDRANT
DVP	DOMINION VIRGINIA POWER					WI	WROUGHT IRON
						WL	WATER LEVEL
E	EAST/EASEMENT					WL	WATER LINE
EA	EACH					WO	WINDOW OPENING
ECC	ECCENTRIC	L	LENGTH/ANGLE			WO	WITHOUT
EF	EACH FACE	LA	LINE AHEAD			WP	WATERPROOF
EFF	EFFLUENT	LAB	LABORATORY			WPF	WATERPROOFING
EIP	EXIST IRON PIPE	LAM	LAMINATED			WPT	WALL PENETRATING TYPE
EL OR ELEV	ELEVATION	LAT	LATERAL			WSE	WATER SURFACE ELEVATION
ELEC	ELECTRIC/ELECTRICAL	LAV	LAVATORY			WSP	WEATHERSTRIP
ELL	ELBOW	LB	POUND/LINE BACK			WT	WEIGHT
ENGR	ENGINEER	LF	LINEAR FEET			W.T.	WALL THICKNESS
ENT	ENTRANCE	LG	LONG			WV	WATER VALVE
EOG	EDGE OF GRAVEL	LL	LONG LEG HORIZONTAL			WWF	WELDED WIRE FABRIC
EOP	EDGE OF PAVEMENT	LLV	LONG LEG VERTICAL				
EQ	EQUAL	LP	LIGHT POLE				
EQPT	EQUIPMENT	LPT	LOW POINT				
EW	EACH WAY	LT	LIGHT			YD	YARD
EX	EXISTING	LTG	LIGHTING			YR	YEAR
EXC	EXCAVATE	LVR	LOUVER				
EXH	EXHAUST	LWL	LOW WATER LEVEL				
EXP	EXPANSION						
EXT	EXTERIOR						



PROJECT NOTES:

GENERAL NOTES:

- EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE OWNER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED. AFTER COMPLETION OF THE PROJECT THE CONTRACTOR SHALL REMOVE ALL EROSION CONTROL DEVICES WHERE A GOOD STAND OF GRASS HAS BEEN ESTABLISHED AND EROSION IS NO LONGER EVIDENT. REMOVAL OF THE REMAINDER OF THE EROSION CONTROL DEVICES SHALL OCCUR AS OTHER AREAS ARE ESTABLISHED. REMOVAL OF THE EROSION CONTROL DEVICES SHALL BE PERMITTED ONLY WITH THE PRIOR APPROVAL OF THE OWNER.
- ALL AREAS DISTURBED BY GRADING, EXCAVATION, AND GENERAL CONSTRUCTION SHALL BE SEEDED, MULCHED, AND RESTORED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION.
- ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
- TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR DIVERT SEDIMENT LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.
- LOCATIONS OF EXISTING SHOWN UTILITIES ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING EXACT LOCATION, ORIENTATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO EXCAVATION.
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SHOULD ANY FIELD CONDITIONS BE ENCOUNTERED THAT VARY FROM THE INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL VERIFY EXACT MATERIALS, LOCATION, ELEVATION, DIMENSIONS, AND LAYOUT OF EXISTING PIPING TO BE CONNECTED TO PRIOR TO ORDERING MATERIALS.
- TYPICAL DEPTH OF COVER FOR BURIED PIPELINE SHALL BE 4 FEET UNLESS OTHERWISE SHOWN OR SPECIFIED.
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SHEETING REQUIRED FOR THE INSTALLATION. ALL EXCAVATIONS SHALL BE KEPT WITHIN THE DESIGNATED EASEMENT WIDTHS. EXCAVATION WITHIN PAVED AREAS IS PROHIBITED, UNLESS OTHERWISE SHOWN OR SPECIFIED. SHEETING SHALL BE INSTALLED AS REQUIRED TO PROTECT EXISTING UTILITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE COMPANY ANY ADDITIONAL SUPPORT OF EXISTING POWER POLES AS REQUIRED FOR TRENCH EXCAVATION. ALL COSTS OF SUCH WORK SHALL BE PAID BY THE CONTRACTOR.
- THE CONTRACTOR SHALL REMOVE AND REINSTALL ALL EXISTING FENCE AS REQUIRED FOR THE INSTALLATION. ANY ADDITIONAL FENCE MATERIALS REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY CONSTRUCTION AREAS. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT.
- THE CONTRACTOR SHALL RESTORE GRADE TO PRE CONSTRUCTION CONDITION UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- CONSTRUCTION ENTRANCES SHALL BE PLACED AS NEEDED BY THE CONTRACTOR ACCORDING TO THE DRAWING STANDARD DETAILS.
- CONTRACTOR SHALL PROVIDE A MEANS TO KEEP ALL NEW PIPING BONDED TO EXISTING PIPING DURING CONSTRUCTION.
- SLOPES AND GROUND COVER ARE TO BE RESTORED WITHIN FIVE (5) WORKING DAYS.
- CONTRACTOR TO VERIFY DEPTH OF EXISTING UTILITIES BY TEST PIT AND ADJUST DEPTH OF BORE ACCORDINGLY.
- CONTRACTOR SHALL COORDINATE WITH THE LOCAL WATER PROVIDER FOR THE HYDROSTATIC TEST WATER.

CONSTRUCTION SEQUENCE

- OBTAIN APPROPRIATE CONSTRUCTION PERMITS
- INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES
- CLEAR AND GRUB
- ROUGH GRADE SITE
- EXCAVATE AND INSTALL GAS PIPELINES AND ASSOCIATED INFRASTRUCTURE
- FINISH FINAL GRADING AND SURFACE RESTORATION
- REMOVE EROSION AND SEDIMENTATION CONTROL MEASURES. (E&S MEASURES SHALL REMAIN UNTIL ENTIRE SITE IS APPROPRIATELY REESTABLISHED)

LEGEND

<h5>E&S SYMBOLS</h5> <p>INLET PROTECTION</p> <p>CULVERT INLET PROTECTION</p>	<h5>SECTION AND DETAIL KEYING</h5> <p>DRAWINGS ARE CROSS REFERENCED IN THE FOLLOWING METHOD:</p> <p>(A) A SECTION CUT ON SHEET 3 IS IDENTIFIED AS FOLLOWS:</p> <p>SECTION LETTER SHEET WHERE SECTION IS SHOWN</p> <p>(B) THE SECTION SHOWN ON SHEET 6 IS IDENTIFIED AS FOLLOWS:</p> <p>SECTION LETTER SHEET FROM WHERE SECTION WAS TAKEN</p> <p>STANDARD DETAILS ARE REFERENCED BY A UNIQUE SEVEN DIGIT NUMBER AND ARE SHOWN ON THE DRAWINGS BY ONE OF TWO METHODS:</p> <p>2000003 — REFERENCED ITEM</p> <p>OR</p> <p>SEE 2000003 — REFERENCED ITEM</p> <p>STANDARD DETAILS ARE COMPILED IN APPROXIMATE NUMERICAL ORDER IN</p>
--	--

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and Improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

© 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
 PITT COUNTY, NORTH CAROLINA

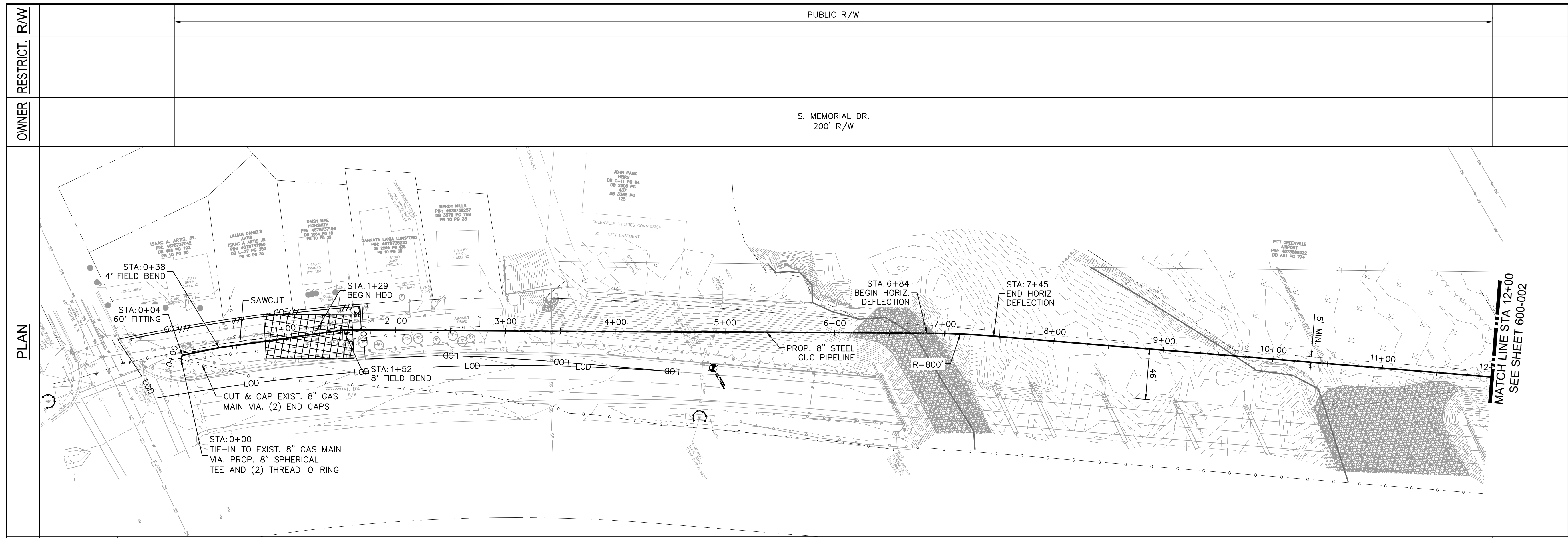
SHEET TITLE: **GENERAL NOTES**

DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)

SEAL:

KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 000-001
 SHEET INDEX: 2 OF 18

December 15, 2020 1:10:00 PM Kevin VonOrt



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OVERHEAD POWER LINE
- SANITARY SEWER LINE
- STORM LINE
- SANITARY SEWER FORCE MAIN
- UGT
- SUBSURFACE TELECOMMUNICATIONS
- W
- RW
- G
- E
- UK
- ACCESS PATH
- PIPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATting
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/JAB PIT
- FILTER RING
- CURB INLET FILTER
- TEST HOLE LOCATION
- INLET PROTECTION
- SILT FENCE OUTLET

NORTH

PIPE BAR

DETAIL	1	1	1
PIPE			B
COATING	A	A	
LENGTH (LF)	4'	144'	1052'
FITTINGS	3	1	
CAT. PROTECTION			

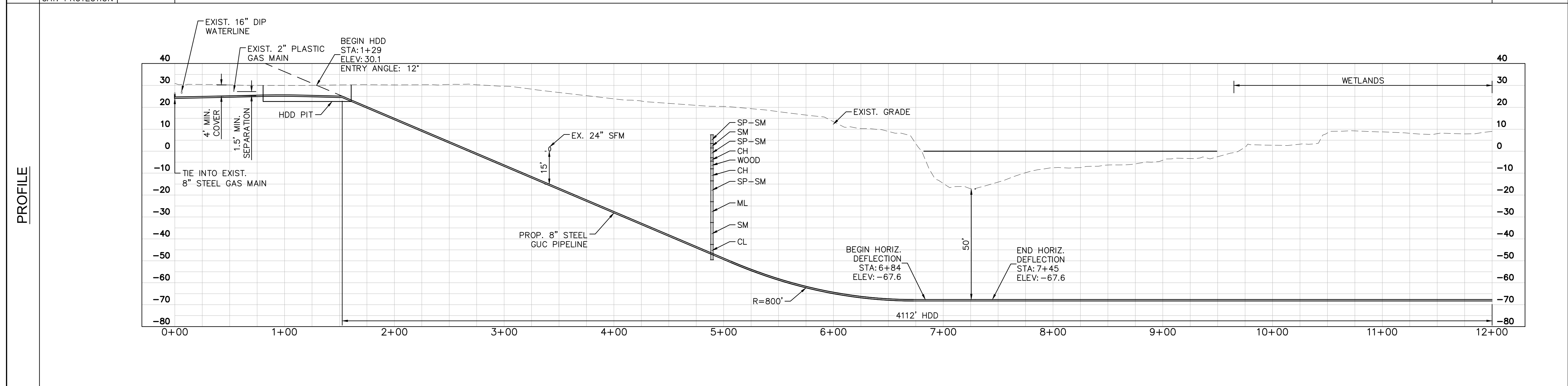
0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.322" W.T., API-5L X-52, ERW

PIPE COATING
A = MIN. 12-14 MILS FBE
B = MIN. 12-14 MILS FBE, DUAL COAT W/ 60 MILS POWERCONCRETE

FITTINGS
1 = 90° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
2 = 45° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
3 = 8" SPHERICAL TEE



0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

CLIENT: **Greenville Utilities**

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **PLAN & PROFILE**

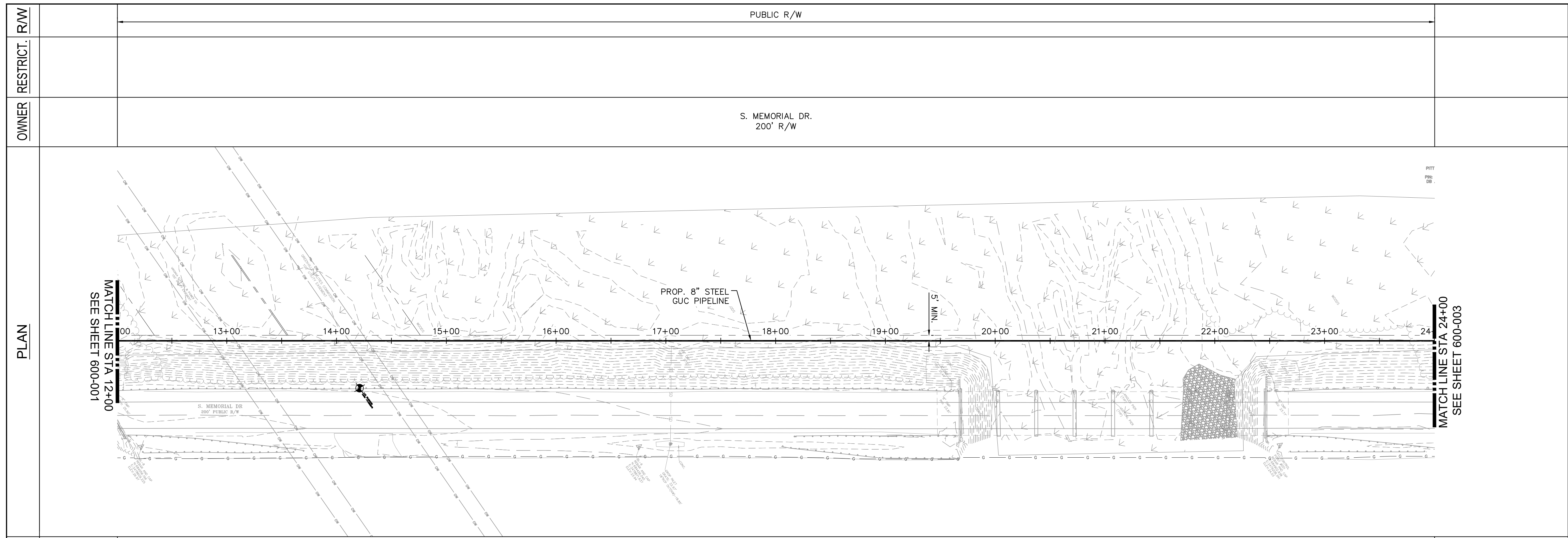
DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL: **NORTH CAROLINA PROFESSIONAL SEAL 44899 P.Y. AND C. CLARK**

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 600-001
SHEET INDEX: 3 OF 18

December 15, 2020 - 10:18am By: Kevin.VanOrd

R:\VAB_CAD\116780000 - GC Memorial Drive\Plan Sheets\600-000 Plan & Profile.dwg



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OH OVERHEAD POWER LINE
- SS SANITARY SEWER LINE
- S SANITARY SEWER FORCE MAIN
- SFM SANITARY SEWER FORCE MAIN
- UGT UG TELECOMMUNICATIONS
- W SUBSURFACE WATER
- RW SUBSURFACE RECLAIMED WATER
- G SUBSURFACE GAS
- E SUBSURFACE ELECTRIC
- UK SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREE LINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TPF TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/JAB PIT
- FILTER RING
- CURB INLET FILTER
- TEST HOLE LOCATION
- INLET PROTECTION
- SILT FENCE OUTLET

NORTH

DETAIL	QUANTITY
PIPE	1
COATING	B
LENGTH (LF)	1200'
FITTINGS	
CAT. PROTECTION	

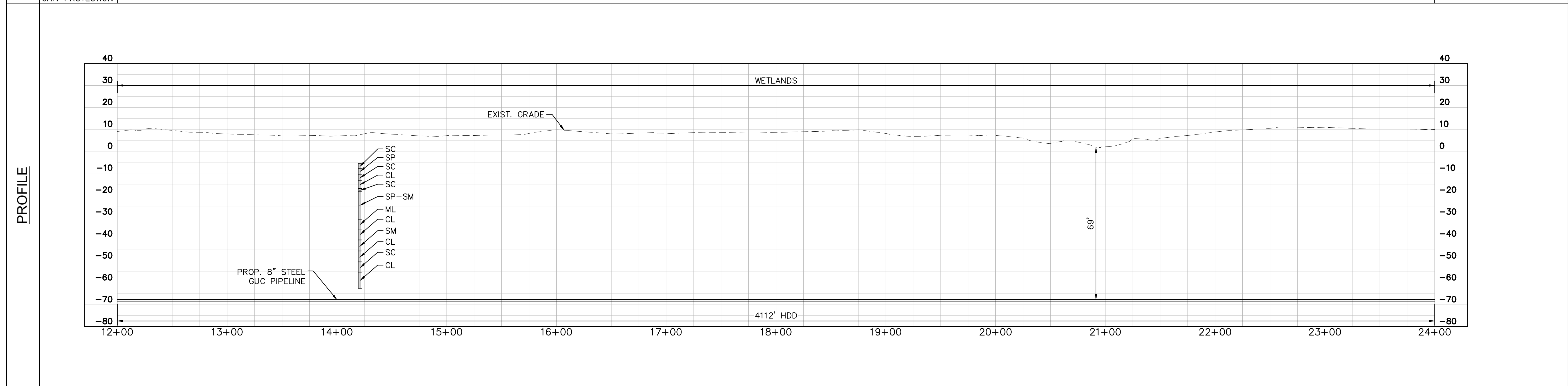
0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.322" W.T., API-5L X-52, ERW

PIPE COATING
A = MIN. 12-14 MILS FBE
B = MIN. 12-14 MILS FBE, DUAL COAT W/ 60 MILS POWERCRETE

FITTINGS
1 = 90° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
2 = 45° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
3 = 8" SPHERICAL TEE



0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **PLAN & PROFILE**

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

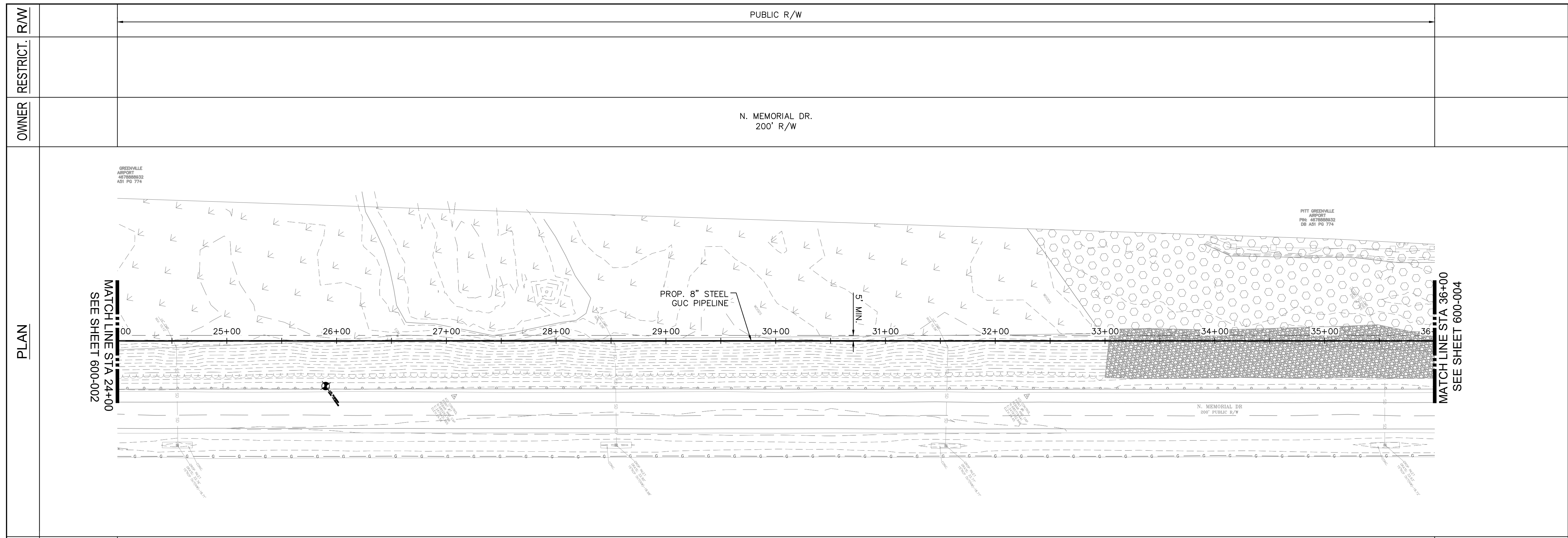
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 44899 P. AND C. CLARK

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 600-002
SHEET INDEX: 4 OF 18

© 2020 Kimley-Horn & Associates, Inc.

December 15, 2020 - 10:18am By: Kevin.VanOrd

K:\VAB-CAD\116780000 - GUC Memorial Bridge\CAD\Plan Sheets\600-000 Plan & Profile.dwg



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OH
- SS
- S
- SFM
- UGT
- W
- RW
- G
- E
- UK
- ACCESS PATH
- PIPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TPF
- TPF
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATting
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/JAB PIT
- FILTER RING
- CURB INLET FILTER
- TEST HOLE LOCATION
- INLET PROTECTION
- SILT FENCE OUTLET

GREENVILLE AIRPORT
4678000032
AS1 PG 774

PIT GREENVILLE AIRPORT
4678000032
OR AS1 PG 774

N. MEMORIAL DR.
200' R/W

PROP. 8" STEEL GUC PIPELINE

5' MIN.

MATCH LINE STA 24+00
SEE SHEET 600-002

MATCH LINE STA 36+00
SEE SHEET 600-004

N. MEMORIAL DR.
200' PUBLIC R/W

0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.322" W.T., API-5L X-52, ERW

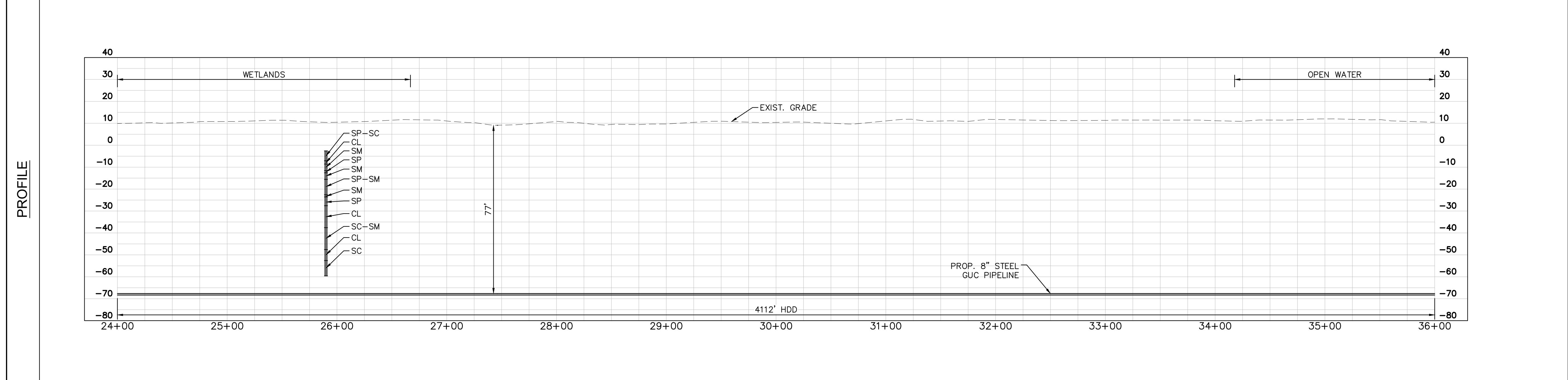
PIPE COATING
A = MIN. 12-14 MILS FBE
B = MIN. 12-14 MILS FBE, DUAL COAT W/ 60 MILS POWERCRETE

FITTINGS
1 = 90° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
2 = 45° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
3 = 8" SPHERICAL TEE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

DETAIL	QUANTITY
PIPE	1
COATING	B
LENGTH (LF)	1200'
FITTINGS	
CAT. PROTECTION	



0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **PLAN & PROFILE**

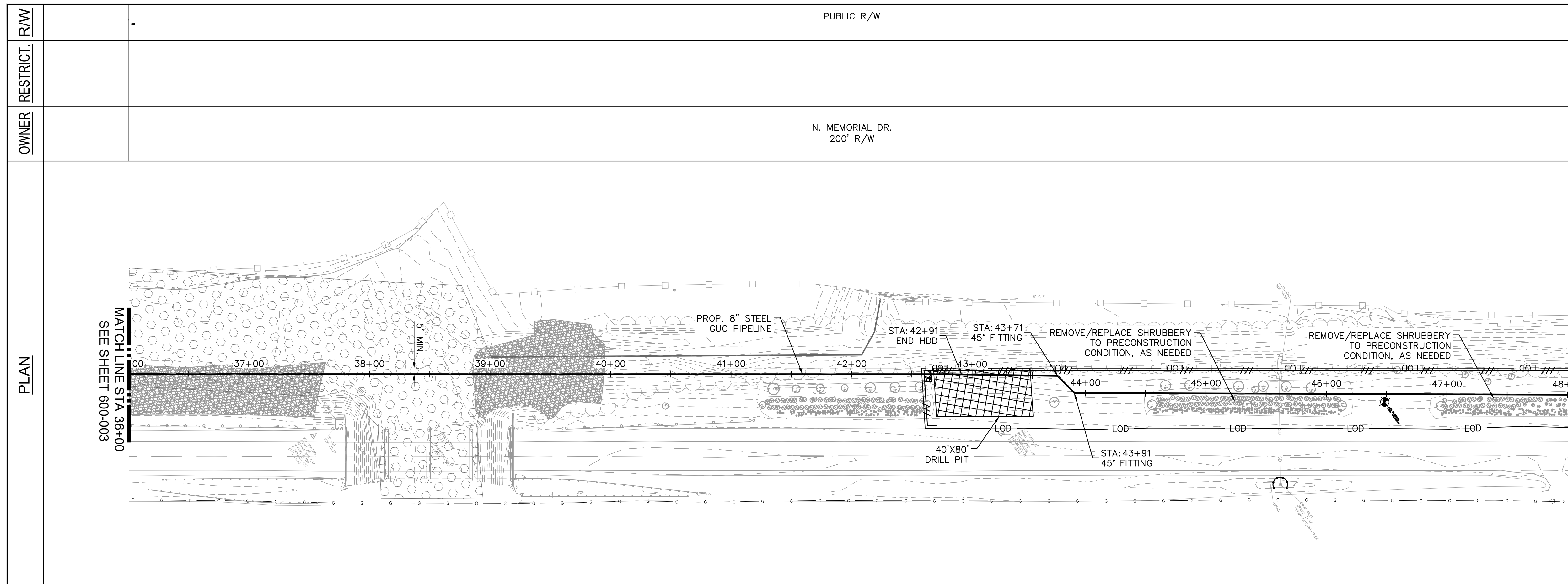
DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL: **North Carolina Professional Engineer**
44899
RYAN D. CLARK

