AMERICAN RESCUE PLAN ACT (ARPA)

PROJECT MANUAL

FOR

Highway 16 Waterline Extension

CATAWBA COUNTY
NC

catawba county
MAKING. LIVING. BETTER.

JUNE 2024

HIGHFILL Project No. CAT2101

Prepared by:

HIGHFILL

Highfill Infrastructure Engineering, P.C.
9300 Harris Corners Pkwy, Suite 440
Charlotte, North Carolina 28269
Tel 980-237-6232 | NC Firm License No. C-2586

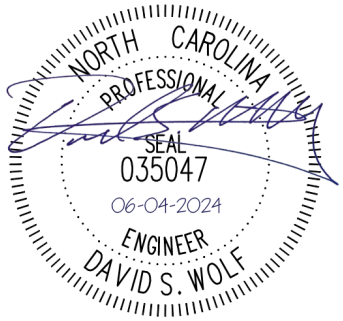
AMERICAN RESCUE PLAN ACT (ARPA) FUNDED

HWY 16 WATERLINE EXTENSION

CATAWBA COUNTY
NC

JUNE 2024

HIGHFILL Project No. CAT2101



Highfill Infrastructure Engineering, PC
9300 Harris Corners Pkwy, Suite 440
Charlotte, North Carolina 28269
Tel 980-237-6232
Firm License No. C-2586

TABLE OF CONTENTS

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS

Bidding Requirements

C-111 Advertisement for Bids
C-200 Instruction to Bidders
C-201 Project Special Provisions
- Addendum – Rules Implementing Mediated Settlement Conferences in Catawba County Construction Projects

C-410 Bid Form for Construction Contract
C-430 Bid Bond (Penal Sum Form)
C-433 Identification of MBE Participation
Affidavit A: Listing of Good Faith Efforts
Affidavit B: Intent to Perform Contract with Own Workforce
Affidavit C: Portion of Work to be Performed by Minority Firms
Affidavit D: Good Faith Efforts
C-451 Qualification Statement
C-480 Non-collusion Affidavit

Contracting Requirements

C-510 Notice of Award
C-520 Agreement Between Owner and Contractor for Construction Contract
- Attachment B – Coronavirus State and Local Fiscal Recovery Funds Addendum
- Attachment C – Coronavirus State and Local Fiscal Recovery Funds Addendum Certification Regarding Lobbying

C-550 Notice to Proceed
C-610 Performance Bond
C-615 Payment Bond
C-620 Contractors Application for Payment
C-625 Certificate of Substantial Completion
C-627 North Carolina Reimbursable Sales and Use Tax Statement
C-700 Modified General Conditions
C-800 Modified Supplementary Conditions
C-825 Pre-Audit Certification
C-940 Work Change Directive
C-941 Change Order
C-942 Field Order
C-Y1 Contractor's Final Affidavit and Waiver of Lien
C-Y2 Consent of Surety for Final Payment

TABLE OF CONTENTS

DIVISION 1 – GENERAL REQUIREMENTS

Section 01 11 00 – Summary of Work
Section 01 14 00 – Work Restrictions
Section 01 20 00 – Price and Payment Procedures
Section 01 25 00 – Substitution Procedures
Section 01 31 00 – Project Management and Coordination
Section 01 32 00 – Construction Progress Documentation
Section 01 33 00 – Submittal Procedures
Section 01 40 00 – Quality Requirements
Section 01 55 26 – Temporary Traffic Control
Section 01 60 00 – Product Requirements
Section 01 71 00 – Examination and Preparation
Section 01 74 00 – Cleaning and Waste Management
Section 01 77 00 – Closeout Procedures
Section 01 78 00 – Closeout Submittals

DIVISION 2 – EXISTING CONDITIONS

Section 02 01 00 – Maintenance of Existing Conditions
Section 02 32 00 – Geotechnical Investigations

DIVISION 3 – CONCRETE

Section 03 30 53 – Miscellaneous Concrete Below Grade

DIVISION 31 – EARTHWORK

Section 31 05 00 – Common Work Results for Earthwork
Section 31 10 00 – Site Clearing
Section 31 22 00 – Grading
Section 31 23 00 – Excavation and Fill
Section 31 23 19 – Dewatering
Section 31 23 33 – Trenching and Backfilling
Section 31 25 00 – Erosion and Sedimentation Controls