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 600-003
SHEET INDEX: 5 OF 18

December 15, 2020 - 10:18am By: Kevin.VanOrd

K:\VAB_CAD\116780000 - GUC Memorial Drive Bridge\CAD\Plan Sheets\600-000 Plan & Profile.dwg



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OH OVERHEAD POWER LINE
- SS SANITARY SEWER LINE
- S STORM LINE
- SFM SANITARY SEWER FORCE MAIN
- UGT UG TELECOMMUNICATIONS
- W SUBSURFACE WATER
- RW SUBSURFACE RECLAIMED WATER
- G SUBSURFACE GAS
- E SUBSURFACE ELECTRIC
- UK SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREE LINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TPF TREE PROTECTION FENCE
- LOD LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/JAB PIT
- FILTER RING
- CURB INLET FILTER
- TEST HOLE LOCATION
- INLET PROTECTION
- SILT FENCE OUTLET

PIPE BAR

DETAIL	1	1	1	1
PIPE	B	A	A	A
COATING				
LENGTH (LF)	660'	80'	50'	379'
FITTINGS		2	2	
CAT. PROTECTION				

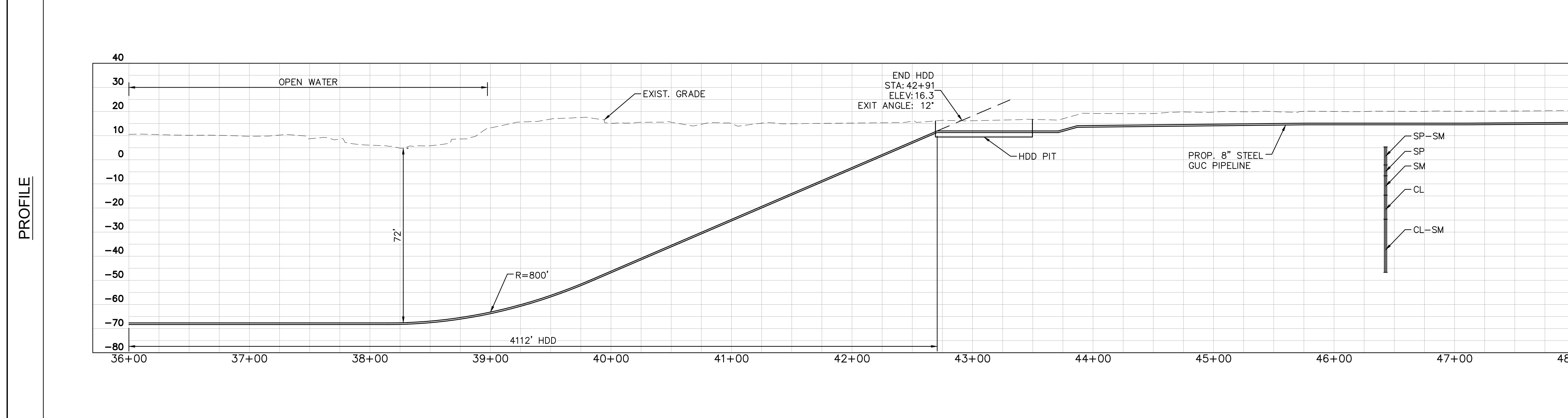
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.322" W.T., API-5L X-52, ERW

PIPE COATING
A = MIN. 12-14 MILS FBE
B = MIN. 12-14 MILS FBE, DUAL COAT W/ 60 MILS POWERCRETE

FITTINGS
1 = 90° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
2 = 45° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
3 = 8" SPHERICAL TEE



HORIZONTAL SCALE: 1"=50'

VERTICAL SCALE: 1"=25'

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

© 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **PLAN & PROFILE**

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

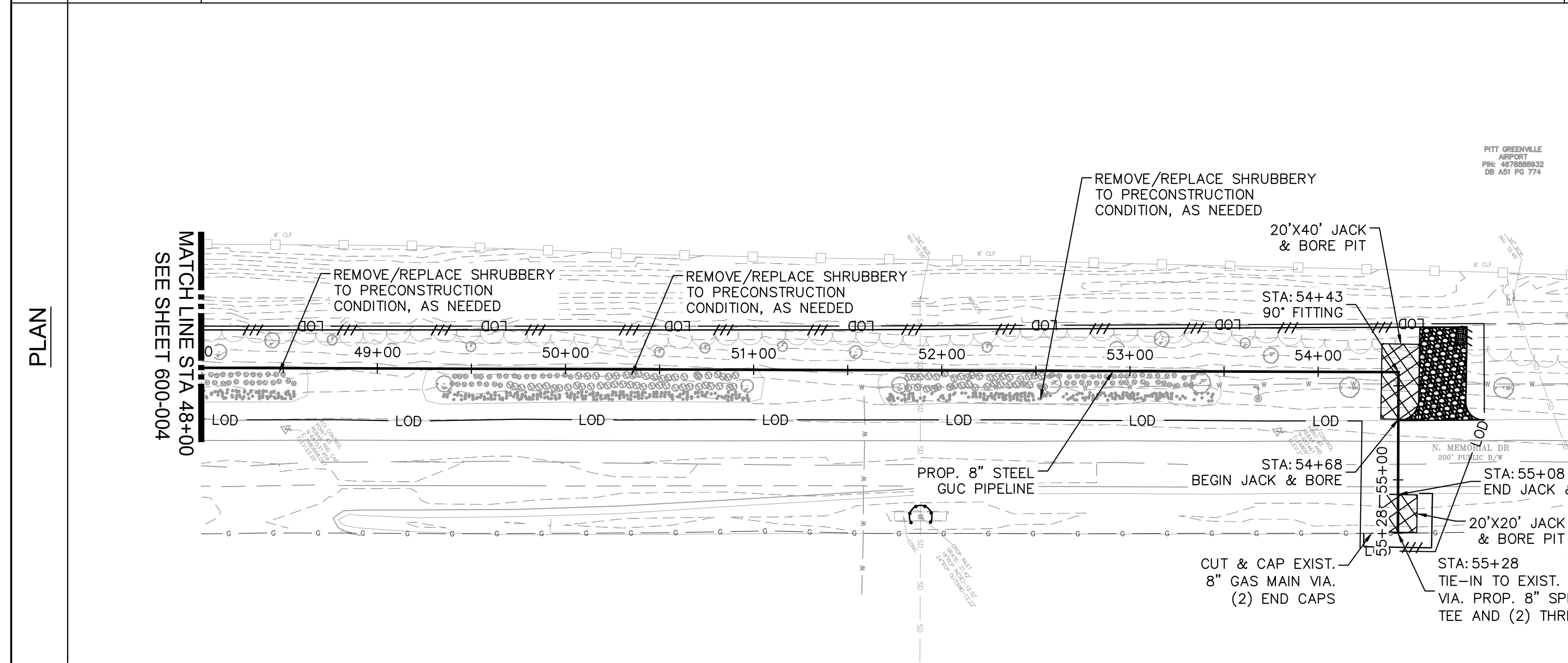
SEAL: **North Carolina Professional Engineer**
44899
RYAN D. CLARK

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 600-004
SHEET INDEX: 6 OF 18

December 15, 2020 - 10:18am By: Kevin.VanOrd

K:\VAB-CAD\116780000 - GUC Memorial Drive Bridge\CAD\Plan Sheets\600-000 Plan & Profile.dwg

OWNER	N. MEMORIAL DR. 200' R/W
RESTRICT.	
R/W	PUBLIC R/W



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OH OVERHEAD POWER LINE
- SS SANITARY SEWER LINE
- S STORM LINE
- SFM SANITARY SEWER FORCE MAIN
- UGT SUBSURFACE TELECOMMUNICATIONS
- W SUBSURFACE WATER
- RW SUBSURFACE RECLAIMED WATER
- G SUBSURFACE GAS
- E SUBSURFACE ELECTRIC
- UK SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TPF TREE PROTECTION FENCE
- LOD LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/JAB PIT
- CURB INLET FILTER
- INLET PROTECTION
- FILTER RING
- TEST HOLE LOCATION
- SILT FENCE OUTLET

NORTH

PIPE BAR

DETAIL	QUANTITY	UNIT	DESCRIPTION
PIPE	1	LINEAL FOOT	8" STEEL GUC PIPELINE
COATING	A	LINEAL FOOT	12-14 MILS FBE
LENGTH (LF)	643'		
FITTINGS	1		90° FITTING
CAT. PROTECTION	3		8" SPHERICAL TEE

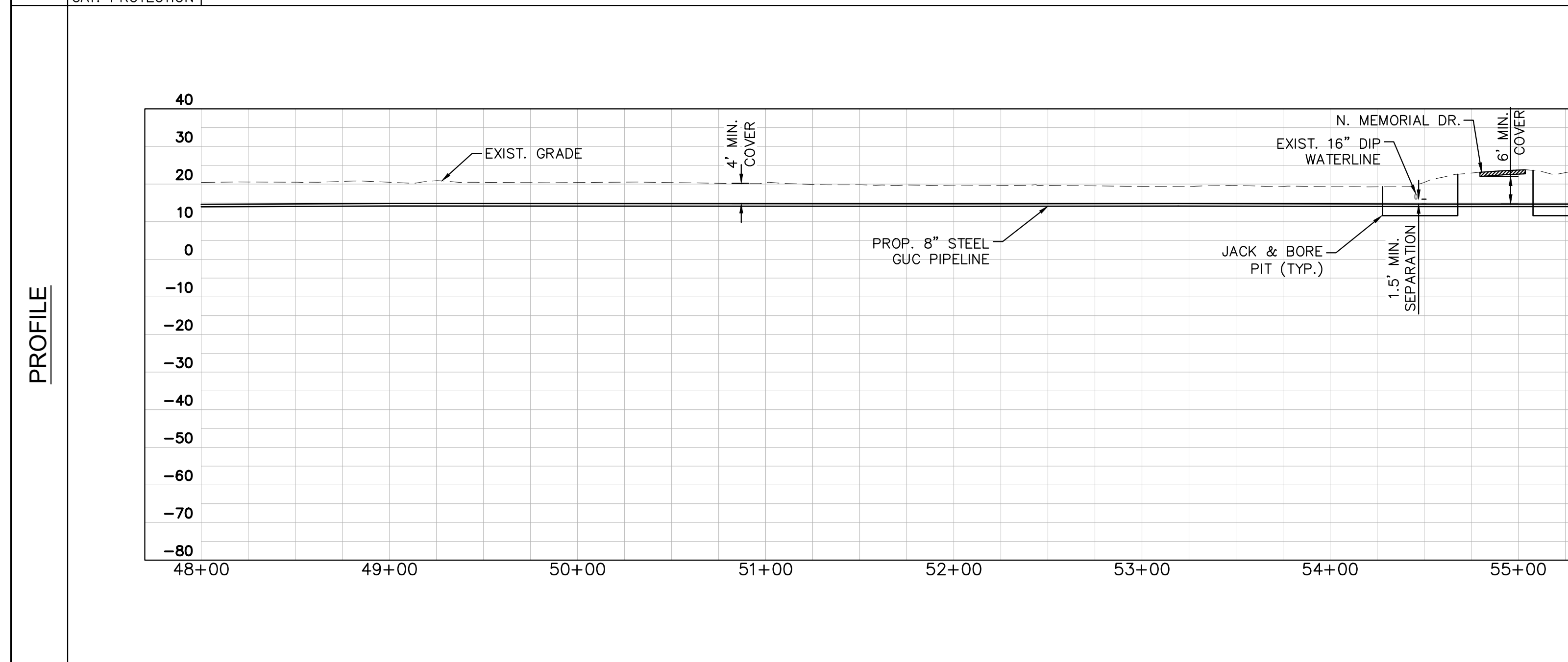
0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.322" W.T., API-5L X-52, ERW

PIPE COATING
A = MIN. 12-14 MILS FBE
B = MIN. 12-14 MILS FBE, DUAL COAT W/ 60 MILS POWERCONCRETE

FITTINGS
1 = 90° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
2 = 45° 8.625" O.D. 0.322" W.T. Y-52-LR, C.I.D. FIELD SEGMENTABLE
3 = 8" SPHERICAL TEE



0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

CLIENT: **Greenville Utilities**

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.

PROJECT NAME:
MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA

SHEET TITLE:
PLAN & PROFILE

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL: **NORTH CAROLINA PROFESSIONAL ENGINEER**
44899
RYAN D. CLARK

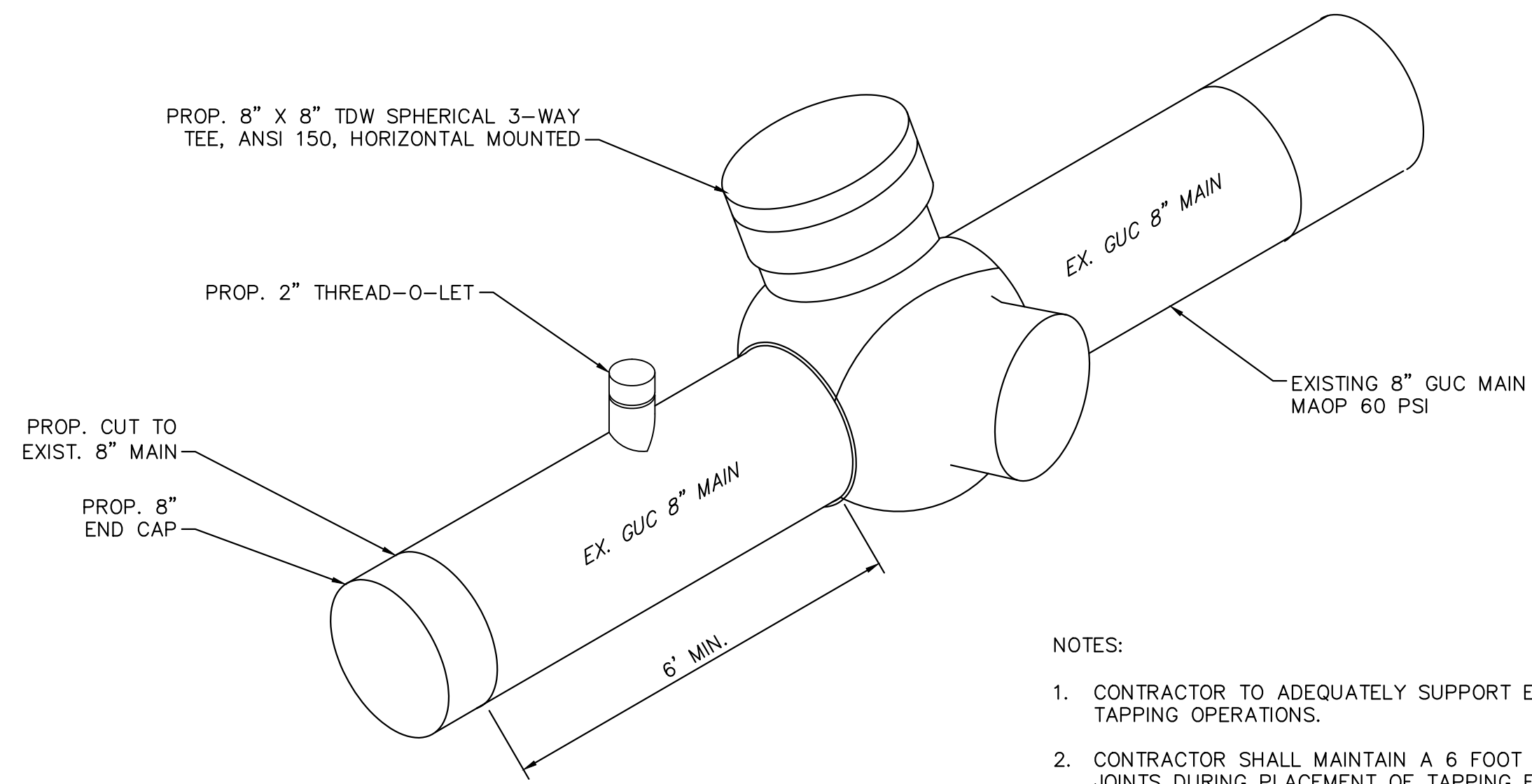
KHA PROJECT NUMBER:
11678000

DRAWING NUMBER:
600-005

SHEET INDEX:
7 OF 18

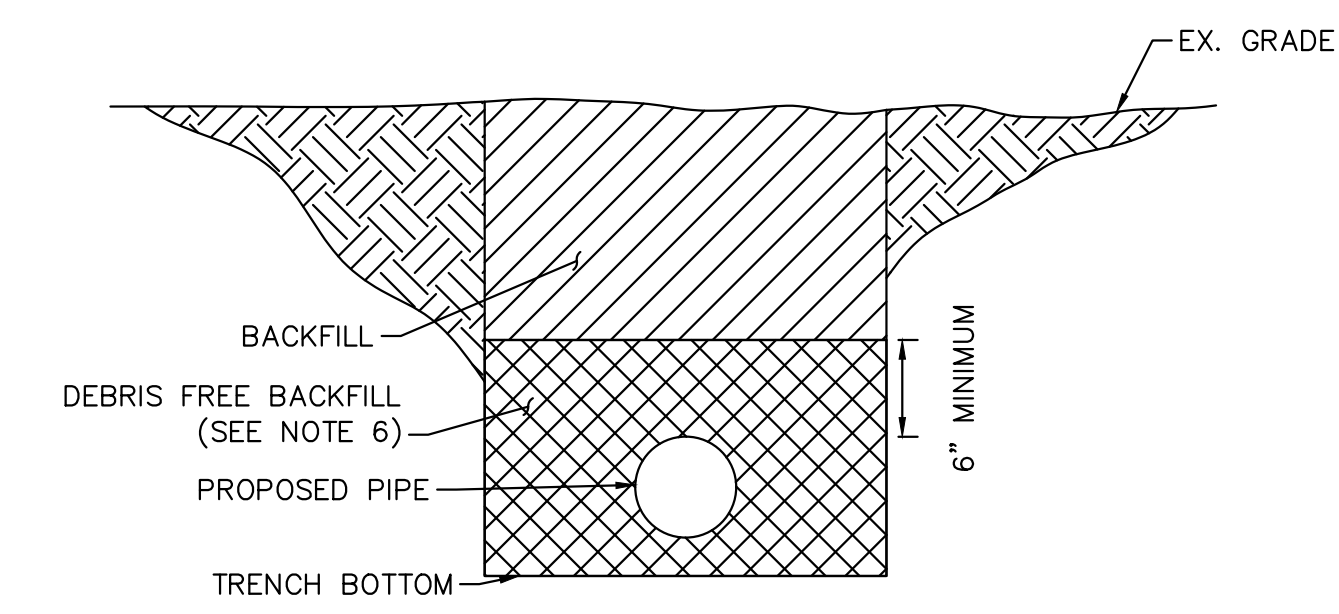
December 15, 2020 - 10:10am By: Kevin VonOrt

K:\VAB_CAD\116780000 - GUC Memorial Drive Bridge\CAD\Plan Sheets\600-000 Plan & Profile.dwg



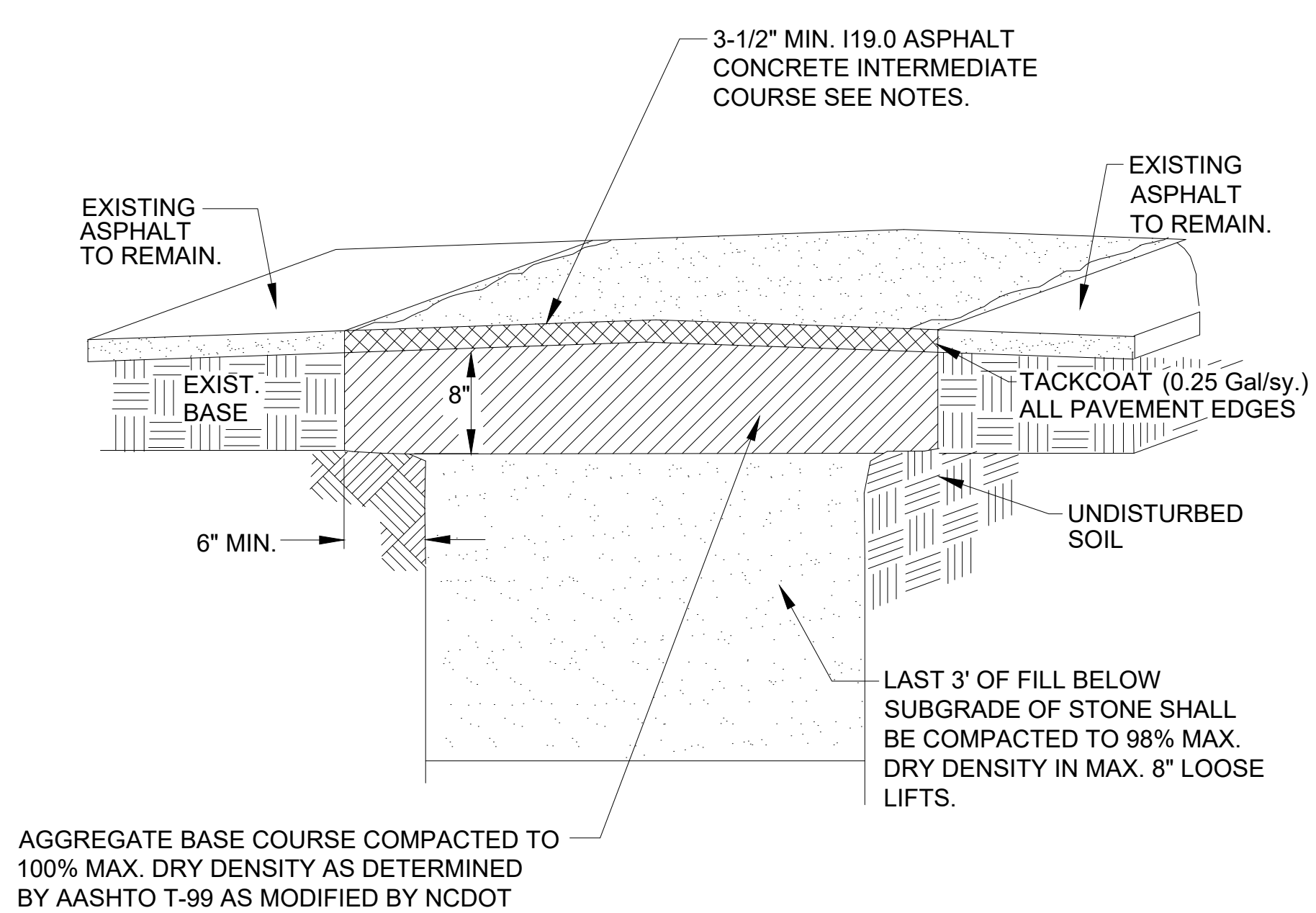
- NOTES:
1. CONTRACTOR TO ADEQUATELY SUPPORT EXISTING 8" MAIN DURING TAPPING OPERATIONS.
 2. CONTRACTOR SHALL MAINTAIN A 6 FOOT SEPARATION FROM EXISTING JOINTS DURING PLACEMENT OF TAPPING FITTING.

8" HOT TAP DETAIL
N.T.S.



TRENCH DETAIL
N.T.S.

- NOTES:
1. ENSURE TRENCH IS FREE OF ROCKS AND OTHER OBJECTS THAT COULD DAMAGE THE PIPE
 2. ENSURE TRENCH IS AT THE PROPER DEPTH TO ALLOW 3 FEET OF COVER FROM TOP OF PIPE TO FINISHED SURFACE.
 3. USE A HOLIDAY DETECTOR TO FIND PINHOLES IN COATING AND REPAIR PRIOR TO LOWERING PIPE INTO DITCH.
 4. IF ROCK IS FOUND ALONG TRENCH CONTRACTOR SHALL INSTALL SAND BAGS OR FOAM PILLOWS EVERY 15 FEET TO SUPPORT PIPE ALONG TRENCH BED.
 5. PIPE SHALL BE ADEQUATELY SUPPORTED DURING LOWERING INTO DITCH. LIFT PIPE USING NYLON SLING OR OTHER APPROPRIATE DEVICES.
 6. FIRST 6" OF BACKFILL SHOULD BE FREE OF ROCK AND OTHER MATERIALS THAT COULD DAMAGE THE PIPE OR PIPE COATING.
 7. DO NOT USE EXCESSIVE FORCE TO TAMPER DIRECTLY OVER THE PIPE ON THE FIRST 6" OF BACKFILL.
 8. ENSURE FINAL DITCH COVER IS FLUSH WITH SURROUNDING GROUND.

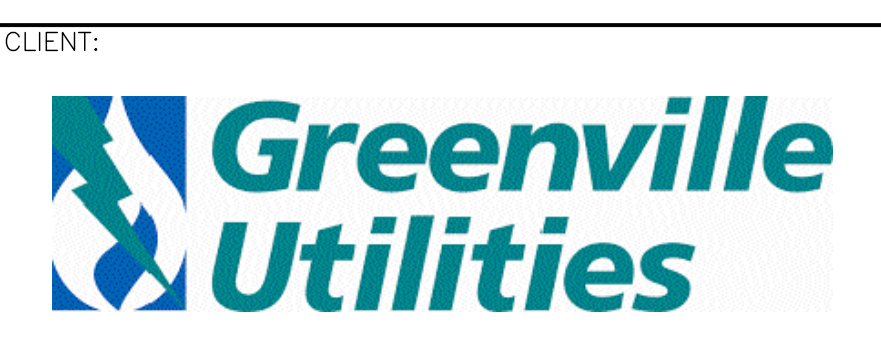


- NOTES:
1. CONTRACTOR SHALL PATCH PAVEMENT TO THE SAME PAVEMENT PROFILE AS EXISTED PRIOR TO REMOVING PAVEMENT.
 2. WHERE PATCH OF ASPHALT CURBING OCCURS CONTRACTOR SHALL MATCH EXISTING CURB GRADES WITHIN 0.02 FEET. PATCHES THAT ARE ABOVE THE CURB GRADE LINE WILL NOT BE ACCEPTABLE AND SHALL BE REMOVED AND REPLACED. CURB PATCH SHALL BE THE SAME SHAPE/TEMPLATE AS THE EXISTING CURB.
 3. CONTRACTOR SHALL BE REQUIRED TO PROVIDE TRAFFIC CONTROL AND DEVICES AS REQUIRED BY THE M.U.T.C.D. OR N.C. SUPPLEMENT. WORK CANNOT PROCEED UNTIL THE MEASURES ARE IN PLACE. CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT NEW PAVEMENT FROM TRAFFIC AND OTHER SOURCES OF DAMAGE UNTIL ASPHALT HAS SUFFICIENTLY COOLED TO PREVENT DAMAGE.
 4. CONTRACTOR SHALL SAWCUT EXISTING PAVEMENT STRAIGHT AND TRUE IMMEDIATELY PRIOR TO PAVING. THE FINAL PRODUCT SHALL BE SUBJECT TO THE OWNERS APPROVAL.
 5. PATCH PAVING ON N.C.D.O.T. MAINTAINED ROADS SHALL BE IN ACCORDANCE WITH THE APPROVED N.C.D.O.T. ENCROACHMENT.
 6. PAVEMENT REPAIR DETAIL DOES NOT INCLUDE ASPHALT SURFACE COURSE BECAUSE IT IS INTENDED FOR AREAS THAT WILL HAVE UTILITY WORK DONE IN ADVANCE OF FINAL PAVEMENT SURFACE. MILL AND OVERLAY OF THE PAVEMENT REPAIR AREA ALONG WITH ADJACENT ROADWAY IS ANTICIPATED.

PAVEMENT REPAIR DETAIL
N.T.S.

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

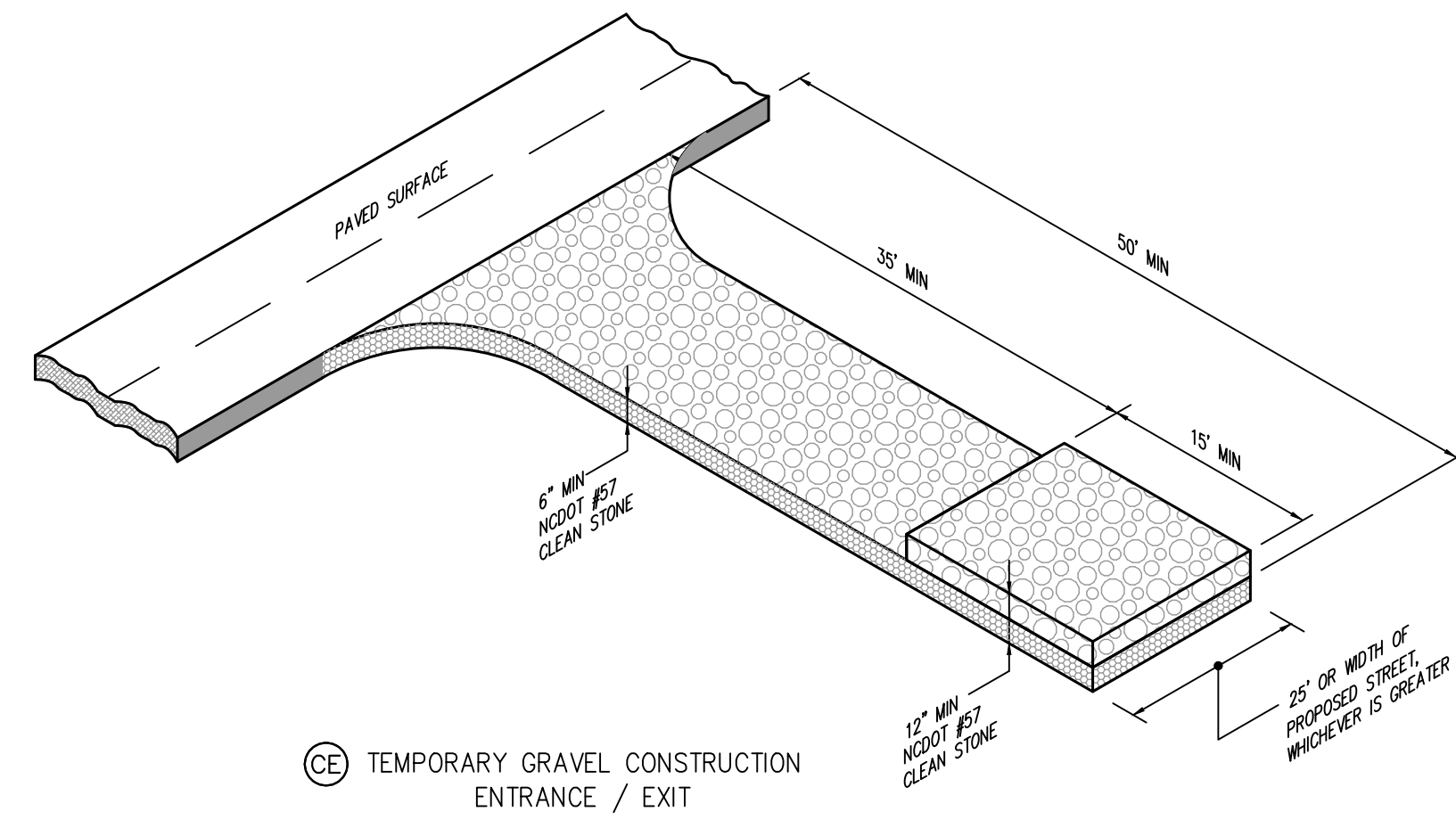
ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.



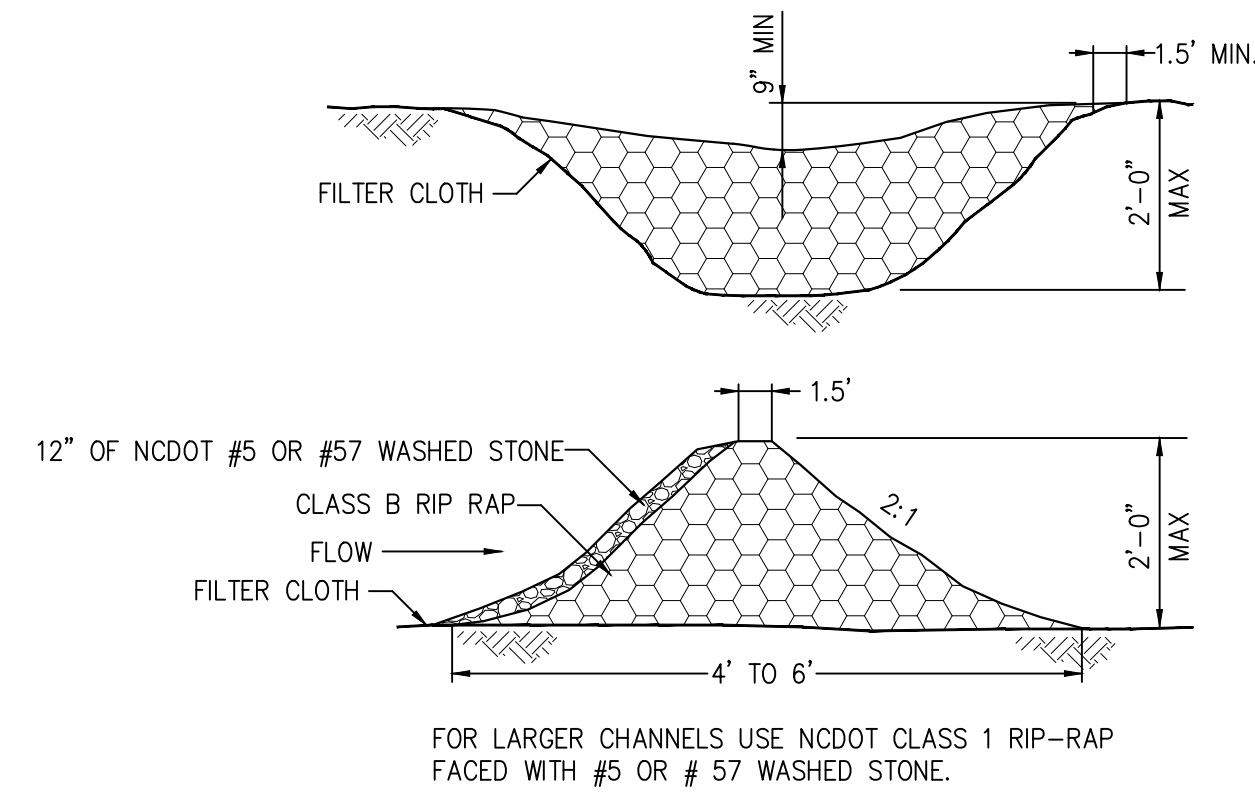
PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA
SHEET TITLE: **DETAILS**

DATE: 10/15/20
SCALE (H.V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)
SEAL: NORTH CAROLINA PROFESSIONAL SEAL 44899 P. AND. CLARK ENGINEER

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 800-001
SHEET INDEX: 8 OF 18



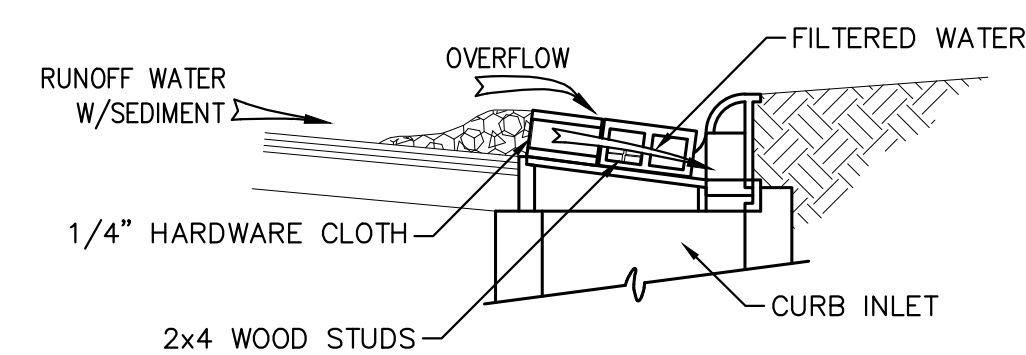
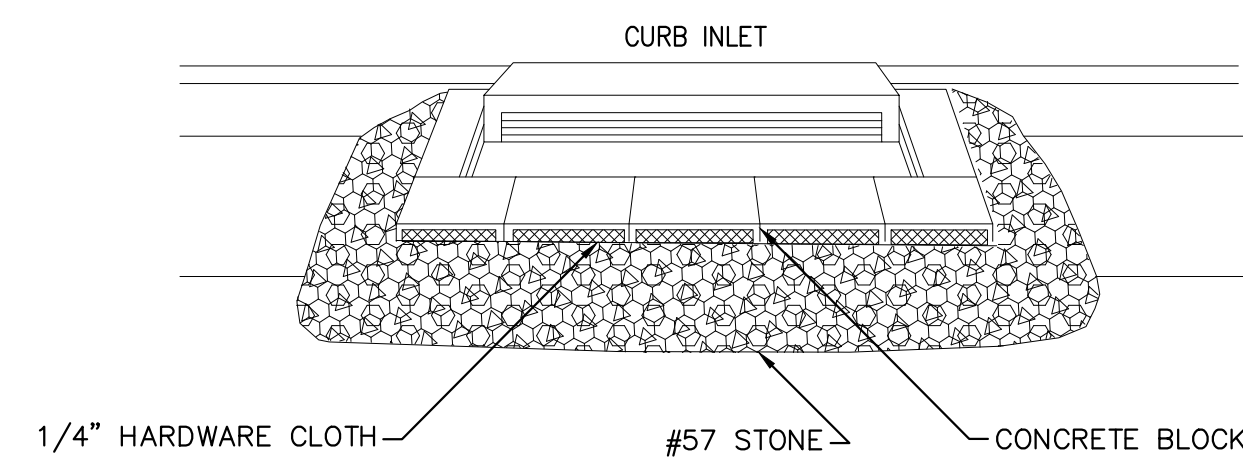
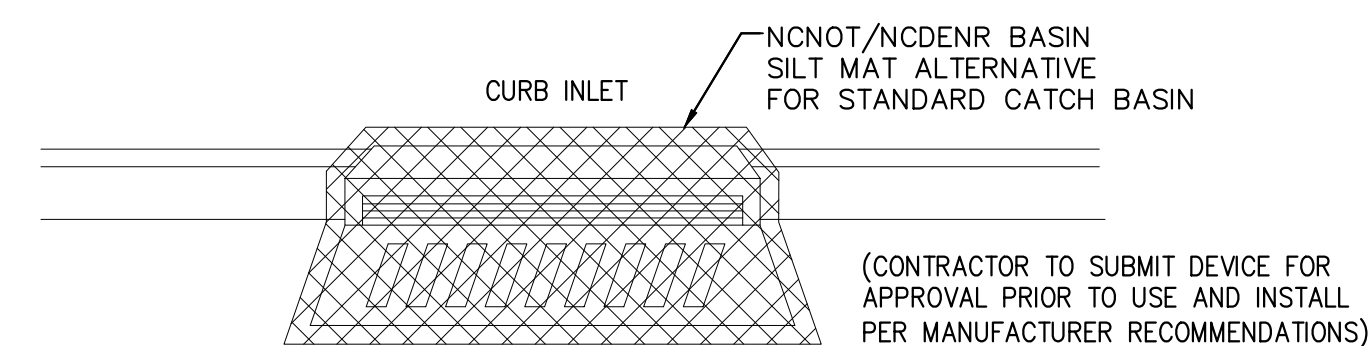
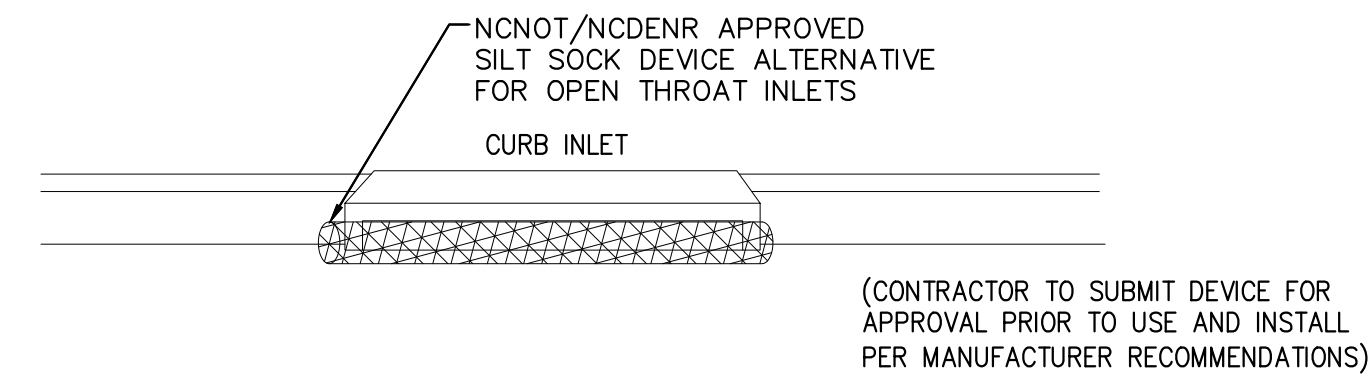
CE TEMPORARY GRAVEL CONSTRUCTION ENTRANCE / EXIT



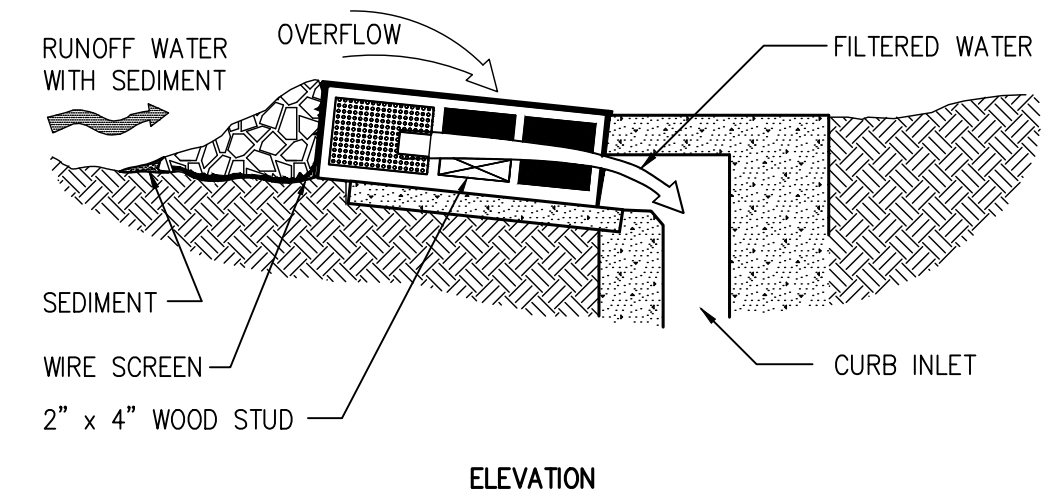
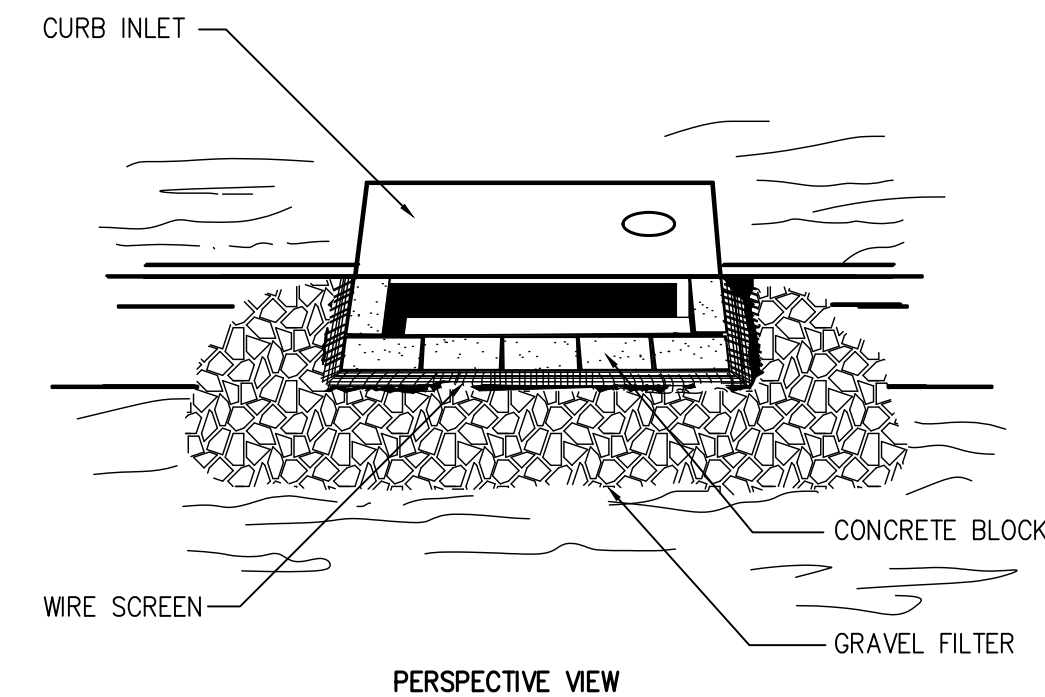
CD STONE CHECK DAM

NOTES:

1. EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED.
2. STOCKPILE LOCATIONS AND LAY DOWN AREAS SHALL BE LOCATED WITHIN THE EXISTING CONSTRUCTION LIMITS AS SHOWN ON THE PLANS. CONSTRUCTION ENTRANCES SHALL BE PLACED AS NEEDED BY THE CONTRACTOR ACCORDING TO THE STANDARD DETAILS IN THE DRAWINGS.
3. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH TEMPORARY SEEDING.
4. SEEDING SHALL BE AS SPECIFIED FOR DISTURBED AREAS. AFTER SEEDING, THE AREA SHALL BE ROLLED AND MULCHED WITH FINE GRAIN STRAW AT THE APPLICATION RATE SPECIFIED (SEE CONTRACT DOCUMENTS). AN ASPHALTIC COAT, OR APPROVED EQUAL TREATMENT AT RATE OF 25-35 GAL. / 1,000 SQ.FT..
5. PROVIDE FOR GROUND COVER ON EXPOSED SLOPES WITHIN 21 CALENDAR DAYS FOLLOWING COMPLETION OF ANY PHASE OF GRADING; PERMANENT GROUND COVER FOR ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR 90 CALENDAR DAYS (WHICHEVER IS SHORTER), FOLLOWING COMPLETION OF CONSTRUCTION OR DEVELOPMENT.



IP CURB INLET PROTECTION



SPECIAL APPLICATION
 THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.
 * GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

IP BLOCK & GRAVEL CURB INLET SEDIMENT FILTER

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **E&SC DETAILS**

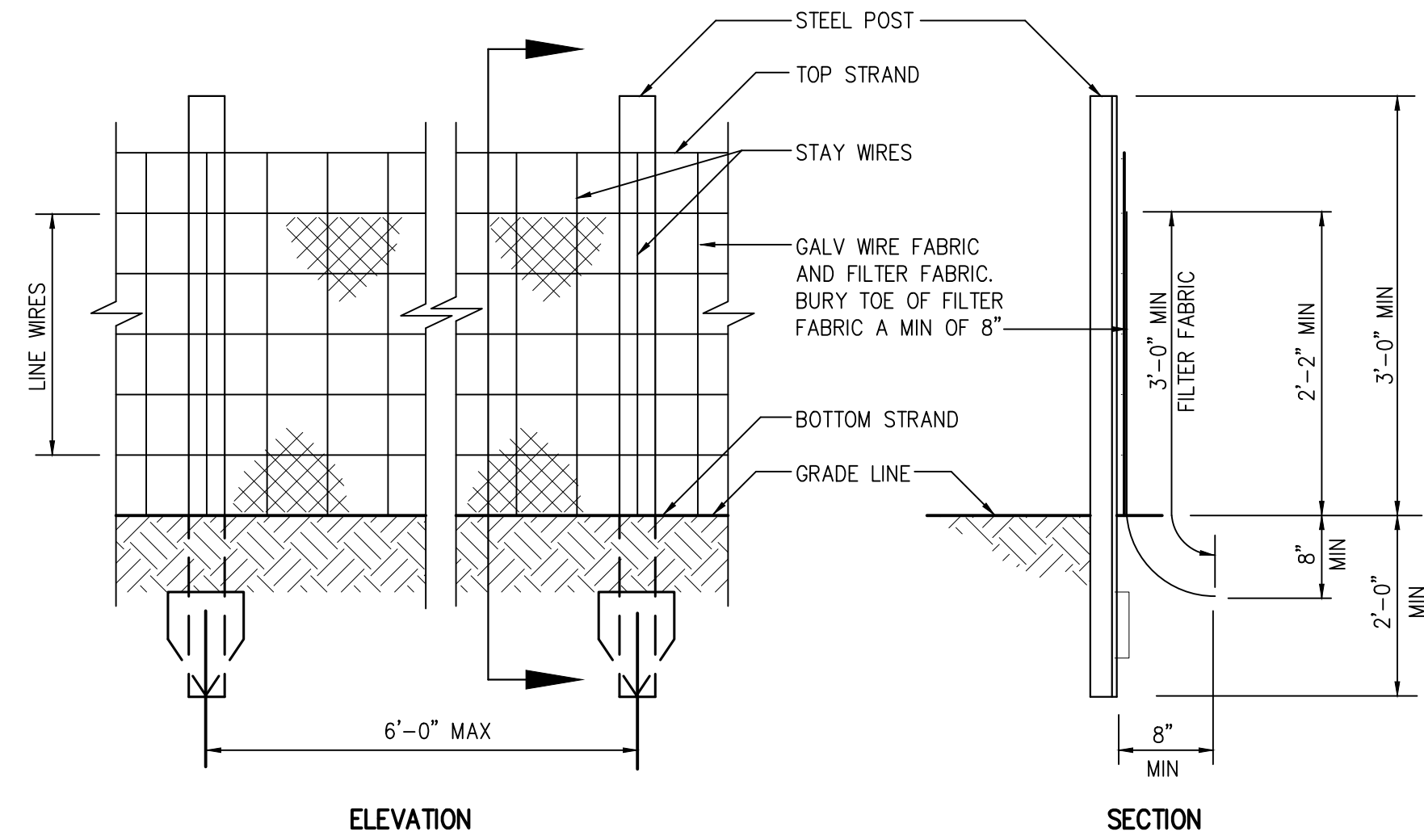
DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)

SEAL: **PROFESSIONAL ENGINEER**
 NORTH CAROLINA
 44899
 P. AND. CLARK

KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 800-002
 SHEET INDEX: 9 OF 18

NOTES:

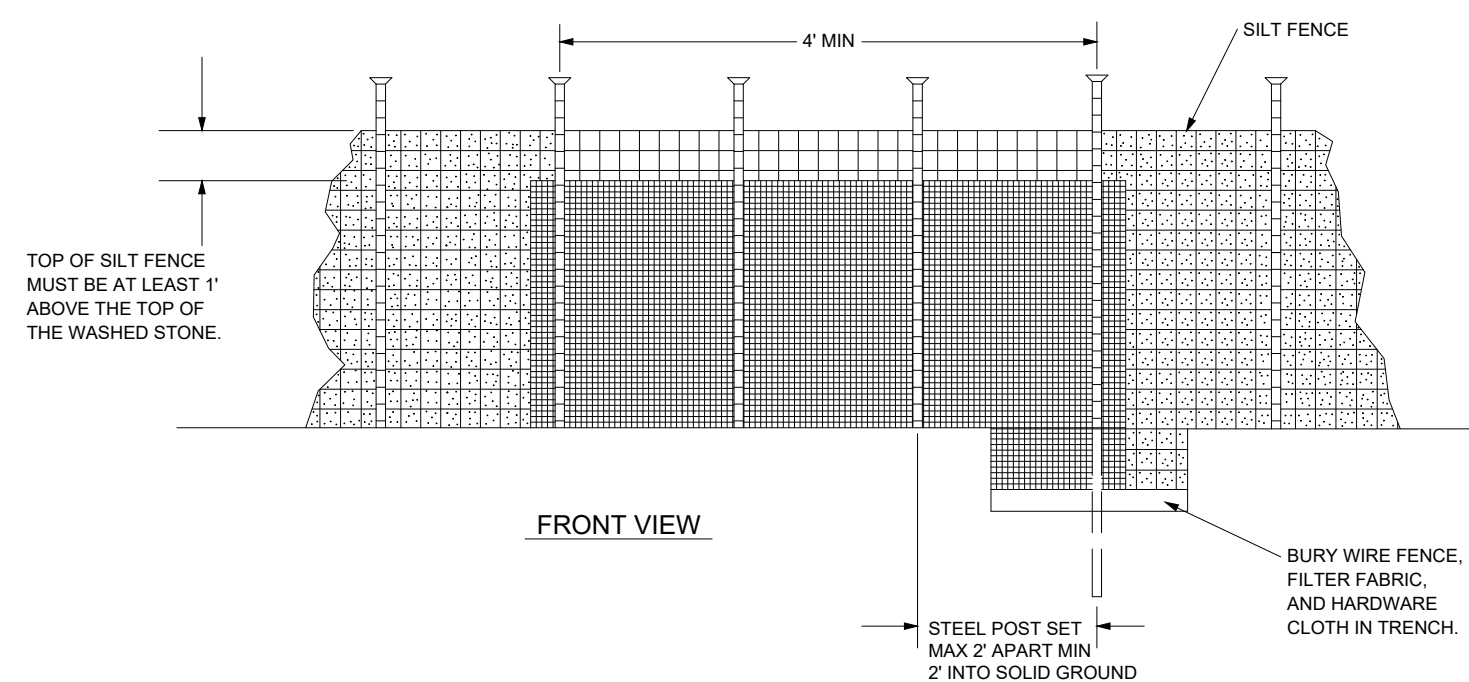
1. EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED ACCORDING TO THE CONTRACT DOCUMENTS AND AS DIRECTED BY THE ENGINEER. ALL DEVICES SHALL BE MAINTAINED SUCH THAT THEY FUNCTION AS INTENDED.
2. STOCKPILE LOCATIONS AND LAY DOWN AREAS SHALL BE LOCATED WITHIN THE EXISTING CONSTRUCTION LIMITS AS SHOWN ON THE PLANS. CONSTRUCTION ENTRANCES SHALL BE PLACED AS NEEDED BY THE CONTRACTOR ACCORDING TO THE STANDARD DETAILS IN THE DRAWINGS.
3. ANY DISTURBED AREA LEFT EXPOSED FOR A PERIOD GREATER THAN 14 DAYS SHALL BE STABILIZED WITH TEMPORARY SEEDING.
4. SEEDING SHALL BE AS SPECIFIED FOR DISTURBED AREAS. AFTER SEEDING, THE AREA SHALL BE ROLLED AND MULCHED WITH FINE GRAIN STRAW AT THE APPLICATION RATE SPECIFIED (SEE CONTRACT DOCUMENTS). AN ASPHALTIC COAT, OR APPROVED EQUAL TREATMENT AT RATE OF 25-35 GAL. / 1,000 SQ.FT..
5. PROVIDE FOR GROUND COVER ON EXPOSED SLOPES WITHIN 21 CALENDAR DAYS FOLLOWING COMPLETION OF ANY PHASE OF GRADING; PERMANENT GROUND COVER FOR ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR 90 CALENDAR DAYS (WHICHEVER IS SHORTER), FOLLOWING COMPLETION OF CONSTRUCTION OR DEVELOPMENT.