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 32 11 00 – Base Courses
Section 32 12 00 – Flexible Paving
Section 32 16 00 – Curbs, Gutters, Sidewalks, and Driveways
Section 32 90 00 – Planting

DIVISION 33 – UTILITIES (See also City of Hickory Water Standards)

Section 33 01 10.58 – Disinfection of Water Utility Piping Systems
Section 33 05 23.16 – Utility Bored Crossing
Section 33 05 97 – Identification and Signage for Utilities
Section 33 14 13 – Water Utility Distribution Piping
Section 33 14 19 – Valves and Hydrants for Water Utility Service

TABLE OF CONTENTS

CITY OF HICKORY STANDARDS

Excerpted from the Engineering Department Manual of Practice:
Section 02200 - Earthwork
Section 02222 - Excavating and Backfilling
Section 02227 - Boring Encasement
Section 02400 - Thrust Blocking
Section 02401 - Water Valves, Valve Boxes, Air Relief Valves, Tapping Sleeve & Valves
Section 02402 - Fire Hydrant & Appartenances
Section 02500 - Leakage Testing
Section 02501 - Sterilization
Section 02570 – Bituminous Pavement Repair
Section 02660 – Water System
Section 02661 – Water System Design Spec
Section 02668 – Water Service Connections
Section 02900 – Restoration of Services
Section 02930 – Seeding & Landscaping

APPENDIX A – Owner Obtained Permits, Encroachment and Occupancy Agreements

APPENDIX B – Report of Subsurface Exploration

CATAWBA COUNTY
NEWTON, NC
HIGHWAY 16 WATERLINE EXTENSION
BID NO. 24-1023

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the **Highway 16 Waterline Extension project** will be received, by **Catawba County**, in the **2nd floor meeting room, Government Center, located at 25 Government Drive, Newton, North Carolina 28658**, until **2:00 PM** local time on **July 24, 2024**, at which time the Bids which have been duly received will be **publicly** opened and read. The Project consists of constructing **a 12-inch potable waterline and related appurtenances between existing waterlines on NC Highway 150 and NC Highway 16 Bypass.**

A mandatory pre-bid conference will be held at 10:00 AM local time on **June 26, 2024**, at the **Catawba County Government Center - 2nd floor meeting room** located at 25 Government Drive, Newton, North Carolina 28658.

Catawba County has been awarded Coronavirus State and Local Fiscal Recovery Funds (CSLFRF) by the Treasury Department under the American Rescue Plan Act (ARPA). As such, the County allocated funds toward water infrastructure needs. Any contracts awarded pursuant to this Advertisement for Bids (hereinafter "AFB") must comply with the terms of ARPA, regulations issued by the U.S. Department of the Treasury governing the expenditure of monies distributed from the Fiscal Recovery Funds (including, without limitation, the Interim Final Rule (86 Fed. Reg. 26,786 (May 17, 2021) and Final Rule (87 Fed. Reg. 4,338 (Jan. 27, 2022)), the Award Terms and Conditions applicable to the Fiscal Recovery Funds, and such other guidance as Treasury has issued or may issue governing the expenditure of monies distributed from the Fiscal Recovery Funds.

Pursuant to the Regulatory Requirements, the County must comply with Uniform Administrative Requirements, Cost Principles, and Audit Requirement for Federal Awards 2 CFR Part 200, other than such provisions as Treasury has determined or may determine are inapplicable to the Fiscal Recovery Funds. In addition, the County must include within the contract applicable provisions described in Appendix II to 2 C.F.R. Part 200, contained in Attachment B – Coronavirus State and Local Fiscal Recovery Addendum.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis as indicated in the Bid Form.

The Issuing Office for the Bidding Documents is:

HIGHFILL INFRASTRUCTURE ENGINEERING, P.C.
9300 Harris Corners Pkwy, Suite 440
Charlotte, North Carolina 28269
Contact: Carmen Morrow cmorrow@hiepc.com
Tel 980-237-6232

Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 8:00 AM and 5:00 PM, **by appointment**, and may obtain copies of the Bidding Documents from the Issuing Office as described herein.