(SF) SILT FENCE

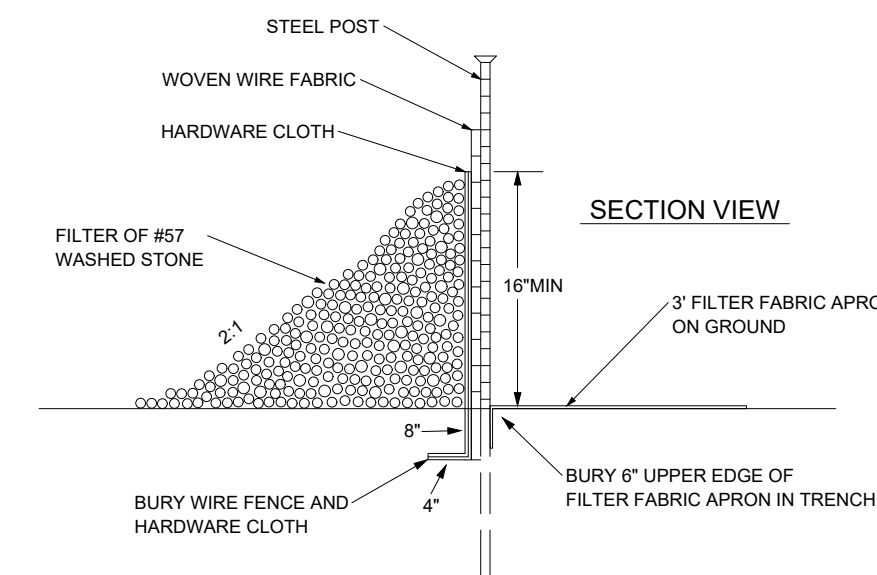
NOTE:

1. EXTRA STRENGTH FILTER FABRIC (AS APPROVED BY ENGINEER) WITH 6'-0" POST SPACING DOES NOT REQUIRE MESH SUPPORT FENCE.
2. FILTER FABRIC SHALL BE WIRED DIRECTLY TO POST.



NOTES:

1. REMOVE SEDIMENT WHEN HALF OF STONE OUTLET IS COVERED.
2. REPLACE STONE AS NEEDED TO ENSURE DEWATERING.



(SF) SILT FENCE OUTLET

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT
 PITT COUNTY, NORTH CAROLINA**

SHEET TITLE: **E&SC DETAILS CONT.**

DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)

SEAL: **PROFESSIONAL ENGINEER
 NORTH CAROLINA
 44899
 P. AND. CLARK**

KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 800-003
 SHEET INDEX: 10 OF 18

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT
 Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"> Temporary grass seed covered with straw or other mulches and tackifiers Hydroseeding Rolled erosion control products with or without temporary grass seed Appropriately applied straw or other mulch Plastic sheeting 	<ul style="list-style-type: none"> Permanent grass seed covered with straw or other mulches and tackifiers Geotextile fabrics such as permanent soil reinforcement matting Hydroseeding Shrubs or other permanent plantings covered with mulch Uniform and evenly distributed ground cover sufficient to restrain erosion Structural methods such as concrete, asphalt or retaining walls Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

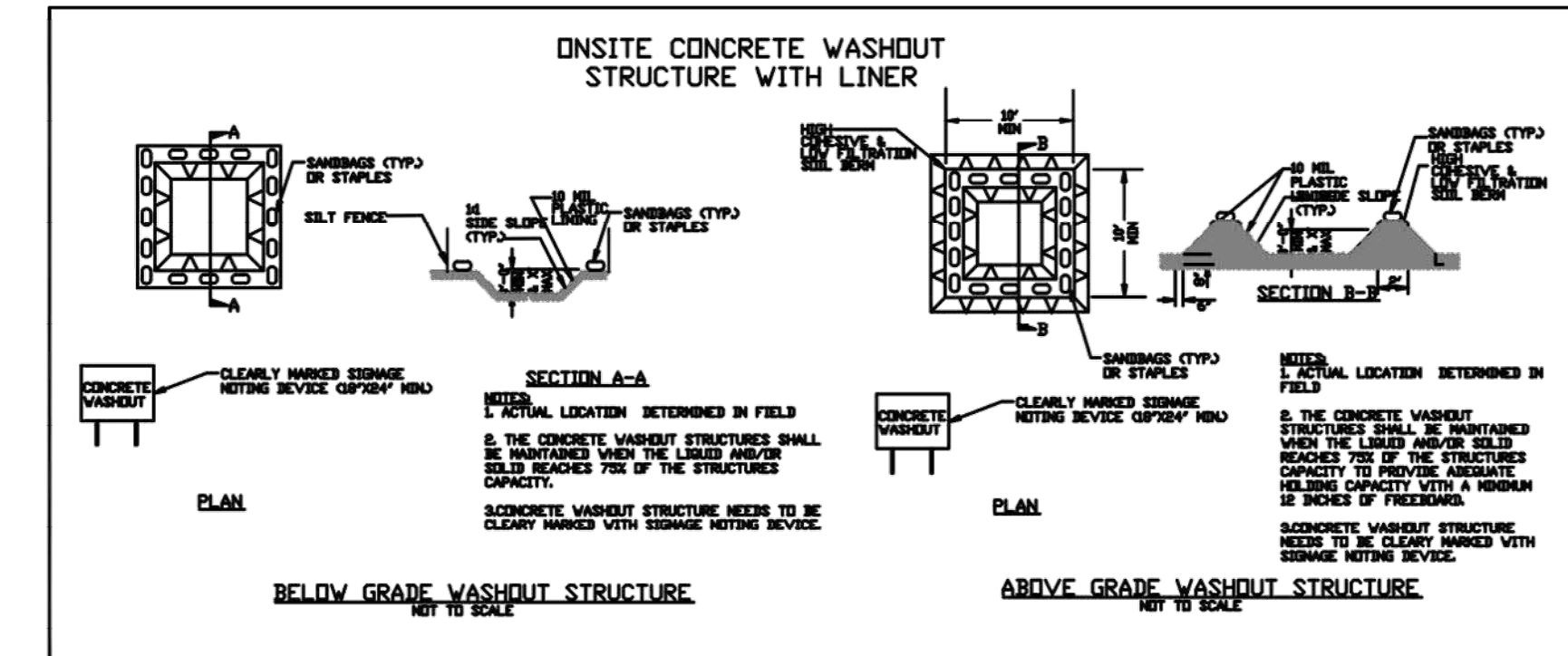
- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



CONCRETE WASHOUTS

- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
 PITT COUNTY, NORTH CAROLINA
 SHEET TITLE: **NCG01 GROUND STABILIZATION AND MATERIALS HANDLING**

DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)

SEAL: **NORTH CAROLINA PROFESSIONAL ENGINEER 44899 P. AND C. CLARK**

KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 800-004
 SHEET INDEX: 11 OF 18

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be documented in the manner described:

Item to Document	Documentation Requirements
(a) Each E&SC Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC Plan.	Initial and date each E&SC Measure on a copy of the approved E&SC Plan or complete, date and sign an inspection report that lists each E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC Plan.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC Measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC Measures.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation

In addition to the E&SC Plan documents above, the following items shall be kept on the site and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

- (a) This general permit as well as the certificate of coverage, after it is received.
- (b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.
- (c) All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

**PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

SECTION C: REPORTING

1. Occurrences that must be reported

Permittees shall report the following occurrences:

- (a) Visible sediment deposition in a stream or wetland.

- (b) Oil spills if:
 - They are 25 gallons or more,
 - They are less than 25 gallons but cannot be cleaned up within 24 hours,
 - They cause sheen on surface waters (regardless of volume), or
 - They are within 100 feet of surface waters (regardless of volume).

- (a) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

- (b) Anticipated bypasses and unanticipated bypasses.

- (c) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	<ul style="list-style-type: none"> • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6)]. • Division staff may waive the requirement for a written report on a case-by-case basis.



NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA**

SHEET TITLE: **NCG01 SELF-INSPECTION,
RECORDKEEPING AND REPORTING**

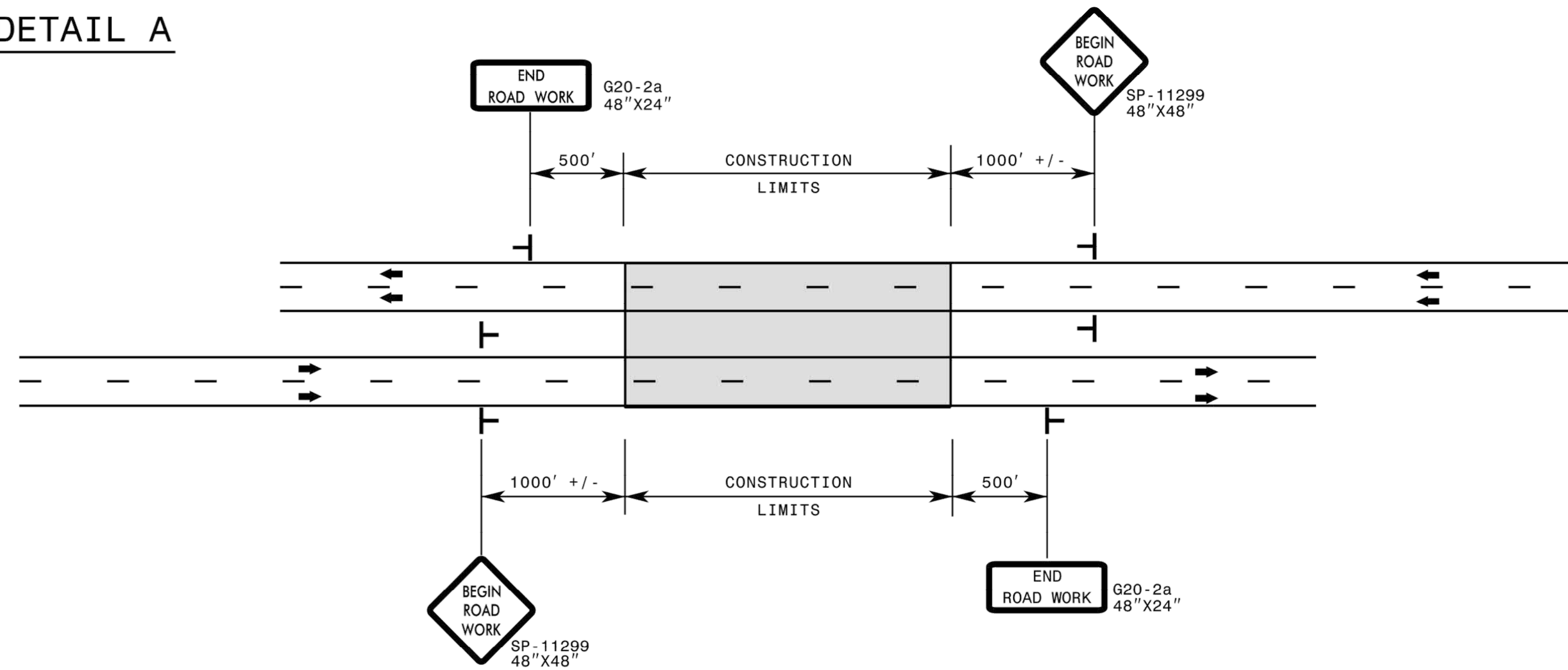
DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)

SEAL:

KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 800-005
 SHEET INDEX: 12 OF 18

December 15, 2020 - 10:20am By: Kevin.VanOrd

DETAIL A



GENERAL NOTES

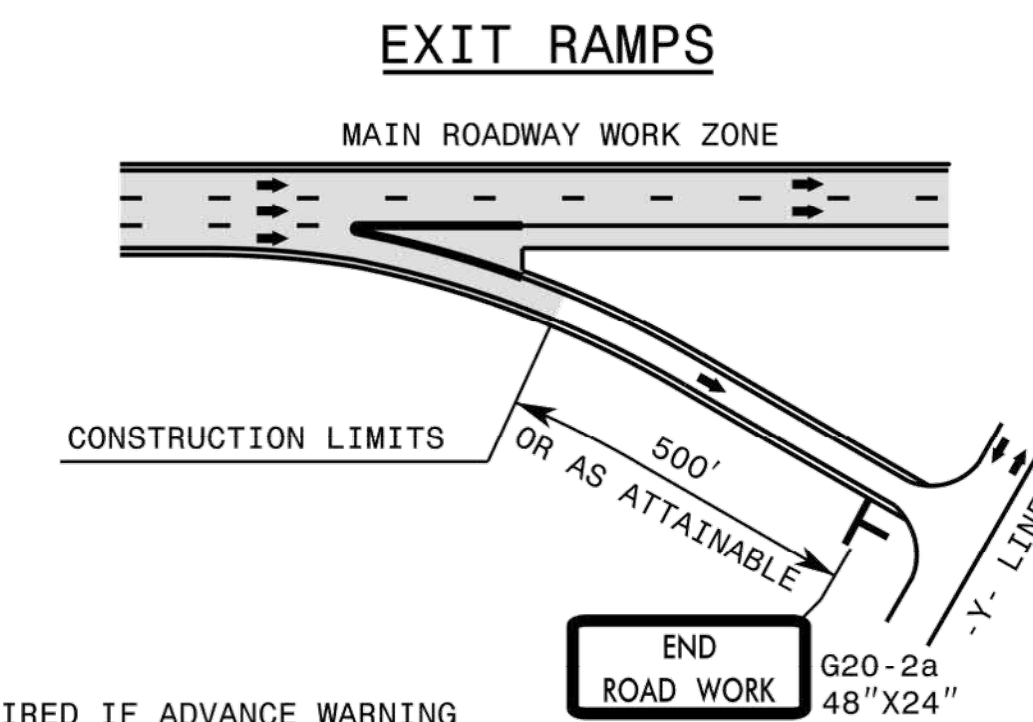
- 1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
- 2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.
- 3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- 4- ERECT SIGNS PER RSD. 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.
- 5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.
- 6- DO NOT BACK BRACE SIGN SUPPORTS.
- 7- TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND

└ STATIONARY SIGN

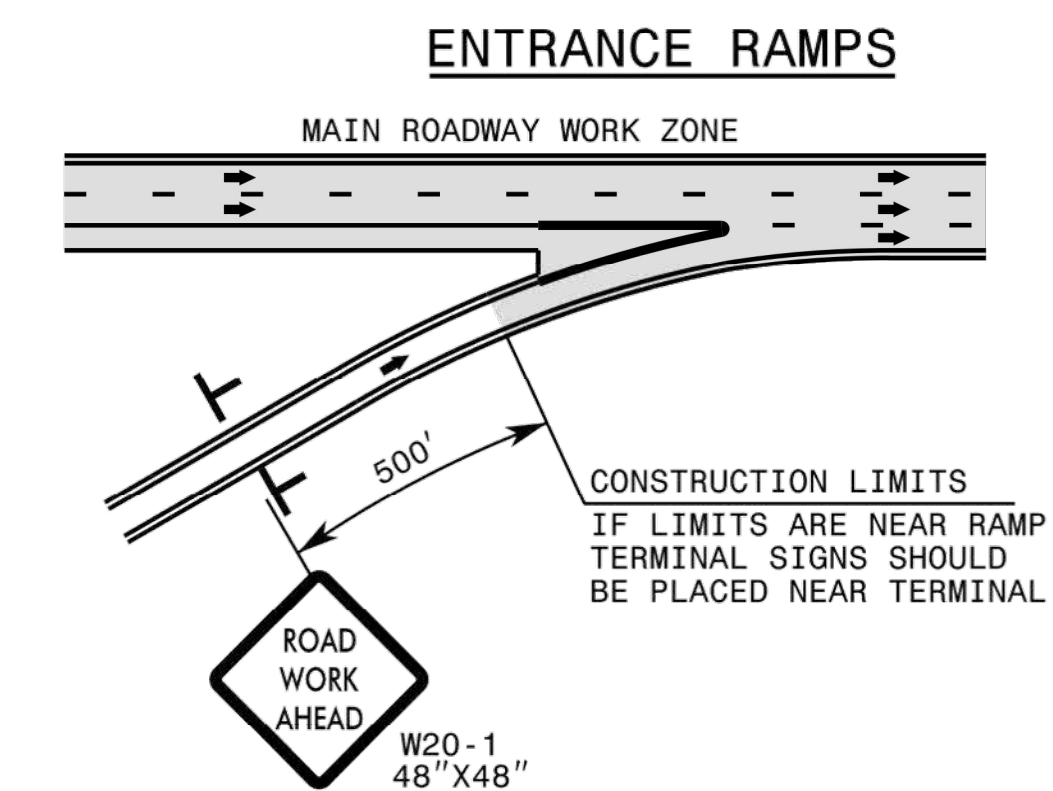
← DIRECTION OF TRAFFIC FLOW

DETAIL B



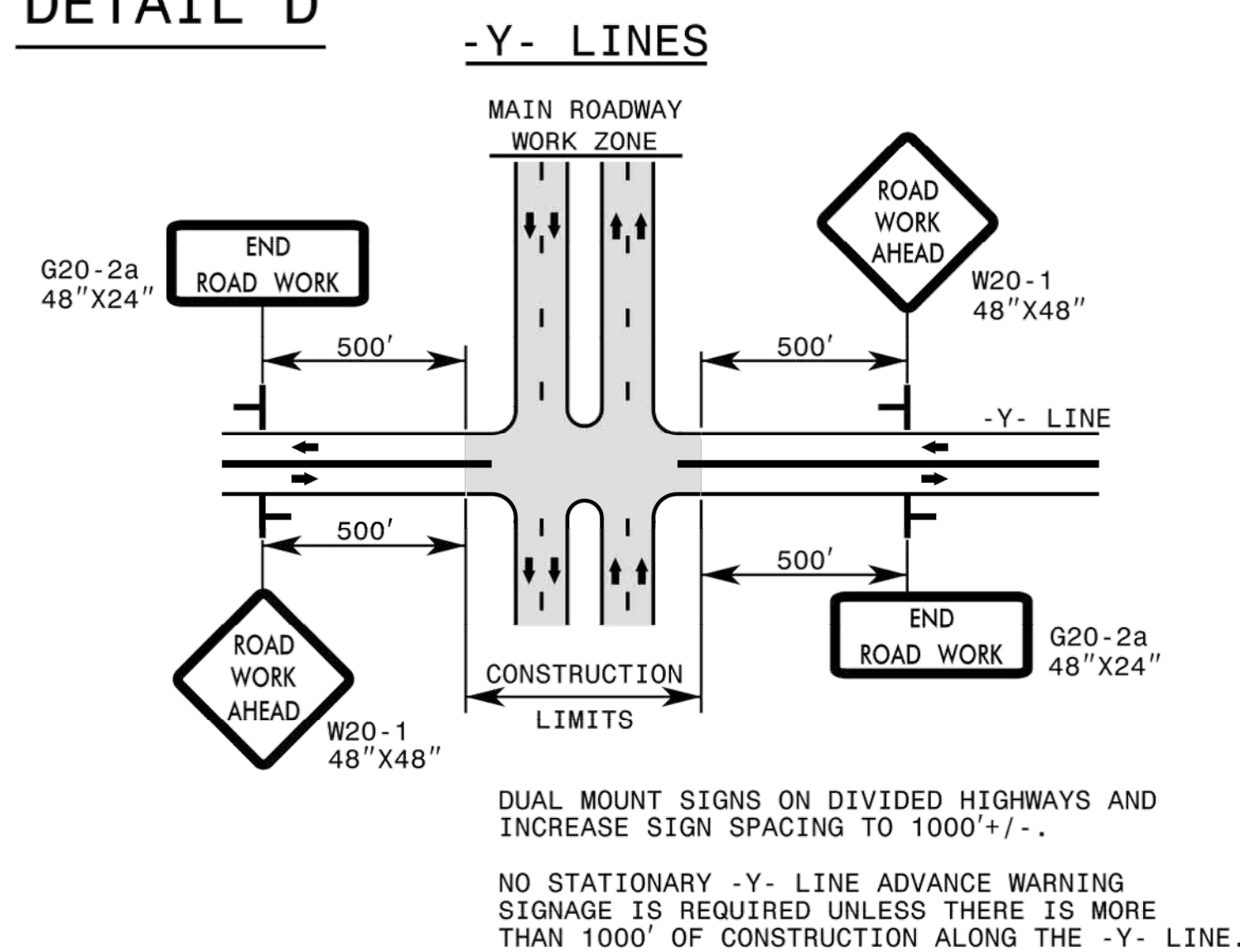
NOTE: SIGN NOT REQUIRED IF ADVANCE WARNING SIGNS HAVE BEEN PLACED ALONG -Y- LINE THAT RAMP INTERSECTS. IF CONSTRUCTION LIMITS ARE AT END OF RAMP, PLACE SIGN AT END OF RAMP.

DETAIL C



CONSTRUCTION LIMITS IF LIMITS ARE NEAR RAMP TERMINAL SIGNS SHOULD BE PLACED NEAR TERMINAL

DETAIL D



DUAL MOUNT SIGNS ON DIVIDED HIGHWAYS AND INCREASE SIGN SPACING TO 1000' +/- .

NO STATIONARY -Y- LINE ADVANCE WARNING SIGNAGE IS REQUIRED UNLESS THERE IS MORE THAN 1000' OF CONSTRUCTION ALONG THE -Y- LINE.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR FACILITIES ≤ 55 MPH

SHEET 2 OF 3
1101.01

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

© 2020 Kimley-Horn & Associates, Inc.



PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **WORK ZONE ADVANCE WARNING**

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 44899 ENGINEER PLYMOUTH, N.C.

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 900-001
SHEET INDEX: 13 OF 18

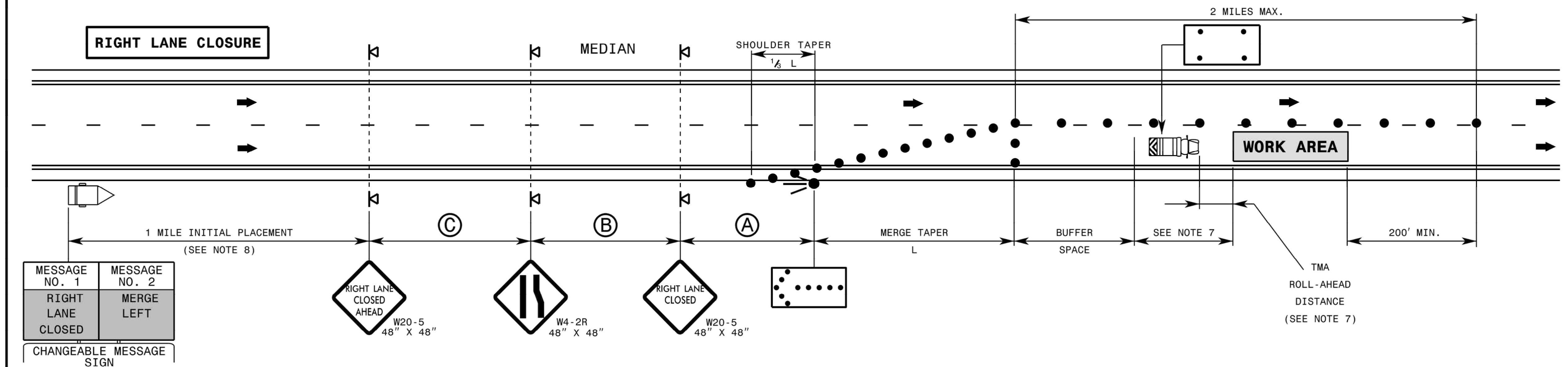
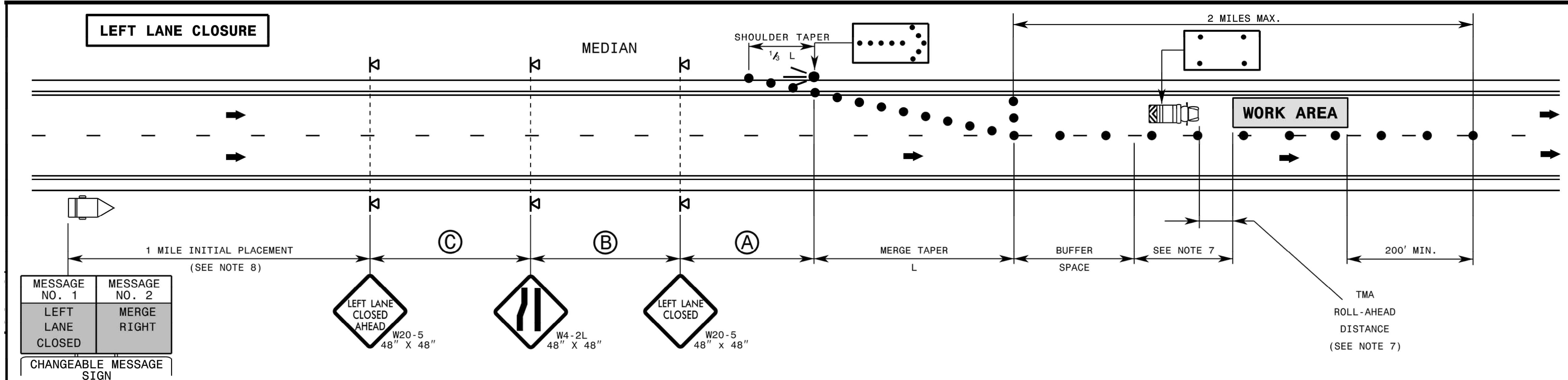
1-18

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
DIVIDED MULTI-LANE ROADWAY-1 LANE CLOSED
(FOR ROADWAYS < 60 MPH)

SHEET 3 OF 14

1101.02

December 15, 2020 - 10:20am By: Kevin.VanOrd



GENERAL NOTES

- 1- IF NECESSARY USE THIS RSD. FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY.
- 2- PLACE FLASHING ARROW BOARDS (FAB) ON THE SHOULDER (PAVED OR UNPAVED). PLACE FAB WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE FAB LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE FAB IS MET (SEE RSD. 1101.11, SHEET 2).
- 3- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- 4- REFER TO RSD. 1101.11, SHEETS 1, 2, & 4, FOR "L" DISTANCE, BUFFER SPACE, AND SIGN SPACING.
- 5- REFER TO RSD. 1101.02, SHEETS 9 & 10, FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
- 6- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- 7- POSITION THE TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMAs AS WORK PROGRESSES.
- 8- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY, UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PLACE CMS APPROXIMATELY 1 MILE IN ADVANCE OF THE FIRST W20-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE CMS 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP. MONITOR TRAFFIC, AND WHEN NECESSARY, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP.
- 9- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

LEGEND

- FLASHING ARROW BOARD
- FLASHING ARROW BOARD (96"X48" MIN.), "CAUTION MODE"
- TRUCK MOUNTED ATTENUATOR (TMA)
- CHANGEABLE MESSAGE SIGN (CMS)
- DRUM
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA**

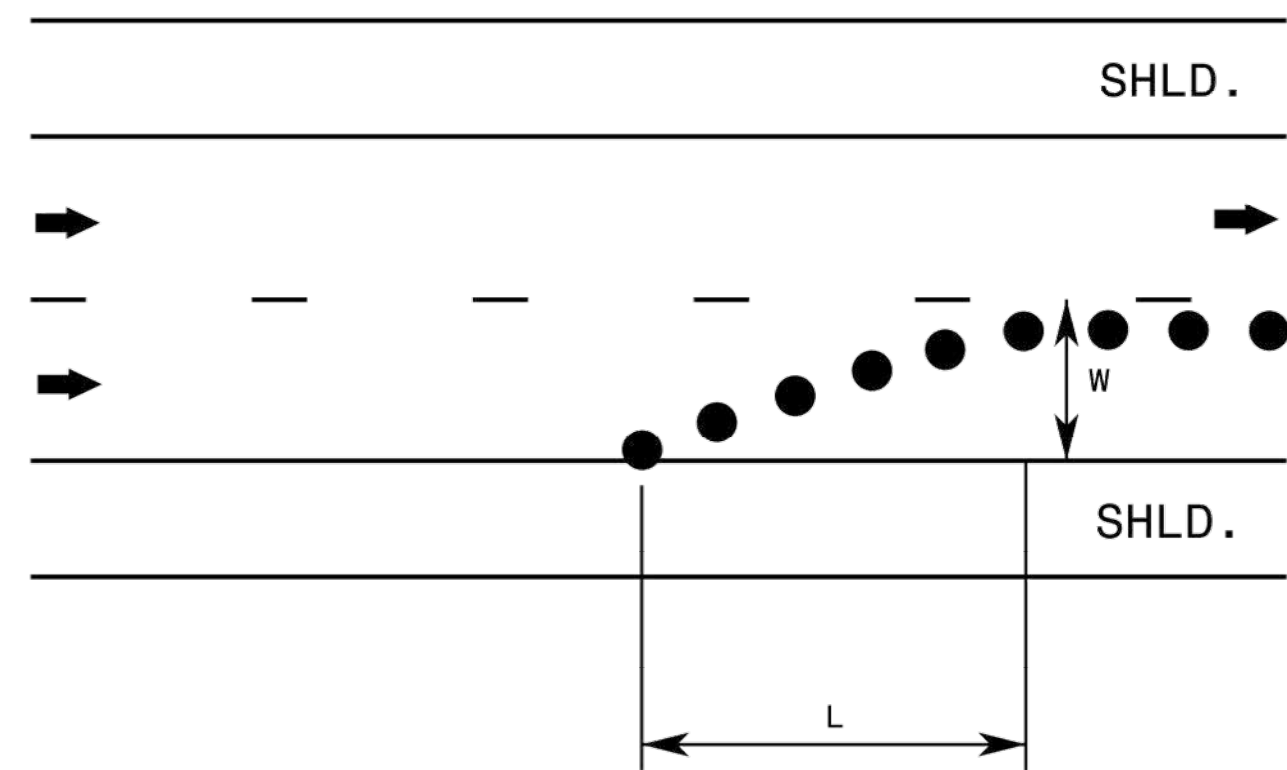
SHEET TITLE: **TEMPORARY LANE CLOSURE**

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL: **North Carolina Professional Engineer
44899
RYAN D. CLARK**

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 900-002
SHEET INDEX: 14 OF 18

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS

UPSTREAM TAPER

- MERGING TAPER..... L MINIMUM
- SHIFTING TAPER..... 1/2 L MINIMUM
- SHOULDER TAPER..... 1/3 L MINIMUM
- TWO-WAY TRAFFIC TAPER..... .50 - 100 FEET MAXIMUM

DOWNSTREAM TAPER

.....100 FEET MAXIMUM

TAPER LENGTH

DO NOT INTRODUCE A MERGING OR SHIFTING TAPER WITHIN A CURVE OF THE ROADWAY

QUICK REFERENCE - "L" DISTANCE TABLE												
MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)												
POSTED SPEED "S" (MPH)	LATERAL WIDTH "W" (FEET)											
	1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE MUTCD.
WHERE:

<u>SPEED LIMIT</u>	<u>FORMULA</u>
40 MPH OR LESS	$L_{MIN} = \frac{W \times S^2}{60}$
45 MPH OR GREATER	$L_{MIN} = W \times S$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

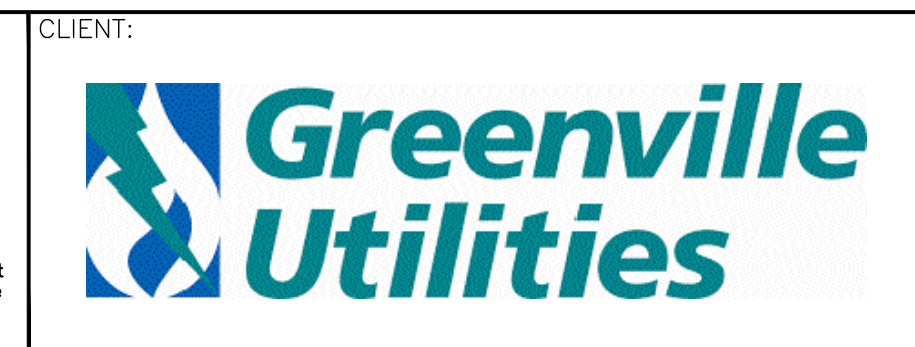
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
"L" DISTANCE AND CHANNELIZING
DEVICE TAPER CRITERIA

SHEET 1 OF 4
1101.11

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-8600
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adoption by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
© 2020 Kimley-Horn & Associates, Inc.



CLIENT:
Greenville Utilities

PROJECT NAME:
**MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA**

SHEET TITLE:
TRAFFIC CONTROL DESIGN LENGTHS

DATE: 10/15/20
SCALE (H,V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

SEAL:
PROFESSIONAL ENGINEER
NORTH CAROLINA
44899
RYAN D. CLARK

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 900-003
SHEET INDEX: 15 OF 18

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE		MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
	STOPPING SIGHT DISTANCE (FEET)	PASSING SIGHT DISTANCE (FEET)	
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2680	615

GENERAL NOTES

- 1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.
- 2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.
- 3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.
- 4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

1-18
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
BUFFER SPACE & SIGHT DISTANCE

SHEET 2 OF 4
1101.11

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.


CLIENT:



PROJECT NAME:
MEMORIAL DRIVE BRIDGE REPLACEMENT
 PITT COUNTY, NORTH CAROLINA

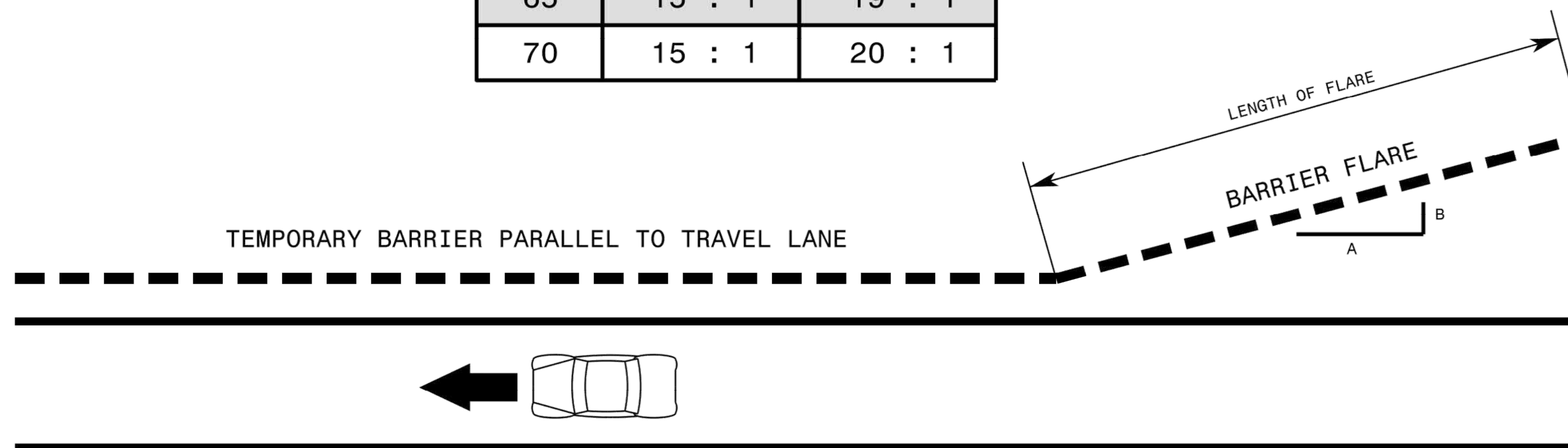
SHEET TITLE:
TRAFFIC CONTROL BUFFER & SIGHT DISTANCE

DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)



KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 900-004
 SHEET INDEX: 16 OF 18

TEMPORARY BARRIER FLARE RATES		
POSTED SPEED LIMIT (MPH)	UNANCHORED (A:B)	ANCHORED (A:B)
≤ 30	7 : 1	8 : 1
35	8 : 1	9 : 1
40	8 : 1	10 : 1
45	10 : 1	12 : 1
50	11 : 1	14 : 1
55	12 : 1	16 : 1
60	14 : 1	18 : 1
65	15 : 1	19 : 1
70	15 : 1	20 : 1



GENERAL NOTES

- 1- REFER TO THE 2011 ROADSIDE DESIGN GUIDE OR THE LATEST EDITION.
- 2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY.

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
 TEMPORARY BARRIER FLARE RATES

SHEET 3 OF 4

1101.11

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600

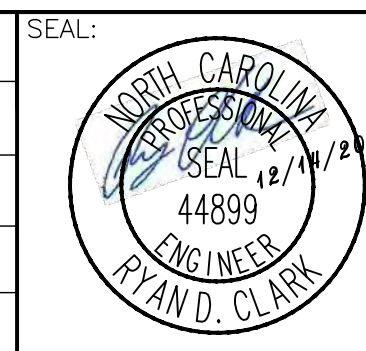
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.



PROJECT NAME:
MEMORIAL DRIVE BRIDGE REPLACEMENT
 PITT COUNTY, NORTH CAROLINA

SHEET TITLE:
TRAFFIC CONTROL BARRIER FLARE RATES

DATE:
 10/15/20
 SCALE (H,V):
 AS SHOWN
 DRAWN BY:
 CJM
 DESIGNED BY:
 RDC
 CHECKED BY:
 RDC (PM)



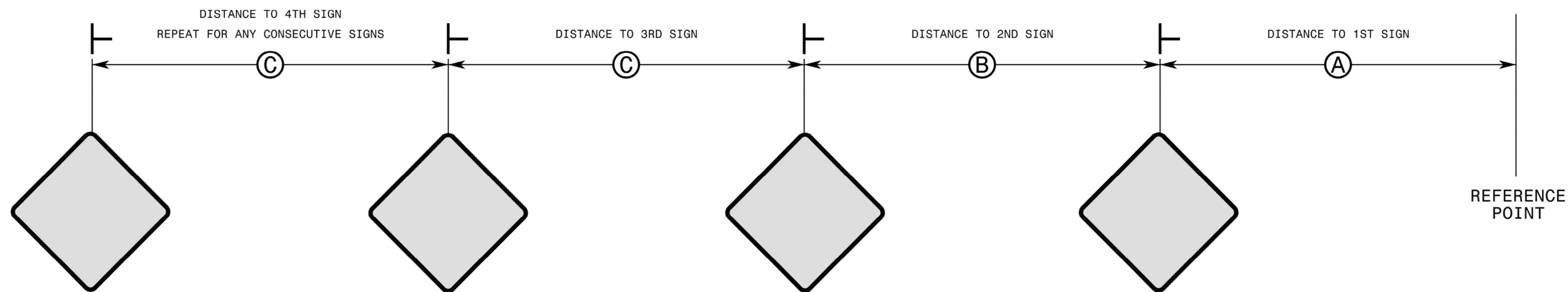
KHA PROJECT NUMBER:
 11678000

DRAWING NUMBER:
 900-005

SHEET INDEX:
 17 OF 18

ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET) ±		
	(A)	(B)	(C)
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

- 1- REFER TO 2009 MUTCD OR THE LATEST EDITION.
- 2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.
- 3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

1-18
 STATE OF NORTH CAROLINA
 DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
 SPACING OF TEMPORARY SIGNS IN SERIES

SHEET 4 OF 4

1101.11

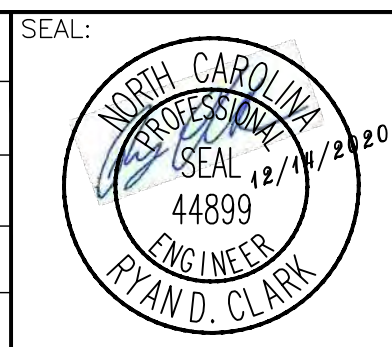
REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:

ENGINEER: **Kimley»Horn**
 4525 MAIN STREET
 SUITE 1000
 VIRGINIA BEACH, VA 23462
 TEL: (757) 213-8600
This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.
 © 2020 Kimley-Horn & Associates, Inc.

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT
 PITT COUNTY, NORTH CAROLINA**
 SHEET TITLE: **TRAFFIC CONTROL SIGN SPACING**

DATE: 10/15/20
 SCALE (H,V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)



KHA PROJECT NUMBER: 11678000
 DRAWING NUMBER: 900-006
 SHEET INDEX: 18 OF 18

Exhibit 4

NCDOT Encroachment Agreement

ROUTE NC 11 (Memorial Drive) PROJECT Memorial Drive Bridge Natural Gas Main Relocation COUNTY OF STATE OF NORTH CAROLINA Pitt

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT
PRIMARY AND SECONDARY HIGHWAYS

-AND-

Greenville Utilities Commission

401 S. Greene Street, Greenville, NC 27835

340-G

THIS AGREEMENT, made and entered into this 17 day of July 20 20 by and between the Department of Transportation, party of the first part; and Greenville Utilities Commission party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) NC 11, located as shown by the attached map

with the construction and/or erection of: 5525 linear feet of 8-inch steel natural gas main, installed parallel to NC 11 (Memorial Drive) will be horizontal directional drilled at the depths and alignment specified on the attached plans. The 8-inch steel natural Gas main tie-ins will be installed per plan by traditional open cut and jack and bore methods. The natural gas main relocation is being performed due to the NCDOT project B-4786 (Replace Bridge NO. 38 Over the Tar River).

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utility Agent of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. Compliance with Regulations: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

- b. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. **Information and Reports:** The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
 - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. **Incorporation of Provisions:** The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

R/W (161) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

ATTEST OR WITNESS:

Amy C. Wade
Amy C. Wade, Executive Secretary

Greenville Utilities Commission



DEPARTMENT OF TRANSPORTATION

DocuSigned by:
BY: R. Preston Hunter
DIVISION ENGINEER

Anthony C. Cannon
Anthony C. Cannon, General Manager/CEO

Greenville Utilities Commission
Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the Manager of Right of Way. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the existing and/or proposed encroachment.
4. Length, size and type of encroachment.
5. Method of installation.
6. Dimensions showing the distance from the encroachment to edge of pavement, shoulders, etc.
7. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
8. Drainage structures or bridges if affected by encroachment (show vertical and horizontal dimensions from encroachment to nearest part of structure).
9. Method of attachment to drainage structures or bridges.
10. Manhole design.
11. On underground utilities, the depth of bury under all traveled lanes, shoulders, ditches, sidewalks, etc.
12. Length, size and type of encasement where required.
13. On underground crossings, notation as to method of crossing - boring and jacking, open cut, etc.
14. Location of vents.

GENERAL REQUIREMENTS

1. Any attachment to a bridge or other drainage structure must be approved by the Head of Structure Design in Raleigh prior to submission of encroachment agreement to the Division Engineer.
2. All crossings should be as near as possible normal to the centerline of the highway.
3. Minimum vertical clearances of overhead wires and cables above all roadways must conform to clearances set out in the National Electric Safety Code.
4. Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections.
5. All vents should be extended to the right of way line or as otherwise required by the Department.
6. All pipe encasements as to material and strength shall meet the standards and specifications of the Department.
7. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
8. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

August 11, 2020

Greenville Utilities Commission
401 S. Greene St.
Greenville, NC 27835

County: Pitt
Encroachment: E021-074-20-00176

The encroaching party's construction contractor must submit the NCDOT Workforce Safety Plan for Encroachment Activities: COVID-19 form to the District Engineer prior to construction. **ABSOLUTELY NO WORK CAN BE ALLOWED WITHIN NCDOT R/W UNTIL THIS FORM HAS BEEN SUBMITTED!**

Attached hereto, for your files, is a copy of the Right of Way Encroachment Contract, which has been properly executed. The contract covers the following: relocation of 5,525' of 8" gas main along the west side on NC 11 as shown on attached plans.

APPROVED SUBJECT TO SPECIAL PROVISIONS:

Specific Requirements:

- 1. That the party of the second part agrees to provide traffic control devices, lane closures, road closures, positive protection and/or any other warning or positive protection devices necessary for the safety of road users during construction and any subsequent maintenance. This shall be performed in conformance with the latest NCDOT Roadway Standard Drawings and Standard Specifications for Roads and Structures and Amendments or Supplements thereto. Where there is no guidance provided in the Roadway Standard Drawings or Specifications, comply with the Manual on Uniform Traffic Control Devices for Streets and Highways and Amendment or Supplement thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.*
- 2. All lanes of traffic shall be open on thoroughfares from 6:00 AM until 8:30 AM and from 4:30 PM until 6:00 PM on weekdays. Approval must be received by the District Engineer's office at (252) 623-5300 prior to any lane closure.*
- 3. The encroaching party shall notify the District Engineer's office at D2D1notifications@ncdot.gov or (252) 623-5300 prior to beginning construction and upon completion of construction.*
- 4. An executed copy of this encroachment agreement, contract, and plans shall be present at the construction site at all times during construction. If safety or traffic conditions warrant such action, NCDOT reserves the right to further limit, restrict, or suspend operations within the right of way.*

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION 2 – DISTRICT 1 OFFICE
1701 WEST 5TH STREET
WASHINGTON, NC 27889

Telephone: (252) 623-5300
Fax: (252) 946-7433
Customer Service: 1-877-368-4968

Location:
1701 WEST 5TH STREET
WASHINGTON, NC 27889

Website: www.ncdot.gov

Boring and Directional Drilling:

- 1) Directional drilling methods have not been given statewide approval for use on NCDOT right of way. Under no condition shall jetting alone or wet boring with water of utility pipelines be allowed. Directional boring using jetting with a Bentonite (or equivalent material) slurry is approved at a minimum depth of ten (10) feet below the pavement surface [fifteen (15') feet below the surface of partial and/or full control of access roads] and two (2) feet below any ditch line. Directional boring is not allowed in embankment material. Directional boring is allowed beneath embankment material in naturally occurring soil. Any parallel installation utilizing the directional boring method shall be made at a minimum depth of three (3') feet (**cover**) below the ground surface and outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway. All directional bores shall maintain ten (10) feet minimum (clear) horizontal distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. All directional bores shall maintain ten (10) feet minimum (clear) vertical distance from the nearest part of pipe culverts or box culverts. Directional bores **are not** allowed beneath bridge footings, culvert wingwall footings or retaining walls. The tip of the drill string shall have a cutter head. Detection wire shall be installed with non-ferrous material. Any changes shall be submitted to the District Engineer for approval prior to construction. For multiple conduit installations (including perpendicular & parallel installations), install conduits with five (5) feet minimum (clear) horizontal separation between each conduit or install multiple conduits within a single duct. An overbore shall not be more than two (2") inches greater than the diameter of the pipe or encasement. An overbore exceeding two (2") inches greater than the diameter of the pipe or encasement will be considered if the encroachment agreement includes a statement signed and sealed by a licensed North Carolina Professional Engineer indicating that an overbore in excess of two (2") inches of the diameter of the pipe or encasement will arch and no damage will be done to the pavement or sub-grade. HDPE pipe installed by directional boring shall not be connected to existing pipe or fittings for one (1) week from the time of installation to allow tensional stresses to relax.
- 2) Directional boring using jetting with a Bentonite (or equivalent material) slurry is approved at a minimum depth of 10 (ten) feet below the roadway surface (15 feet for controlled access roadways) and 2 (two) feet below any ditch line. Any changes shall be submitted to the District Engineer for approval prior to construction.
- 3) Crossing by bore only no open cuts will be permitted.
- 4) Roadway bores shall be installed perpendicular to the centerline.
- 5) All roadway crossings by dry bore method shall be a minimum of 3 feet below the elevation of the existing roadway and 3 feet below the existing ditch.
- 6) All roadway crossings that exceed 6" shall be encased.
- 7) Pipe encasements shall extend from ditch line to ditch line in cut sections, and 5 (five) feet beyond toe of slope in fill sections, and 3 (three) feet behind curb sections.

Drainage:

- 8) Minimum of two feet clearance below the stream bed or flowline of crossline is required. The utility shall be encased for a minimum distance of ten feet on each side of the centerline of the stream. The utility cannot be located closer than five feet from the end of crossline pipe.

- 9) Minimum two feet clearance required for utility installations beneath crossline pipes. Crossline pipe shall be removed to allow for proper installation of utility. If crossline pipe is damaged it shall be replaced with new pipe. The utility shall be encased if the clearance is less than four feet.

Earthwork

- 10) Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight. The Contractor shall comply with all OSHA requirements and provide a competent person on site to supervise excavation at all times.
- 11) All fill areas/backfill shall be compacted to 95% density in accordance with AASHTO T99 as modified by the NCDOT. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The Contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. All material placed in a maximum of 6" lifts.
- 12) Excavation material shall not be placed on pavement. Drainage structures shall not be blocked with excavation materials. Any drainage structure disturbed or damaged shall be restored to its original condition as directed by the District Engineer.
- 13) All earth areas disturbed shall be graded, dressed, seeded, mulched, and tacked with liquid asphalt or other approved means within 10 days of completion of work in any area.
- 14) Vegetative cover shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer.
- 15) All soils located inside the Right of Way shall be considered a type "C" soil. All trenching, shoring and excavation shall follow the OSHA guidelines for this type of soil.
- 16) Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with all local, State and Federal regulations.

General Requirements:

- 17) Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, fire stations, fire hydrants and hospitals.
- 18) The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the District Engineer.
- 19) All workmanship and materials shall conform to North Carolina Department of Transportation Standards and Specifications manual.
- 20) All utilities shall be placed in accordance with the manual on Policies and Procedures for Accommodating Utilities on the Highway Rights of Way.
- 21) The encroaching party shall comply with all applicable federal, state and local environmental regulations, and shall obtain all necessary federal, state and local environmental permits, including but not limited to, those related to sediment control, storm water, wetland, streams, endangered species and historical sites.

Pitt County
E021-074-20-00176

- 22) NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation.
- 23) The encroaching party is required to contact the appropriate Utility Companies involved and make satisfactory arrangements to adjust the utilities in conflict with the proposed work prior to beginning construction.
- 24) All roadway signs that are removed due to construction shall be reinstalled as soon as possible, but at least by the end of the same workday.
- 25) Right of way monuments disturbed during construction shall be referenced by a Registered Land Surveyor and reset after construction.
- 26) No parking or material storage shall be allowed along the shoulders of any state-maintained roadway.
- 27) All concrete and asphalt driveways within NCDOT right of way shall be crossed by dry bore methods. Any deviation shall be replaced with like materials and be warranted for three years to cover all damages resulting from the open cut. Proper Traffic Control; Devices, Signs, etc., shall be installed to ensure public safety.
- 28) All existing structures, pavement, drainage or otherwise, located inside the Right of Way that are affected by this work shall be restored to meet the *NCDOT Standards and Specifications* as directed by the District Engineer. Any and all repairs required for open pavement cuts will utilize the same thicknesses of asphalt that was existing; no ABC will be used in the filling of pavement cuts to get the desired finish elevation of the surface asphalt.
- 29) When pavement cuts are allowed by the District Engineer on roadways where pavement overlays/replacements are not scheduled within one year, the following general information shall be adhered to **UNLESS otherwise approved by the District Engineer:**
 - Pavements shall be cut full depth and removed.
 - After trench work is complete, the edges of the existing pavement along the trench should be recut a minimum of 1' wider on each side of the trench; or if the pavement is undermined, to 1' beyond the undermined portion and remove the pavement. The design section stated below would be placed in those areas.
 - The pavement design section for pavement repairs shall be 11.0" B25.0C or B25.0BC Asphalt Concrete Base Course (accomplished in 2 lifts minimum).
 - Mill the entire area 1.5" starting at 15' back from the edge of the final pavement cut.
 - Overlay the entire area with 2.0" S9.5C or S905B Asphalt Concrete Surface Course (13" of asphalt total).
- *For those cuts within 1 year of overlays/replacements, no overlay and associated milling would be required and the repair may be reduced **per the discretion of the District Engineer**. Follow the NCDOT Standard Specifications for further and more detailed procedures.
- 30) All shoulder installation shall remain a minimum of 1 foot distance per 1 foot depth (1:1 slope) from the edge of pavement to the nearest inside wall of excavation.

- 31) Any disturbed guardrail shall be reset according to the applicable standard or as directed by the District Engineer.
- 32) The resetting of the Control of Access fence shall be in accordance with the applicable NCDOT standard and as directed by the District Engineer.
- 33) Excavation within 500 feet of a signalized intersection will require notification by the party of the second part to Steve Hamilton, PE, Division Traffic Engineer at telephone number (252) 439-2816. All traffic signal or detection cables must be located prior to excavation.

Traffic Control:


- 34) During non-working hours, equipment shall be parked as close to right of way lines as possible and be properly barricaded in order to not have any equipment obstruction within the Clear Recovery Area.
- 35) NCDOT Work Zone Control Qualifications and Training Program. Effective July 1, 2010, all flagging operations within NCDOT Right of Way require qualified and trained Work Zone Flaggers. Effective July 1, 2011, qualified and trained Work Zone Traffic Control Supervisors will be required on Significant Projects. Training for this certification is provided by NCDOT approved training sources and by private entities that have been pre-approved to train themselves. If you have questions, contact our web site at www.ncdot.org/-wzte, or contact Roger Garrett with NCDOT Work Zone Traffic Control Unit at (919) 661-4809 or rmgarrett@ncdot.gov.
- 36) Any work requiring equipment or personnel within 5' of the edge of any travel lane of an undivided facility and within 10' of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers.
- 37) Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.

Utilities:

- 38) Any utility marker required shall be as close to the right of way line as possible. If it is not feasible to install markers at or near the right of way line, written approval specific to the site shall be obtained from the District Engineer prior to installation.
- 39) All splice boxes, manholes, and other appurtenances within the NCDOT right of way shall be located at/outside the right of way line. Manholes and/or vaults shall not be placed in the ditch line, side slopes of the ditches, or in the pavement.
- 40) Where utility is installed in the Right of Way and are not of ferrous material, a locating tape shall be installed with the pipeline.
- 41) All manholes and/or vaults within NCDOT right of way shall be of pre-approved design. If any proposed structure is not of a design pre-approved by NCDOT, the encroaching party shall submit details and design calculations signed and sealed by a State of North Carolina registered Professional Engineer for approval prior to construction. NCDOT Design Services may be contacted for an approved design list.

Pitt County
E021-074-20-00176

Sincerely,

DocuSigned by:

EE1BFCED479F467...
R. Preston Hunter, P.E.
Division Engineer

February 20, 2020 - 9:38am By: draunmgp@khl

Sheet List Table	
Sheet Number	Sheet Title
000-000	COVER
000-001	GENERAL NOTES
600-001	PLAN & PROFILE
600-002	PLAN & PROFILE
800-003	PLAN & PROFILE
600-004	PLAN & PROFILE
800-005	PLAN & PROFILE
800-001	DETAILS

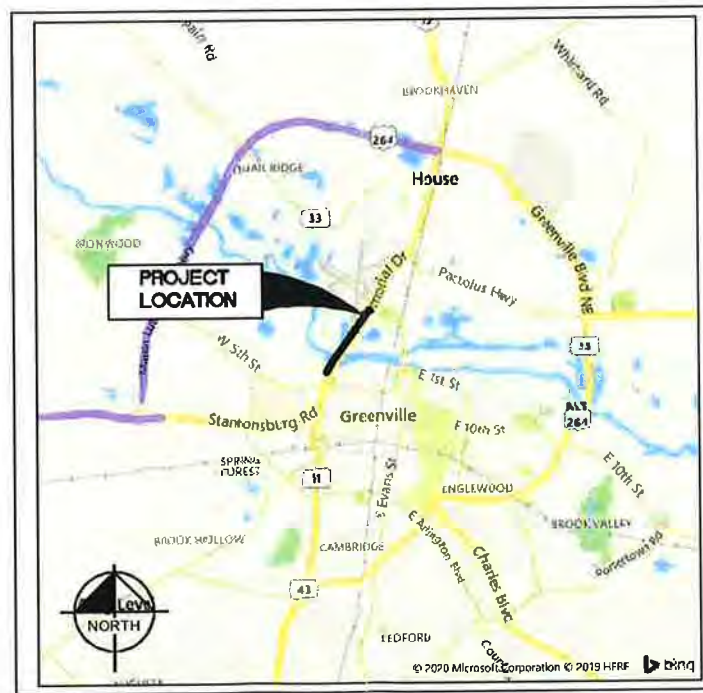


GAS DISTRIBUTION SYSTEM IMPROVEMENTS MEMORIAL DRIVE BRIDGE GAS MAIN RELOCATION

CONTACTS	
OWNER:	GREENVILLE UTILITIES COMMISSION 401 SOUTH GREENE STREET GREENVILLE, NC 27834 CONTACT: TBD
CIVIL ENGINEER:	KIMLEY-HORN AND ASSOCIATES, INC. 4525 MAIN STREET, SUITE 1000 VIRGINIA BEACH, VA 23462 PHONE: (757) 548-7353 CONTACT: RYAN CLARK
OPERATIONS:	TBD CONTACT: TBD
24-HOUR CONTACT:	TBD GREENVILLE UTILITIES

SITE INFO

5524" X 8" STEEL PIPE
MAOP = 60 PSIG



NOT TO SCALE

PROJECT LOCATION

PREPARED IN THE OFFICE OF:



4525 MAIN STREET, SUITE 1000, VIRGINIA BEACH, VA 23462
PHONE: (757) 213-8600

REVISIONS

NO.	DATE	DESCRIPTION	BY

This document, together with the concepts and designs presented herein, as an instrument of services, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

Copyright Kimley-Horn and Associates, Inc., 2020

DRAWING: SEAL:

DATE: JOB NUMBER:

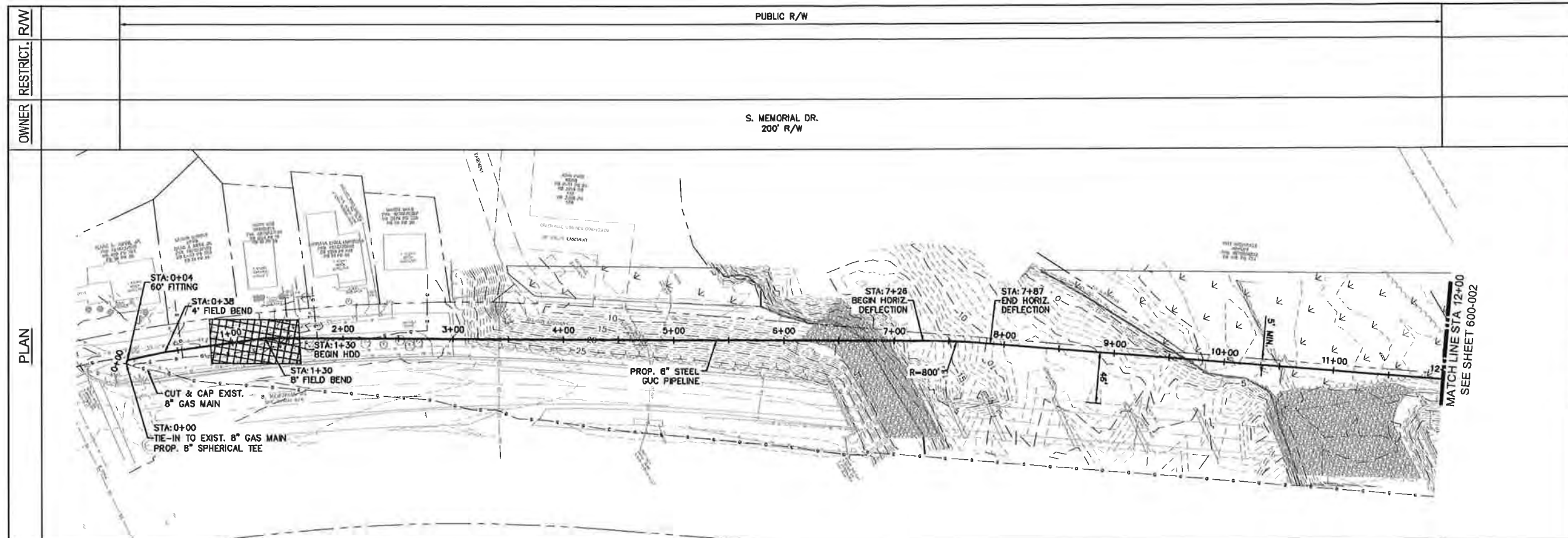
FEBRUARY 20, 2020

60% PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY

116780000

ISSUED FOR CONSTRUCTION
BY DATE



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- 15
- 14
- FENCE LINE
- OVERHEAD POWER LINE
- SANITARY SEWER LINE
- STORM LINE
- SANITARY SEWER FORCE MAIN
- UTILITY
- UGT
- TELECOMMUNICATIONS
- SUBSURFACE WATER
- SUBSURFACE RECLAIMED WATER
- G
- SUBSURFACE GAS
- E
- SUBSURFACE ELECTRIC
- UK
- SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- ST FENCE
- TREE PROTECTION FENCE
- UNITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATting
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/AMB PIT
- CURB INLET FILTER
- FILTER RING
- TEST HOLE LOCATION

SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.219" W.T. API-DL X-82 ERW

PIPE COATING
A = 14 MILS FBE, DUAL COAT W/ 60 MIL POWERCONCRETE

FITTINGS
1 = 8" 8.000" O.D. 0.219" W.T. Y-62-LR C.I.D. FIELD SEGMENTABLE
2 = 8" SPHERICAL TEE

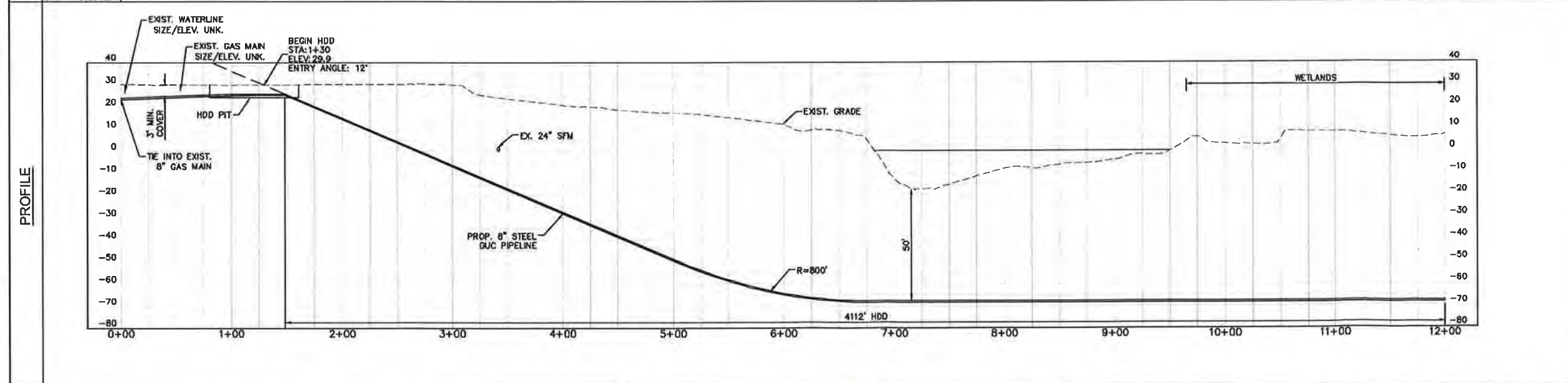
SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

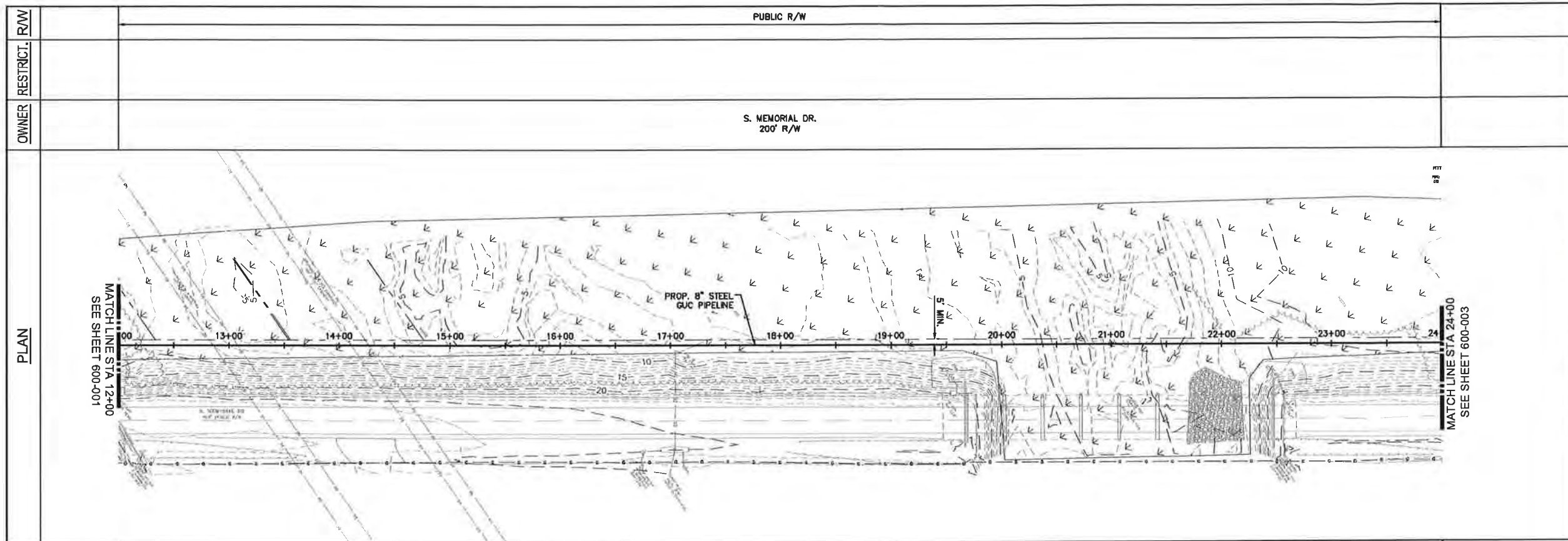
PIPE BAR

DETAIL	1	1	1
PIPE	A	A	A
COATING	4'	144'	1052'
LENGTH (LF)	2	1	
FITTINGS			
CAT. PROTECTION			



ENGINEER: Kimley»Horn 4525 MAIN STREET SUITE 1000 VIRGINIA BEACH, VA 23462 TEL: (757) 213-0000	CLIENT: Greenville Utilities	PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT PITT COUNTY, NORTH CAROLINA	DATE: 2/20/20 SCALE (H/V): AS SHOWN	SEAL: 60% PLANS	KHA PROJECT NUMBER: 11678000
SHEET TITLE: PLAN & PROFILE		DESIGNED BY: CJM CHECKED BY: RDC (PM)	THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT-OF-WAY.		DRAWING NUMBER: 600-001
REV. #	REVISION:	DATE:	DRAWN BY:	CHECKED BY:	SHEET INDEX: 3 OF 8

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and validation by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc. © 2020 Kimley-Horn & Associates, Inc.



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OVERHEAD POWER LINE
- SANITARY SEWER LINE
- STORM LINE
- SANITARY SEWER FORCE MAIN
- UGT
- SUBSURFACE TELECOMMUNICATIONS
- SUBSURFACE WATER
- SUBSURFACE RECLAIMED WATER
- SUBSURFACE GAS
- SUBSURFACE ELECTRIC
- SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRIKOUT
- TREE LINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- GRILL/LAMB PIT
- CURB INLET FILTER
- FILTER RING
- TEST HOLE LOCATION

NORTH

0 25 50 100
HORIZONTAL SCALE: 1"=50'

DETAIL	
PIPE	1
COATING	A
LENGTH (LF)	1200'
FITTINGS	
CAT. PROTECTION	

MATERIAL

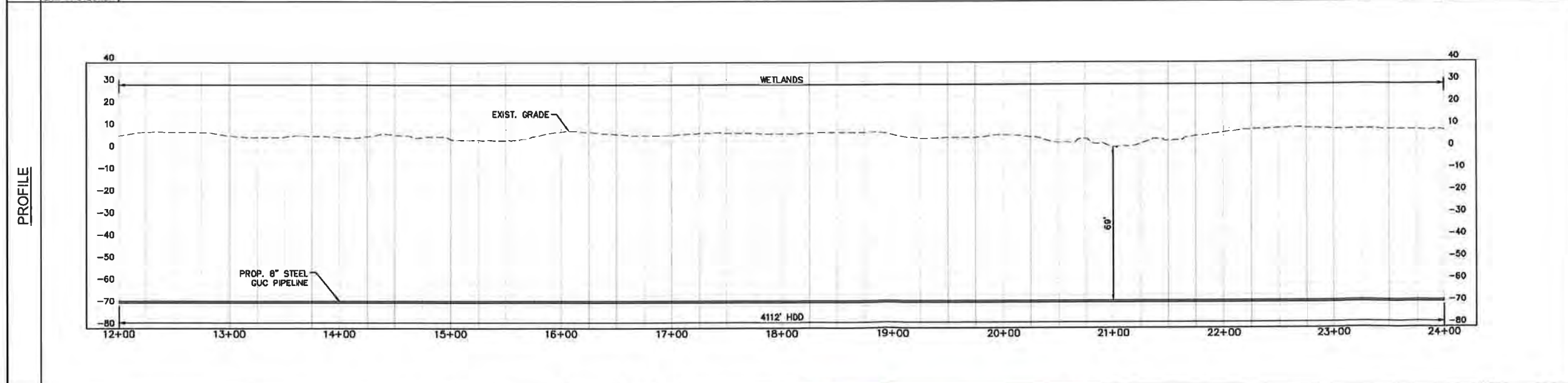
PIPE
1 = 8.625" O.D. 0.218" W.T. API-5L X-52 ERW

PIPE COATING
A = 14 MILS FBE, DUAL COAT W/ 80 MIL POWERCORETE

FITTINGS
1 = 8.000" O.D. 0.218" W.T. Y-52-LR C.I.D. FIELD SEGMENTABLE
2 = 8" SPHERICAL TEE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'



REV. #	REVISION	DATE	DRAWN BY	CHECKED BY

ENGINEER: **Kimley»Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-0800

CLIENT: **Greenville Utilities**

This document, together with the concepts and designs presented herein, is an instrument of service, to be used only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and approval by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

© 2020 Kimley-Horn & Associates, Inc.

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT**
PITT COUNTY, NORTH CAROLINA

SHEET TITLE: **PLAN & PROFILE**

DATE: 2/20/20
SCALE (H.V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

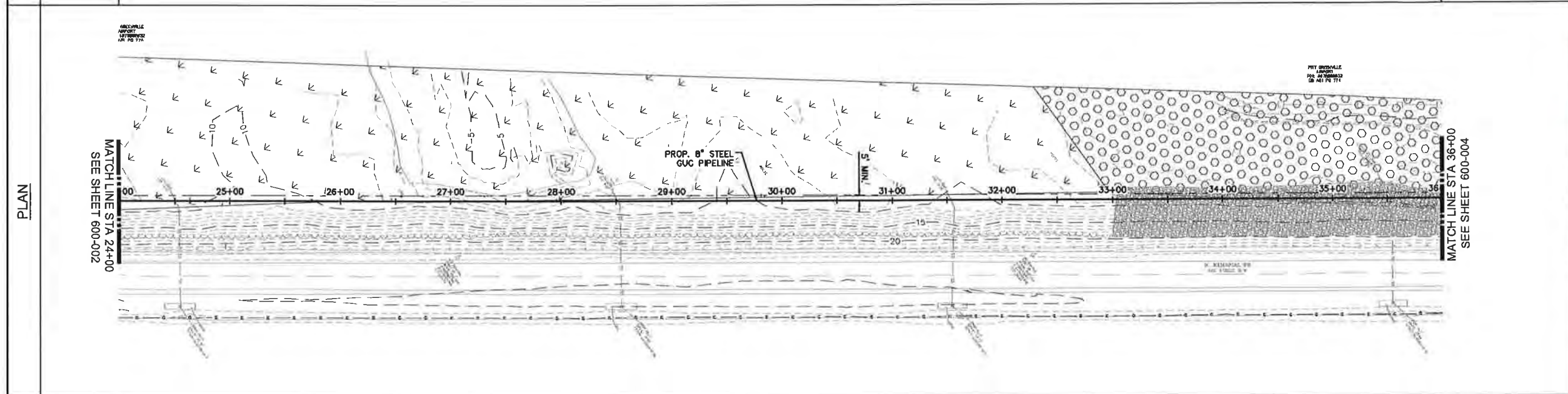
SEAL: [Signature]

KHA PROJECT NUMBER: 11878000
DRAWING NUMBER: 600-002
SHEET INDEX: 4 OF 8

60% PLANS
THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY

February 23, 2020 - 9:25am by chris@kimleyhorn.com

OWNER	PUBLIC R/W
OWNER	N. MEMORIAL DR. 200' R/W



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- 15
- 14
- FENCE LINE
- OVERHEAD POWER LINE
- SS
- SANITARY SEWER LINE
- STORM LINE
- S
- SANITARY SEWER FORCE MAIN
- SFM
- SUBSURFACE TELECOMMUNICATIONS
- W
- SUBSURFACE WATER
- RW
- SUBSURFACE RECLAIMED WATER
- G
- SUBSURFACE GAS
- E
- SUBSURFACE ELECTRIC
- UK
- SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREES
- STREAM BUFFER
- PROPOSED GAS LINE
- SILT FENCE
- TPF
- TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/GRAB PIT
- CURB INLET FILTER
- FILTER RING
- TEST HOLE LOCATION

SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.219" W.T. API-5L X-52 ERW

PIPE COATING
A = 14 MILS FBE, DUAL COAT W/ 60 MIL POWERCONCRETE

FITTINGS
1 = 80° 8.000" O.D. 0.219" W.T. Y-82-LR, C.I.D. FIELD SEGMENTABLE
2 = 8" SPHERICAL TEE

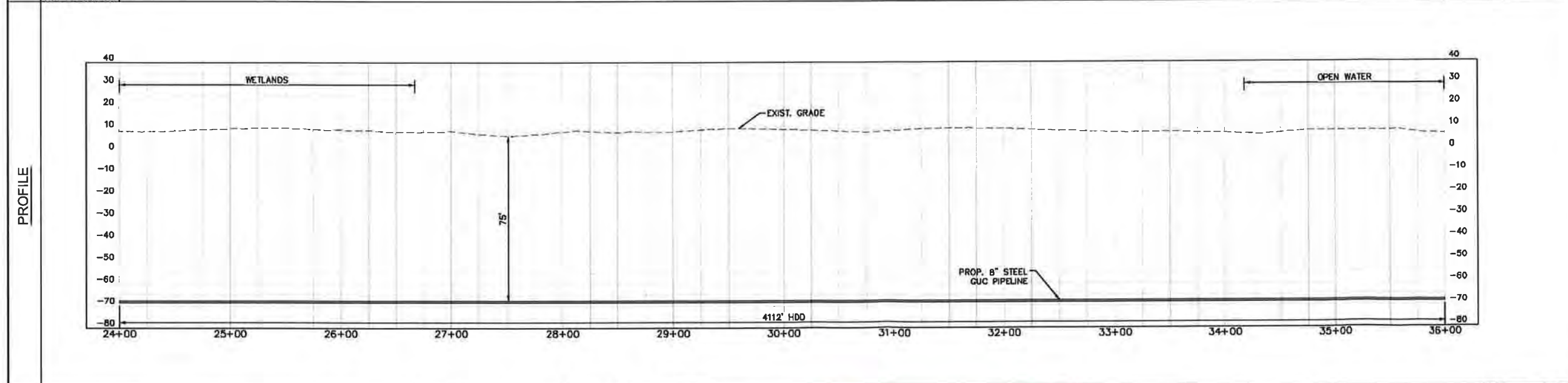
SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

0 12.5 25 50
VERTICAL SCALE: 1"=25'

North Arrow

DETAIL	
PIPE	1
COATING	A
LENGTH (LF)	1200'
FITTINGS	
CAT. PROTECTION	



REV. #	REVISION	DATE	DRAWN BY	CHECKED BY

ENGINEER: **Kimley-Horn**
4525 MAIN STREET
SUITE 1000
VIRGINIA BEACH, VA 23462
TEL: (757) 213-0800

CLIENT: **Greenville Utilities**

PROJECT NAME: **MEMORIAL DRIVE BRIDGE REPLACEMENT
PITT COUNTY, NORTH CAROLINA**

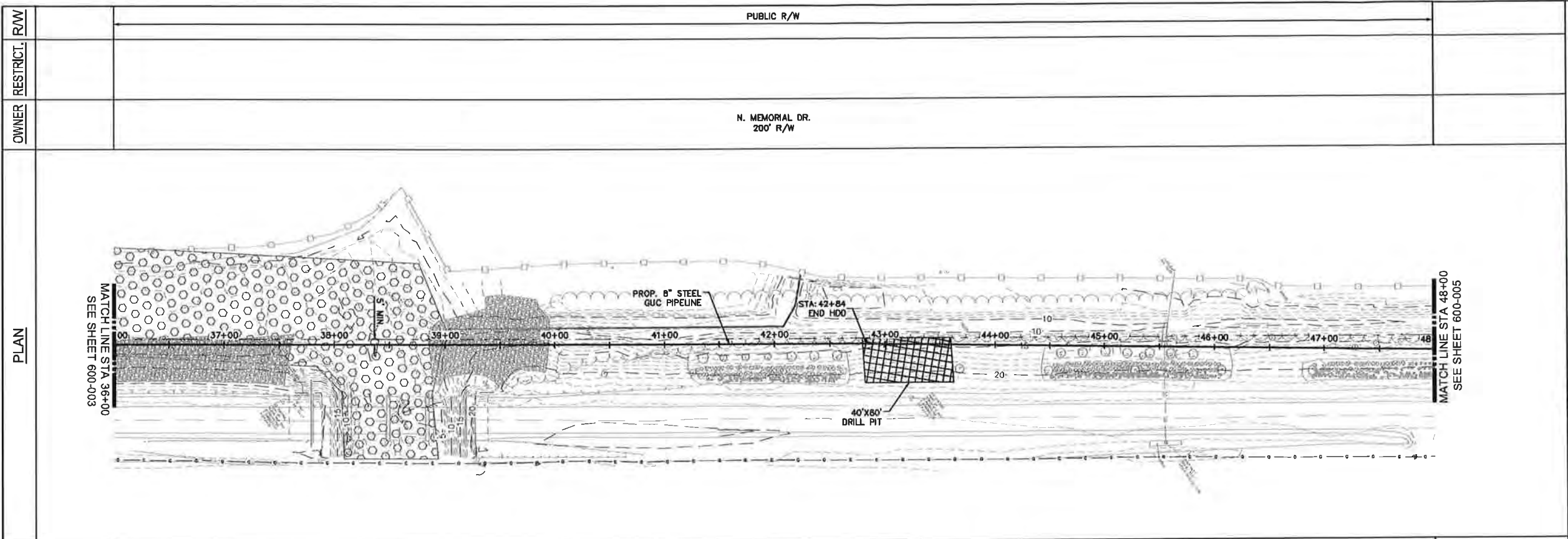
SHEET TITLE: **PLAN & PROFILE**

DATE: 2/20/20
SCALE (H/V): AS SHOWN
DRAWN BY: CJM
DESIGNED BY: RDC
CHECKED BY: RDC (PM)

KHA PROJECT NUMBER: 11678000
DRAWING NUMBER: 600-003
SHEET INDEX: 5 OF 8

These plans are unfinished and unapproved and are not to be used for any type of construction or the acquisition of right of way.

DATE: 2/20/20
 SCALE (H/V): AS SHOWN
 DRAWN BY: CJM
 DESIGNED BY: RDC
 CHECKED BY: RDC (PM)



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FENCE LINE
- OVERHEAD POWER LINE
- SANITARY SEWER LINE
- STORM LINE
- SANITARY SEWER FORCE MAIN
- UGT
- TELECOMMUNICATIONS
- SUBSURFACE WATER
- SUBSURFACE RECLAIMED WATER
- SUBSURFACE GAS
- SUBSURFACE ELECTRIC
- SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SLT FENCE
- TREE PROTECTION FENCE
- LIMITS OF DISTURBANCE
- HAYBALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL / JAB PIT
- CURB INLET FILTER
- FILTER RING
- TEST HOLE LOCATION

SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. Q.210" W.T. API-5L X-52 ERW

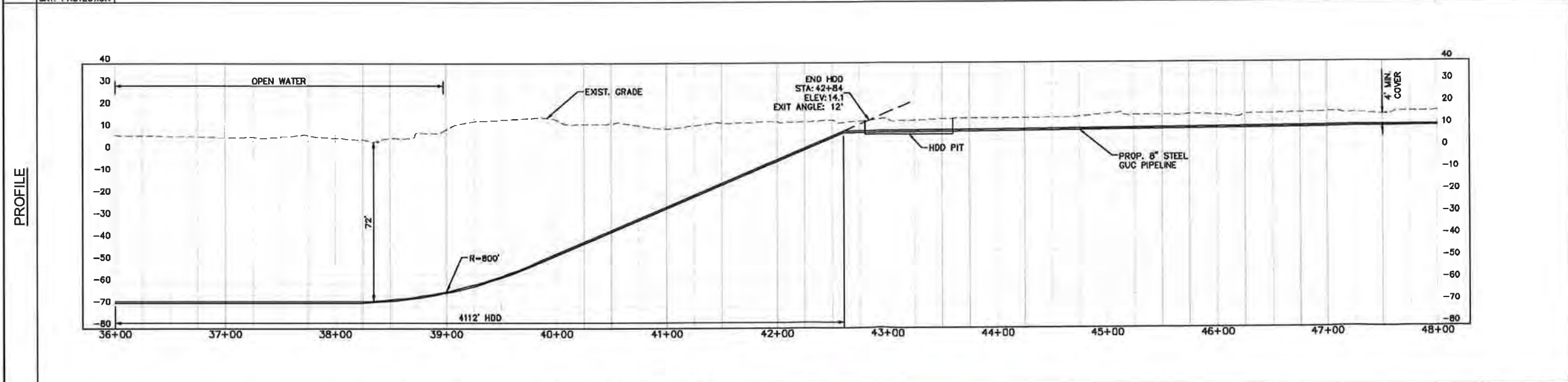
PIPE COATING
A = 14 MILS FBE, DUAL COAT W/ 50 MIL POWDERCOATE

FITTINGS
1 = 8" 8.000" O.D. Q.210" W.T. Y-52-LR C.I.O. FIELD SEGMENTABLE
2 = 8" SPHERICAL TEE

SCALE

0 25 50 100
HORIZONTAL SCALE: 1"=50'
0 12.5 25 50
VERTICAL SCALE: 1"=25'

DETAIL	LENGTH (LF)	DATE
PIPE	660'	
COATING		
FITTINGS		
CAT. PROTECTION		



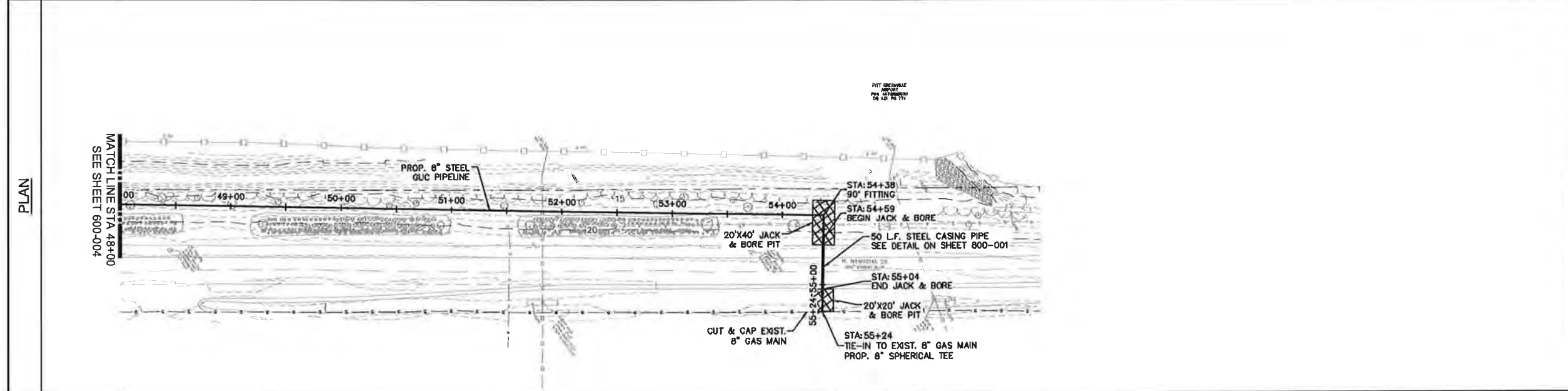
<p>ENGINEER: Kimley-Horn</p> <p>4825 MAIN STREET SUITE 1000 VIRGINIA BEACH, VA 23462 TEL: (757) 213-8900</p> <p><small>This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Plans of and/or reference on this document without written authorization and signature by Kimley-Horn and Associates, Inc. shall be voided. Liability is Kimley-Horn and Associates, Inc. © 2020 Kimley-Horn & Associates, Inc.</small></p>	<p>CLIENT: Greenville Utilities</p>	<p>PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT PITT COUNTY, NORTH CAROLINA</p> <p>SHEET TITLE: PLAN & PROFILE</p>	<p>DATE: 2/20/20</p> <p>SCALE (H,V): AS SHOWN</p> <p>DRAWN BY: CJM</p> <p>DESIGNED BY: RDC</p> <p>CHECKED BY: RDC (PM)</p>	<p>SEAL:</p> <p>KHA PROJECT NUMBER: 11878000</p> <p>DRAWING NUMBER: 600-004</p> <p>SHEET INDEX: 6 OF 8</p>
--	--	---	--	--

REV. # REVISION:

DATE: DRAWN BY: CHECKED BY:

February 23, 2020 9:28am By: cjm/rajapathi

RESTRICT.	PUBLIC R/W
OWNER	N. MEMORIAL DR. 200' R/W



LEGEND

- EASEMENT BOUNDARY
- RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- DRIVEWAY EDGE
- BUILDING
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- 15
- 14
- FENCE LINE
- OVERHEAD POWER LINE
- SANITARY SEWER LINE
- STORM LINE
- SANITARY SEWER FORCE MAIN
- SUBSURFACE TELECOMMUNICATIONS
- SUBSURFACE WATER
- SUBSURFACE RECLAIMED WATER
- SUBSURFACE GAS
- SUBSURFACE ELECTRIC
- SUBSURFACE UNKNOWN UTILITY
- ACCESS PATH
- PIPE STRINGOUT
- TREELINE
- STREAM BUFFER
- PROPOSED GAS LINE
- SLT FENCE
- TFF
- LIMITS OF DISTURBANCE
- HAYALE LINE
- CONSTRUCTION EASEMENT
- MATTING
- CONSTRUCTION ENTRANCE
- WETLAND
- STREAM
- TEMPORARY CONSTRUCTION EASEMENT
- PERMANENT CONSTRUCTION EASEMENT
- POND
- MILL AND OVERLAY
- DRILL/4MB PIT
- CURB INLET FILTER
- FILTER RING
- TEST HOLE LOCATION

NORTH

PIPE BAR	DETAIL				
	PIPE	1	1	1	1
	COATING	A	A	A	A
	LENGTH (LF)	638'	21'	45'	20'
	FITTINGS		1		2
CAT. PROTECTION					

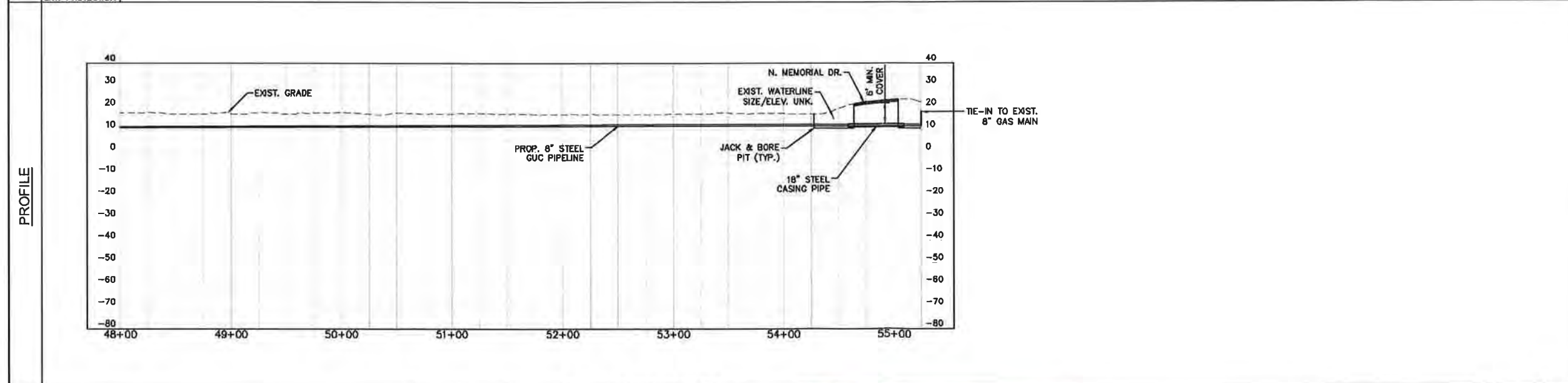
0 25 50 100
HORIZONTAL SCALE: 1"=50'

MATERIAL

PIPE
1 = 8.625" O.D. 0.219" W.T. API-5L X-52 ERW

PIPE COATING
A = 14 MILS FBE, DUAL COAT W/ 60 MIL POWERCONCRETE

FITTINGS
1 = 90° 8.000" O.D. 0.219" W.T. Y-62-LR C.I.D. FIELD SEGMENTABLE
2 = 8" SPHERICAL TEE



0 25 50 100
HORIZONTAL SCALE: 1"=50'

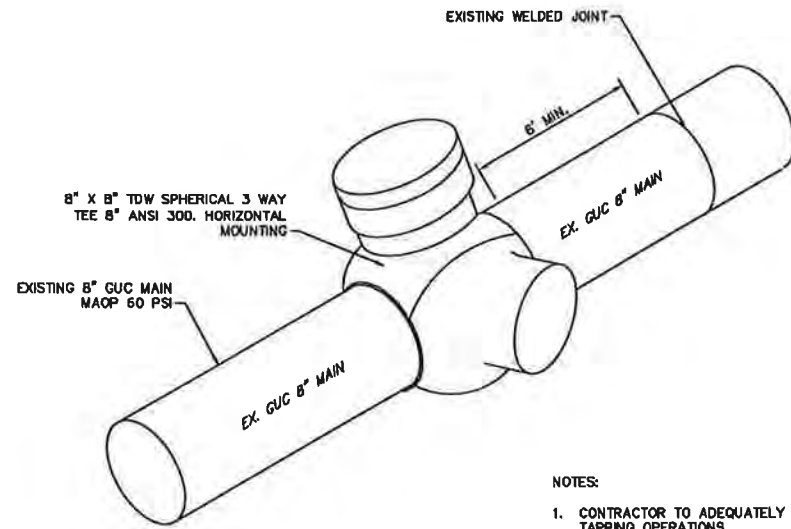
0 12.5 25 50
VERTICAL SCALE: 1"=25'

ENGINEER: Kimley-Horn 4525 MAIN STREET SUITE 1000 VIRGINIA BEACH, VA 23462 TEL: (757) 213-0800	CLIENT: Greenville Utilities	PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT PITT COUNTY, NORTH CAROLINA	DATE: 2/20/20 SCALE (H/V): AS SHOWN	SEAL: [60% PLANS]	KHA PROJECT NUMBER: 11678000
SHEET TITLE: PLAN & PROFILE		DESIGNED BY: CJM	DRAWN BY: CJM	CHECKED BY: RDC (PM)	DRAWING NUMBER: 600-005
REV. # REVISION:		DATE:	DRAWN BY:	CHECKED BY:	SHEET INDEX: 7 OF 8

This document, together with the concepts and designs presented herein, is an instrument of service, to be used only for the specific purpose and client for which it was prepared. Assurances and proper reliance on this document without written authorization and signature by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.

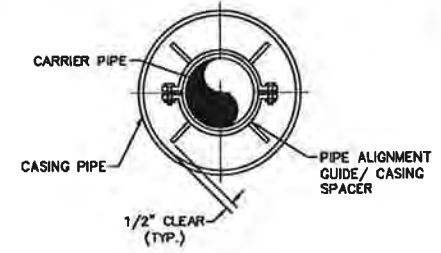
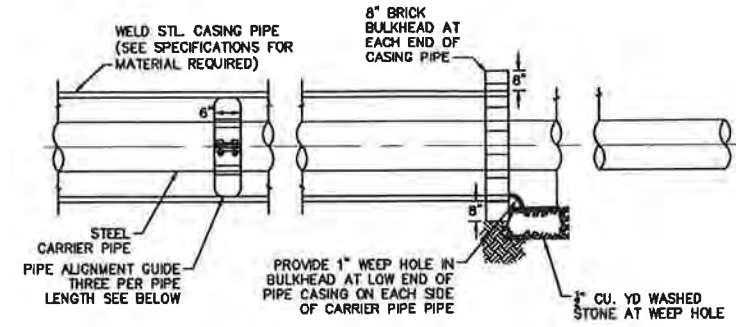
© 2020 Kimley-Horn & Associates, Inc.

February 20, 2020 - 6:35pm by: chris.mccoy@kha.com

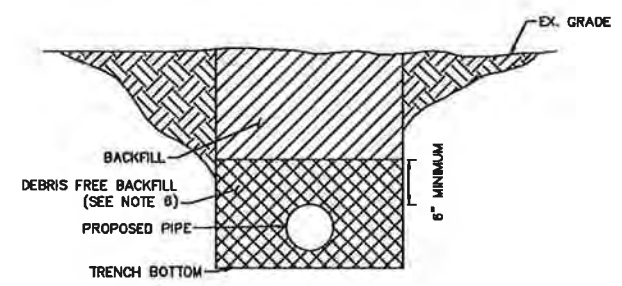


- NOTES:
1. CONTRACTOR TO ADEQUATELY SUPPORT EXISTING 8" MAIN DURING TAPPING OPERATIONS.
 2. CONTRACTOR SHALL MAINTAIN A 6 FOOT SEPARATION FROM EXISTING JOINTS DURING PLACEMENT OF TAPPING FITTING.

8" HOT TAP DETAIL
N.T.S.



STEEL CASING DETAIL
N.T.S.



- NOTES:
1. ENSURE TRENCH IS FREE OF ROCKS AND OTHER OBJECTS THAT COULD DAMAGE THE PIPE.
 2. ENSURE TRENCH IS AT THE PROPER DEPTH TO ALLOW 3 FEET OF COVER FROM TOP OF PIPE TO FINISHED SURFACE.
 3. USE A HOLIDAY DETECTOR TO FIND PINHOLES IN COATING AND REPAIR PRIOR TO LOWERING PIPE INTO DITCH.
 4. IF ROCK IS FOUND ALONG TRENCH CONTRACTOR SHALL INSTALL SAND BAGS OR FOAM PILLOWS EVERY 15 FEET TO SUPPORT PIPE ALONG TRENCH BED.
 5. PIPE SHALL BE ADEQUATELY SUPPORTED DURING LOWERING INTO DITCH. LIFT PIPE USING NYLON SLING OR OTHER APPROPRIATE DEVICES.
 6. FIRST 6" OF BACKFILL SHOULD BE FREE OF ROCK AND OTHER MATERIALS THAT COULD DAMAGE THE PIPE OR PIPE COATING.
 7. DO NOT USE EXCESSIVE FORCE TO TAMPER DIRECTLY OVER THE PIPE ON THE FIRST 6" OF BACKFILL.
 8. ENSURE FINAL DITCH COVER IS FLUSH WITH SURROUNDING GROUND.

TRENCH DETAIL
N.T.S.

REV. #:	REVISION:	DATE:	DRAWN BY:	CHECKED BY:	ENGINEER: Kimley-Horn 4525 MAIN STREET SUITE 1000 VIRGINIA BEACH, VA 23462 TELE (757) 213-8800 <small>This document, together with the concepts and design provided herein, is an instrument of service, is intended only for the specific purpose and client for which it was prepared. Review of and reliance on this document without written authorization and signature by Kimley-Horn and Associates, Inc. shall be without liability to Kimley-Horn and Associates, Inc.</small>	CLIENT: Greenville Utilities	PROJECT NAME: MEMORIAL DRIVE BRIDGE REPLACEMENT PITT COUNTY, NORTH CAROLINA	DATE: 2/20/20 SCALE (H/V): AS SHOWN AS SHOWN 60% PLANS	SEAL:	KHA PROJECT NUMBER: 11678000
							SHEET TITLE: DETAILS	DRAWN BY: CJM DESIGNED BY: RDC CHECKED BY: RDC (PM)	THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY	DRAWING NUMBER: 800-001
										SHEET INDEX: 8 OF 8

February 25, 2020 - 8:50am By: chris.horn@kha.com

WORKFORCE SAFETY PLAN

FOR ENCROACHMENT ACTIVITIES: COVID-19

EFFORTS THE N.C. TRANSPORTATION INDUSTRY IS TAKING TO STOP THE SPREAD OF COVID-19

The North Carolina Department of Transportation (NCDOT) and their partners expect all parties involved in the delivery of transportation projects to abide by the guidelines issued from the Centers for Disease Control and Prevention (CDC) and the North Carolina Department of Health and Human Services (NCDHHS).

Response to COVID-19 is rapidly evolving; new information and guidelines may be issued from the CDC, NCDHHS, or other state or federal agencies. NCDOT and their partners should review the current CDC and NCDHHS guidance, including the resources listed at the end of this document, for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidance included in this document.

Though certain Americans with Disabilities Act (ADA) requirements have been relaxed in response to the pandemic, employers must still maintain all information about employee illness as a confidential medical record in compliance with the ADA. If an employee is suspected of having or tests positive for COVID-19, it is essential that management keep the identity of the employee and details related to the employee's health confidential.

Below are precautions required by NCDOT and from encroaching parties and their contractors performing construction within NCDOT Rights of Way. The term employee refers to any person on a job site within NCDOT right of way for the purpose of constructing or inspecting the work related to construction of a facility under an approved encroachment agreement and where that employee may or may not be under employment by or under contract to NCDOT.

EMPLOYEE WELLNESS

- If an employee has not yet reported to work and develops any COVID-19 symptoms (i.e. fever, coughing, or shortness of breath) — STAY HOME and immediately:
 - Call a health care provider
 - Self-Isolate
 - Communicate with your supervisor
 - Remain calm and follow all instructions from your health care provider
- Employees who appear to have acute respiratory illness symptoms (i.e. cough, shortness of breath) upon arrival to work, or become sick during the day, should be separated from others and sent home immediately. The potentially affected employees should immediately follow the steps outlined above, which includes immediately contacting a health care provider.
- Should an employee show symptoms of acute respiratory illness or be diagnosed with COVID-19, all other employees who have worked in close proximity to the affected employee during the last 14

days and all encroachment points of contact indicated at the end of this plan should be notified of potential exposure to the disease without identifying the affected employee.

- Consideration should be given to employees at “High Risk” of severe illness from COVID-19, who, per NCDHHS, include employees:
 - Over 65 years of age, **OR**
 - With underlying health conditions including heart disease, lung disease, or diabetes, **OR**
 - With weakened immune system
- “High Risk” Employees should be given the opportunity to discuss alternate work arrangements/duties with their employer or take leave according to their company policies.
- For guidance on confirmed positive tests for COVID-19, refer to the most recent version of the “COVID-19 Guidance for Employees on Encroachment Job Sites within NCDOT Right of Way” located on last page of this plan.

PERSONAL HYGIENE

- Clean hands often by washing with soap and water for 20 seconds. If soap and water are not available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains 60%-95% alcohol may be used.
- Avoid touching your eyes, nose, mouth, or other parts of your face.
- Do not breathe, cough, or sneeze on another person or into the open air. Employees should cover their noses and mouth with a tissue when coughing or sneezing (or an elbow or shoulder if no tissue is available).
- A facemask for covering nose and mouth is encouraged on the job site.
- Appropriate gloves are encouraged while performing functions of the job.

CLEANING/DISINFECTING

- Wash stations and/or hand sanitizer are encouraged on each project site.
- Appropriate cleaning staff should clean frequently touched surfaces and objects with disinfectants at a minimum of once per day.
 - Office/buildings: door knobs, light switches, phones, computers/keyboards, copy machines, elevator buttons, toilets, faucets, sinks, countertops, paper towel dispensers, desktops, handrails, folders, vending machines, counters, tables, cabinets/knobs, etc.
 - Shop Yard/Jobsite: vehicle/equipment door handles, keys, gear shifts, steering wheel/operator controls and levers, fuel pump dispensers, touch points on machinery, etc.
 - Electronic equipment: cell phones, computers, keyboards, etc.
- Appropriate cleaning staff should sanitize/disinfect facilities and work areas after persons suspected/confirmed to have COVID-19 have been in the facility or work area.

- It is recommended to close off access to areas used by the ill persons and wait as long as practical, 24 hours if possible, before beginning cleaning and disinfection to minimize potential for exposure to respiratory droplets. Open outside doors and windows to increase air circulation in the area if possible.
- Appropriate cleaning staff should clean and disinfect all areas used by the ill persons, focusing especially on frequently touched surfaces.

GENERAL

- Increase communication measures between all parties regarding schedule, daily activities, etc. to reduce/minimize worker exposure in accordance with but not limited to the requirements below.
- Minimize on-site personnel such as subcontractors, work crews, QC personnel, and inspection staff to those required for that day's activities. If work is postponed or cancelled, immediately notify appropriate parties.
- Practice "Social Distancing" whenever feasible. Social Distancing is designed to limit the spread of a disease by reducing the opportunities for close contact between people. All personnel have the responsibility to remind each other to stay 6 feet or more apart. Examples of Social Distancing include:
 - Reducing face-to-face exposure by using conference calls and video conferencing
 - If an in-person meeting is absolutely required and cannot be rescheduled or attended remotely, the meeting is limited to a maximum of 10 people while maintaining Social Distancing of 6 feet or more.
 - Avoiding unnecessary travel
- Do not congregate at lunch or breaks. Bringing your lunch is encouraged.
- No communal coolers or drink stations are allowed. Supervisors should confirm with employees prior to beginning work for appropriate hydration and nutrition availability to employees for the duration of the employee's shift and without direct contact with others on the job site.
- First line of communication should be by phone, rather than in-person.
- Do not shake hands.
- Do not share iPads, tablets, pens, or clipboards for signing or any other purpose. Take pictures as proof of attendance at meetings.
- Sharing of Personal Protective Equipment (PPE) is strictly prohibited.
- Vehicles, equipment, and tools
 - Limit the number of people riding in a vehicle together.
 - Wipe down and disinfect vehicles after each trip.
 - As much as possible, do not share tools or equipment. If a tool or piece of equipment must be shared, the parts of it that are touched should be sanitized between uses.

RETURN TO WORK

- The following criteria must be followed for an employee who is tested for Covid-19, or asked to self-quarantine by health officials, or has contact with another employee with a positive test result to return to work:
 - at least a 14-day quarantine; **OR**
 - release by a health care provider.
- In accordance with CDC guidance, the following criteria must be followed for an employee with a positive test result to return to work:
 - at least 14 days from positive test notification; **AND**
 - at least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); **AND**
 - at least 7 days have passed since symptoms first appeared.

NCDOT may require certification of fitness to work from a health care provider.

ADDITIONAL RESOURCES

NCDOT and their partners should review the CDC and NCDHHS resources listed below for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidelines included in this document.

- NCDHHS COVID-19 Resources:
 - <https://www.ncdhhs.gov/divisions/public-health/coronavirus-disease-2019-covid-19-response-north-carolina>
- NCOSHR Communicable Disease Emergency Policy
 - <https://oshr.nc.gov/policies-forms/workplace-wellness/communicable-disease-emergency>
- OSHA Guidance on Preparing Workplaces for COVID-19
 - <https://www.osha.gov/Publications/OSHA3990.pdf>
- CDC COVID-19 Resources:
 - <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

AGREEMENT

The encroaching party shall adhere to the requirements of this plan in order to continue work under their approved encroachment agreement. Violations to this plan could result in the violating entity not being allowed to continue work or all work ceasing as determined by the NCDOT District Engineer or Resident Engineer.

PROJECT POINTS OF CONTACT

NCDOT

Name: Ryan Beacham

Phone #: 252-623-5300

Encroaching Party (Primary Contact)

Name: Dillon WADE

Phone #: (252) 551-1594

**Primary Contractor to Encroaching Party
(Point of Contact)**

Name: TBD

Phone #: _____





COVID-19 Guidance for Employees on Encroachment Job sites within NCDOT Right of Way			
CONTACT GROUP			
Relationship to Confirmed POSITIVE Test	What YOU Should Do	What your CREW Should Do <i>Exposure within 6' and longer than 10 minutes</i>	What PROJECT SITE Personnel Should Do <i>No exposure within 6' and longer than 10 minutes</i>
Employee	 <p>Notify your supervisor Self-quarantine for 14 days</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Directly exposed crew self-quarantine for 14 days</p> <p>Continue hygiene & disinfecting measures</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Site personnel without direct contact may continue onsite work or follow their company policy</p> <p>Continue hygiene & disinfecting measures</p>
Direct Contact <i>Interaction with an infected person within 6' and longer than 10 minutes</i>	 <p>Self-quarantine for 14 days</p>	<p>Advise of POSITIVE test without identifying the affected employee*</p> <p>Crew may continue onsite work or follow their company policy</p> <p>Continue hygiene & disinfecting measures</p>	<p>Advise of POSITIVE test *</p> <p>Continue hygiene & disinfecting measures</p>
Secondary Contact	 <p>You may continue onsite work or follow your company policy</p> <p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>
Two or more Persons Removed from Contact	 <p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>	<p>Continue hygiene & disinfecting measures</p>
*Notification Protocol <i>(Comply with HIPAA & ADA confidentiality requirements)</i>	NCDOT employee / agent tests POSITIVE	NCDOT District Engineer/Resident Engineer notifies Encroaching Party's primary point of contact and Contractor Point of Contact, CDC and, if Resident Engineer has oversight for the job site, FHWA any Consultant Firms working for NCDOT	
	Encroaching Party or Contract crew member on job site tests POSITIVE	Encroaching party representative notifies other Contractors, Sub-Contractors and Suppliers with exposed Employees	
		Encroaching party representative or Contractor point of contact notifies appropriate NCDOT District Engineer or Resident Engineer and all other Contractors, Sub-Contractors and Suppliers with exposed Employees	
		NCDOT notifies CDC, and as appropriate, FHWA and any Consultant Firms working for NCDOT	

Exhibit 5

Department of the Army

Relocation Permit



**DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS**

Washington Regulatory Field Office
2407 W 5th Street
Washington, North Carolina 27889

June 17, 2020

Regulatory Division

Action ID: SAW-2020-00387

Mr. F. Durward Tyson, Jr.
Greenville Utilities Commission
Post Office Box 1847
Greenville, North Carolina 27835

Dear Mr. Tyson:

In accordance with your written request of February 21, 2020, and the ensuing administrative record, enclosed is a permit to relocate an existing 8-inch natural gas pipeline by means of horizontally directionally drilling (HDD) under the Tar River, located adjacent to the NC Highway 11 Memorial Bridge, in Greenville, Pitt County, North Carolina.

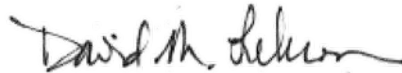
Any deviation in the authorized work will likely require modification of this permit. If any change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

- a. You must complete construction before **December 31, 2025**.
- b. You must notify this office in advance as to when you intend to commence and complete work.
- c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

Thank you for your time and cooperation. You should address all questions regarding this authorization to Ms. Emily Thompson of my staff at the Washington Regulatory Field Office, telephone 910-251-4629, or by email at emily.b.thompson@usace.army.mil.

FOR THE DISTRICT ENGINEER,



Robert J. Clark
Colonel, U.S. Army
District Commander

Enclosures:

Copies Furnished (with enclosures):

Chief, Source Data Unit
NOAA/National Ocean Service
1315 East-west Highway, Room 7316
Silver Spring, Maryland 20910-3282

U. S. Fish and Wildlife Enhancement
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

National Marine Fisheries Service
101 Pivers Island Road
Beaufort, North Carolina 28516

Mr. Todd Bowers
Wetlands and Marine Regulatory Section
Water Protection Division – Region IV
U. S. Environmental Protection Agency
61 Forsyth St. SW
Atlanta, Georgia 30303-8931

DEPARTMENT OF THE ARMY PERMIT

Permittee: Mr. F. Durward Tyson, Jr., Greenville Utilities Commission

Permit No.: SAW-2020-00387

Issuing Office: CESA-W-RG

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Relocation of an existing 8-inch natural gas pipeline by means of horizontally directionally drilling (HDD) under the Tar River.

Project Location: Adjacent to the NC Highway 11 Memorial Bridge, in Greenville, Pitt County, North Carolina.

General Conditions:

- 1. The time limit for completing the authorized work ends on December 31 2025. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.**
- 2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.**
- 3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.**
- 4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.**
- 5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.**
- 6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.**

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).**
- Section 404 of the Clean Water Act (33 U.S.C. 1344).**
- Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).**

2. Limits of this authorization.

- a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.**
- b. This permit does not grant any property rights or exclusive privileges.**
- c. This permit does not authorize any injury to the property or rights of others.**
- d. This permit does not authorize interference with any existing or proposed Federal project.**

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.**
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.**
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.**
- d. Design or construction deficiencies associated with the permitted work.**
- e. Damage claims associated with any future modification, suspension, or revocation of this permit.**

4. It has been determined that the activities authorized do not impair the usefulness of the USACE Navigation project and are not injurious to the public interest.

5. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

6. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. You fail to comply with the terms and conditions of this permit.**
- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).**

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

7. Extensions. General condition I establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



(PERMITTEE) F. DURWARD TYSON, JR.
GREENVILLE UTILITIES COMMISSION

6-16-2020

(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.



FOR THE DISTRICT ENGINEER
ROBERT J. CLARK, COLONEL

06/17/2020

(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

SPECIAL CONDITIONS
Action ID: SAW-2020-00387

a. **Work Limits:** All work authorized by this permit shall be performed in strict compliance with the attached permit plans, dated February 20, 2020, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers (Corps) prior to any active construction in waters or wetlands.

b. **Unauthorized Dredge and/or Fill:** Except as authorized by this permit or any Corps-approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

c. **Permit Distribution:** The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions and drawings shall be available at the project site during construction and maintenance of this project.

d. **Preconstruction Meeting:** The Permittee shall conduct an onsite preconstruction meeting between its representatives, the contractor's representatives and the appropriate Corps Project Manager prior to undertaking any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all terms and conditions contained within the Department of the Army permit. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps Project Manager(s) can attend. The Permittee shall extend an invitation to the Corps a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

e. **Notification of Construction Commencement and Completion:** The Permittee shall notify the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

f. **Reporting Address:** All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District Washington Regulatory Field Office, Attn: Ms. Emily Thompson, 2407 West 5th Street, Washington, NC 27889, or Emily.b.thompson@usace.army.mil. The Permittee shall reference the following permit number, SAW-2020-00387, on all submittals.

g. **Permit Revocation:** The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

h. **Reporting Violations:** Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 910-251-4629 within 24 hours of the Permittee's discovery of the violation.

i. **Hydraulic Fracturing (Fracking):** When directional boring or horizontal directional drilling (HDD) under waters of the United States, including wetlands, the Permittee shall closely monitor the project for hydraulic fracturing or "fracking" and material from the drilling operation leaching to the surface and into jurisdictional areas. Any discharge from fracking or leaching into waters of the United States, including wetlands, shall be reported to U.S. Army Corps of Engineers, Wilmington District Washington Field Office, Attn: Ms. Emily Thompson at 910-251-4629, or Emily.B.Thompson@usace.army.mil within 48 hours. Restoration and/or mitigation may be required as a result of any unintended discharges.

j. **As-Built Construction Plans:** The Permittee shall submit to the Corps as-built surveys of the authorized jurisdictional crossing associated with the utility line installation under the Tar River. The Permittee shall submit the surveys within sixty (60) days of construction completion of the subject utilities.

k. **Endangered Species Act:** The Permittee shall implement all necessary measures to ensure the authorized activity does not kill, injure, capture, harass, or otherwise harm any federally-listed threatened or endangered species. While accomplishing the authorized work, if the Permittee discovers or observes an injured or dead threatened or endangered species, the U.S. Army Corps of Engineers, Wilmington District Washington Field Office, Attn: Ms. Emily Thompson at 910-251-4629, or Emily.b.thompson@usace.army.mil will be immediately notified to initiate the required Federal coordination.

l. **Maintain Flows and Circulation Patterns of Waters:** Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters and/or wetlands.

m. **Clean Fill:** The Permittee shall use only clean fill material for this project. The fill material shall be free of items such as trash, construction debris, metal and plastic products, and concrete block with exposed metal reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

n. **Water Contamination:** All mechanized equipment shall be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Permittee shall immediately report it to the N.C. Division of Water Resources at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act shall be followed.

o. **Aquatic Life Movement:** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. All discharges of dredged or fill material within waters of the United States shall be designed and constructed to maintain low flows to sustain the movement of aquatic species.

p. This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

q. **Federal Project:**

i. This permit does not authorize the interference with any existing or proposed Federal project, and the Permittee will not be entitled to compensation for damage or injury to the authorized structure or work which may be caused from existing or future operations undertaken by the United States in the public interest. No attempt will be made by the Permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work. Use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

ii. The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal, relocation, or alteration.

iii. The Permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work, will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the waterway to its former conditions. If the Permittee fails to comply with this direction, the Secretary or his representative may restore the waterway, by contract or otherwise, and recover the cost from the Permittee.

TERMS AND CONDITIONS FOR THE PURCHASE OF
APPARATUS, SUPPLIES, MATERIALS, LABOR AND EQUIPMENT

1.0 TAXES

No taxes shall be included in any bid prices. GUC is exempt from Federal Excise Tax. GUC is not exempt from North Carolina state sales and use tax or, if applicable, Pitt County sales and use tax. Such taxes shall be shown as a separate item on the invoice.

2.0 INVOICES

It is understood and agreed that orders will be shipped at the established contract prices and quantities in effect on dates orders are placed. Invoicing at variance with this provision may subject the contract to cancellation. Applicable North Carolina sales tax shall be invoiced as a separate line item. All invoices must bear the GUC purchase order number. Mail all invoices to Greenville Utilities Commission, Finance Department, P. O. Box 1847, Greenville, NC 27835-1847.

3.0 PAYMENT TERMS

Payments for equipment, materials, or supplies will be made after the receipt and acceptance of the equipment, materials, supplies or services and after submission of a proper invoice. GUC's normal payment policy is thirty (30) days. GUC will not be responsible for any goods delivered without a purchase order having been issued. Payment will be made in U. S. currency only.

4.0 QUANTITIES

Quantities specified are only estimates of GUC's requirements. GUC reserves the right to purchase more or less than the stated quantities at prices indicated in the submitted Proposal Form based on our actual needs.

5.0 AFFIRMATIVE ACTION

The Provider will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without discrimination by reason of race, color, religion, sex, national origin, or physical handicap.

6.0 CONDITION AND PACKAGING

Unless otherwise indicated in the bid, it is understood and agreed that any item offered or shipped shall be new and in first class condition, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging.

7.0 SAMPLES

Samples of items, if required, must be furnished free of expense to GUC, and if not destroyed, will, upon request, be returned at the Provider's expense. Request for the return of samples must be made at the bid opening, otherwise, the samples will become GUC's property. Each individual sample must be labeled with Provider's name.

8.0 SPECIFICATIONS

Any deviation from specifications must be clearly pointed out, otherwise, it will be considered that items offered are in strict compliance with specifications, and the Provider will be held responsible. Deviations must be explained in detail. **The Provider shall not construe this paragraph as inviting deviation or implying that any deviation will be acceptable.**

9.0 INFORMATION AND DESCRIPTIVE LITERATURE

Providers are to furnish all information requested. Further, as may be specified elsewhere, each Provider must submit with its proposal: cuts, sketches, descriptive literature, and/or complete specifications covering the products offered. Reference to literature submitted with a previous bid does not satisfy this provision. Bids which do not comply with these requirements will be subject to rejection.

10.0 AWARD OF CONTRACT

As directed by statute, qualified bids will be evaluated and acceptance made of the lowest responsible, responsive bid most advantageous to GUC as determined upon consideration of such factors as prices offered, the quality of the article(s) offered, the general reputation and performance capabilities of the Provider, substantial conformity with the specifications and other conditions set forth in the bid, the suitability of the article(s) for the intended use, the related services needed, the date(s) of delivery and performance, and such other factors deemed by GUC to be pertinent or peculiar to the purchase in question.

Acceptance of the order includes acceptance of all terms, conditions, prices, delivery instructions, and specifications as shown on this set of Terms and Conditions and in this order or attached to and made a part of this order.

The conditions of this order cannot be modified except by written amendment in the form of "Amended Purchase Order," which has been approved by GUC's Procurement Manager.

In the event of a Provider's failure to deliver or perform as specified, GUC reserves the right to cancel the order or any part thereof, without prejudice to GUC's other rights. The Provider agrees that GUC may return part of or all of any shipment at Provider's expense. GUC may charge the Provider with all reasonable expenses resulting from such failure to deliver or perform.

11.0 MEDIATION/BINDING ARBITRATION

In the event of any dispute between the Parties, the Parties agree to submit any dispute to non-binding mediation before a mutually agreeable Mediator prior to initiating litigation. If the Parties are unable to agree upon a Mediator within thirty (30) days after demand therefore, either Party may petition a Court of competent jurisdiction for the designation of a qualified Mediator for these purposes. Each Party shall bear its own costs and expenses of participating in the mediation (including, without limitation, reasonable attorneys' fees), and each Party shall bear

one-half (1/2) of the costs and expenses of the Mediator. Unless otherwise agreed, the Parties will hold the mediation in Greenville, North Carolina. The matters discussed or revealed in the mediation session shall not be disclosed in any subsequent litigation.

In the event the matter is not resolved in mediation, either Party may request arbitration. The parties shall jointly select an Arbitrator, and shall be bound by the decision of the Arbitrator with respect to any dispute between the parties with respect to this Agreement. If the parties are unable to mutually agree upon an Arbitrator, the Parties shall each select an Arbitrator, and the two Arbitrators so selected shall select a third Arbitrator, and the decision of the majority of the Arbitrators shall be conclusive and binding upon the Parties. The Parties at all times agree to equally split the costs of any Arbitrator(s) selected in an effort to resolve the dispute between the Parties. Any party desiring to resolve a dispute under the terms of this Agreement shall notify the other Party in writing, and the Parties shall seek to agree upon a mutually agreed-upon Arbitrator within a period of ten (10) days from the date of such written demand. If the Parties are unable to agree within such ten (10) day period, the Parties shall each select an Arbitrator, and the two (2) Arbitrators so selected shall select a third Arbitrator within fifteen (15) days from the date of the written demand for arbitration, and a decision shall be rendered by the Arbitrator(s) so selected within five (5) days after such Arbitrator(s) is selected.

12.0 GOVERNMENT RESTRICTIONS

In the event any Governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship, or performance of the items offered on this bid prior to their delivery, it shall be the responsibility of the successful Provider to notify the GUC Procurement Manager, at once, indicating in its letter the specific regulation which required such alterations. GUC reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or, in the sole discretion of GUC, to cancel the contract.

13.0 INSURANCE

13.1 Coverage – During the term of the contract, the Provider at its sole cost and expense shall provide commercial insurance of such type and with the following coverage and limits:

13.1.1 Workers' Compensation – The Provider shall provide and maintain Workers' Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of \$1,000,000 each accident, covering all Provider's employees who are engaged in any work under the contract. If any work is sublet, the Provider shall require the subcontractor to provide the same coverage for any of its employees engaged in any work under the contract.

13.1.2 General Liability – Commercial Liability Coverage written on an "occurrence" basis in the minimum amount of \$1,000,000 per occurrence.

13.1.3 Automobile – Automobile Liability Insurance, to include coverage for all owned, hired, and non-owned vehicles used in connection with the contract with a minimum combined single limit of \$1,000,000 per accident.

13.2 Requirements - Providing and maintaining adequate insurance coverage is a material obligation of the Provider. All such insurance shall meet all laws of the State of North Carolina. Such insurance coverage shall be obtained from companies that are authorized to provide such coverage and that are authorized to do business in North Carolina by the Commissioner of Insurance. The Provider shall at all times comply with the terms of such insurance policies and all requirements of the insurer under any of such insurance policies, except as they may conflict with existing North Carolina laws or this contract. The limits of coverage under each insurance policy maintained by the Provider shall not be interpreted as limiting the Provider's liability and obligations under the contract. It is agreed that the coverage as stated shall not be canceled or changed until thirty (30) days after written notice of such termination or alteration has been sent by registered mail to GUC's Procurement Manager.

14.0 PATENTS AND COPYRIGHTS

The Provider shall hold and save GUC, its officers, agents, and employees, harmless from liability of any kind, including costs and expenses, including reasonable attorney fees, on account of any copyrighted articles or any patented or unpatented invention, device or appliance manufactured or used in the performance of this contract.

15.0 PATENT AND COPYRIGHT INDEMNITY

The Provider will defend or settle, at its own expense, any action brought against GUC to the extent that it is based on a claim that the product(s) provided pursuant to this agreement infringe any U.S. copyright or patent; and will pay those costs, damages, and attorney fees finally awarded against GUC in any such action attributable to any such claim, but such defense, settlements, and payments are conditioned on the following: (1) that Provider shall be notified promptly in writing by GUC of any such claim; (2) that Provider shall have sole control of the defense of any action on such claim and of all negotiations for its settlement or compromise; (3) that GUC shall cooperate with Provider in a reasonable way to facilitate the settlement of defense of such claim; (4) that such claim does not arise from GUC modifications not authorized by the Provider or from the use of combination of products provided by the Provider with products provided by GUC or by others; and (5) should such product(s) become, or in the Provider's opinion likely to become, the subject of such claim of infringement, then GUC shall permit Provider, at Provider's option and expense, either to procure for GUC the right to continue using the product(s), or replace or modify the same so that it becomes non-infringing and performs in a substantially similar manner to the original product.

16.0 EXCEPTIONS

All proposals are subject to the terms and conditions outlined herein. All responses will be controlled by such terms and conditions and the submission of other terms and conditions, price catalogs, and other documents as part of a Provider's response will be waived and have no effect on this Request for Proposal or any other contract that may be awarded resulting from this solicitation. The submission of any other terms and conditions by a Provider may be grounds for rejection of the Provider's proposal. The Provider specifically agrees to the terms

and conditions set forth in this set of Terms and Conditions by affixing its name on the signatory page contained herein.

17.0 CONFIDENTIAL INFORMATION

Except as provided by statute and rule of law, GUC will keep trade secrets which the Provider does not wish disclosed confidential. Each page shall be identified in boldface at the top and bottom as "CONFIDENTIAL" by the Provider. Cost information shall not be deemed confidential. The determination of whether a matter is confidential will be determined by North Carolina law.

18.0 ASSIGNMENT

No assignment of the Provider's obligations or the Provider's right to receive payment hereunder shall be permitted without the express written consent of GUC, provided however, upon written request approved by the GUC Procurement Manager, solely as a convenience to the Provider, GUC may:

- Forward the Provider's payment check directly to any person or entity designated by the Provider, and
- Include any person or entity designated by Provider as a joint payee on the Provider's payment check.
- In no event shall such approval and action obligate GUC to anyone other than the Provider, and the Provider shall remain responsible for fulfillment of all contract obligations.

19.0 ACCESS TO PERSON AND RECORDS

GUC shall have reasonable access to persons and records of Provider as a result of all contracts entered into by GUC.

20.0 INSPECTION AT BIDDER'S SITE

GUC reserves the right to inspect, at a reasonable time, the item, plant, or other facilities of a prospective Provider prior to contract award and during the contract term as necessary for GUC's determination that such item, plant, or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the contract. Provider may limit GUC's access to restricted areas.

21.0 AVAILABILITY OF FUNDS

Any and all payments of compensation of this specific transaction and any continuation or any renewal or extension are dependent upon and subject to the allocation of GUC funds for the purpose set forth in this Agreement.

22.0 GOVERNING LAWS

All contracts, transactions, agreements, etc., are made under and shall be governed by and construed in accordance with the laws of the State of North Carolina.

23.0 ADMINISTRATIVE CODE

Bids, proposals, and awards are subject to applicable provisions of the North Carolina Administrative Code and General Statutes and Laws of the State of North Carolina.

24.0 EXECUTION

In the discretion of GUC, failure of a duly authorized official of Provider to sign the Signatory Page may render the bid invalid.

25.0 CLARIFICATIONS/INTERPRETATIONS

Any and all questions regarding these Terms and Conditions must be addressed to the GUC Procurement Manager. Do not contact the user directly. **These Terms and Conditions are a complete statement of the parties' agreement and may only be modified in writing signed by Provider and the GUC Procurement Manager.**

26.0 SITUS

The place of all contracts, transactions, agreements, their situs and forum, shall be North Carolina, where all matters, whether in contract or tort, relating to the validity, construction, interpretation, and enforcement shall be determined.

27.0 TERMINATION OF AGREEMENT

GUC or Provider may terminate this Agreement for just cause at any time. Provider will be paid for all time and expenses incurred as of the termination date. Termination for just cause by either party shall be by certified letter and shall be effective thirty (30) days after signed and acknowledged receipt of said letter. Just cause shall be based on reasonable grounds, and there must be a fair and honest cause or reason for such action. The causes for termination, include, but are not limited to: (1) Provider's persistent failure to perform in accordance with the Terms and Conditions, (2) Provider's disregard of laws and regulations related to this transaction, and/or (3) Provider's substantial violation of the provisions of the Terms and Conditions.

28.0 DELIVERY

Shipments will be made only upon releases from a purchase order issued by GUC in accordance with GUC's current needs.

Time is of the essence with respect to all deliveries under this Agreement.

Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) GUC Warehouse, 801 Mumford Road, Greenville, North Carolina 27834, unless otherwise specified.

The agreed price for such equipment, materials, or supplies shall include all costs of delivery

and ownership, and risks of loss shall not be transferred from Provider to GUC until express written acceptance of delivery and inspection by GUC. Delivery hours are between 8:00 AM and 4:30 PM Monday-Friday only. **GUC's purchase order number is to be shown on the packing slip or any related documents.** GUC reserves the right to refuse or return any delivery with no purchase order number or which is damaged. GUC will not be charged a restocking fee for any delivery which is refused or returned.

29.0 INDEMNITY PROVISION

Provider agrees to indemnify and save GREENVILLE UTILITIES COMMISSION of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, its co-owners, joint venturers, agents, employees, and insurance carriers harmless from any and all losses, claims, actions, costs, expenses including reasonable attorney fees, judgments, subrogations, or other damages resulting from injury to any person (including injury resulting in death), or damage (including loss or destruction) to property of whatsoever nature of any person arising out of or incident to the performance of the terms of this Contract by Provider, including, but not limited to, Provider's employees, agents, subcontractors, and others designated by Provider to perform work or services in, about, or attendant to, the work and services under the terms of this Contract. Provider shall not be held responsible for any losses, expenses, claims, subrogations, actions, costs, judgments, or other damages, directly, solely, and proximately caused by the negligence of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina. Insurance covering this indemnity agreement by the Provider in favor of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, shall be provided by Provider.

30.0 FORCE MAJEURE

Neither party shall be considered in default in the performance of its obligations hereunder to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or future, which is beyond the reasonable control of such party. In any such event of force majeure, the parties shall advise each other of such event, and the parties shall negotiate an equitable adjustment to their respective obligations under this Agreement.

31.0 WARRANTY(IES)

The Provider hereby includes all warranties, whether expressed or implied, including, but not limited to, the Implied Warranty of Merchantability and the Implied Warranty of Fitness for a Particular Purpose.

32.0 INTEGRATED CONTRACT

These Terms and Conditions, Instructions to Bidders, Specifications, and the selected Provider's bid represents the entire contract between the Parties. No verbal or other written agreement(s) shall be held to vary the provisions of this Agreement.

33.0 CONTRACT PROVISIONS

Each of the provisions of these Terms and Conditions shall apply to the full extent permitted by law, and the invalidity in whole or in part of any provision shall not affect the remainder of such provision or any other provisions.

34.0 E-VERIFY

E-Verify - I understand that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25 et seq. I am aware of and in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes. To the best of my knowledge, any subcontractors employed by me as a part of this contract are in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes.

35.0 IRAN DIVESTMENT ACT CERTIFICATION

By acceptance of this purchase order, Vendor/Contractor certifies that, as of the date of the purchase order or contract, it is not on the Final Divestment List as created by the State Treasurer pursuant to N.C.G.S. § 143-6A-4. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. § 143C-6A-5(b), Vendor/Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List.

36.0 UNIFORM GUIDANCE

Contracts funded with federal grant or loan funds must be procured in a manner that conforms with all applicable federal laws, policies, and standards, including those under the Uniform Guidance (2 C.F.R. Part 200).

37.0 NOTICES

Notices to the Parties should be sent to the names and addresses specified below:

Cleve Haddock, CLGPO
Procurement Manager
Greenville Utilities Commission
P.O. Box 1847
Greenville, NC 27835-1847