Bidding Documents may be ordered online by registering with the Issuing Office. Contact Carmen Morrow at 980-237-6232, or cmorrow@hiepc.com to register and receive plans. Following registration, complete sets of Bidding Documents may be downloaded from the Issuing Office's website as "zipped" portable document format (PDF) files. The cost of printed Bidding Documents from the Issuing Office will depend on the number and size of the Drawings and Project Manual, applicable taxes, and shipping method selected by the prospective Bidder. Cost of Bidding Documents and shipping is non-refundable. Upon Issuing Office's receipt of payment, printed Bidding Documents will be sent via the prospective Bidder's delivery method of choice; the shipping charge will depend on the shipping method chosen. The date that the Bidding Documents are transmitted by the Issuing Office will be considered the Bidder's date of receipt of the Bidding Documents. Partial sets of the Bidding Documents will not be available from the Issuing Office. Neither the County nor the Engineer/Project Manager will be responsible for full or partial sets of Contract Documents including any addendum obtained from any other source than the Issuing Office.

Bidding Documents will also be available for inspection, **by appointment**, at the Catawba County Purchasing Department, 25 Government Drive, Newton, North Carolina 28658, Phone: 828-465-8224.

In addition, Bidding Documents may be downloaded from the following designated County website:

https://www.catawbacountync.gov/county-services/purchasing/bid-notices/

This website will be updated periodically with addenda and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only as detailed in this Advertisement. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the methods listed herein.

The table below shows the *intended* bid schedule for this Project. Owner will make every effort to adhere to this schedule:

Event	**Responsibility**	**Date and Time**
Advertisement Issued	Owner	June 7, 2024
Pre-Bid Conference	Owner/Contractor	June 26, 2024 at 10:00 AM
Submit Written Questions	Contractor	July 8, 2024 at 5:00 PM
Provide Responses to Questions	Owner	July 12, 2024 at 5:00 PM
Bid Opening	Contractor	July 24, 2024 at 2:00 PM
Contract Award	Owner	TBA
Contract Effective Date	Owner	Upon Execution

Bid security shall be furnished in accordance with the Instructions to Bidders.

Bidders shall submit proof of qualifications to perform the Work as described in the Instructions to Bidders.

All bidders are hereby notified that they must be properly licensed under the state laws governing their prospective trades. Bidders are also notified that applicable provisions of Chapter 87 of the General Statutes of the State of North Carolina shall be observed in the receiving of bids and awarding of contracts for the Work.

Catawba County reserves the right to reject any and all bids and to waive informalities as may be permitted by law.

The County reserves the right to postpone bid openings for its own convenience. Please check the designated County website for details.

Owner: **Catawba County**

By: **Tina Wright**

Title: **Purchasing Manager**

Date: **June 7, 2024**

+ + END OF ADVERTISEMENT FOR BIDS + +

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

Page

ARTICLE 1 – Defined Terms 1

ARTICLE 2 – Copies of Bidding Documents 1

ARTICLE 3 – Qualifications of Bidders – Not Used. 1

ARTICLE 4 – Site and Other Areas; Existing Site Conditions; Examination of Site; Owner's Safety Program; Other Work at the Site 1

ARTICLE 5 – Bidder's Representations 2

ARTICLE 6 – Pre-Bid Conference 3

ARTICLE 7 – Interpretations and Addenda 3

ARTICLE 8 – Bid Security 3

ARTICLE 9 – Contract Times 4

ARTICLE 10 – Liquidated Damages 4

ARTICLE 11 – Substitute and "Or-Equal" Items 4

ARTICLE 12 – Subcontractors, Suppliers, and Others 4

ARTICLE 13 – Preparation of Bid 5

ARTICLE 14 – Basis of Bid 6

ARTICLE 15 – Submittal of Bid 6

ARTICLE 16 – Modification and Withdrawal of Bid 7

ARTICLE 17 – Opening of Bids 7

ARTICLE 18 – Bids to Remain Subject to Acceptance 7

ARTICLE 19 – Evaluation of Bids and Award of Contract 8

ARTICLE 20 – Bonds and Insurance 8

ARTICLE 21 – Signing of Agreement 8

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.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office (Charlotte, NC) in the format stated in the advertisement or invitation to bid.

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

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS – NOT USED.

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;

1. 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.

2. Geotechnical Baseline Report: The Bidding Documents do not contain a Geotechnical Baseline Report (GBR).

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the

Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct the required Site visit during normal working hours and shall not disturb any ongoing operations at the Site.

B. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

C. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

D. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

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

4.05 *Other Work at the Site – Not used.*

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; and the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

E. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations,

tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

F. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

G. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

H. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

I. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

6.01 A Mandatory Pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required 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 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received after the end of the Question Period as indicated in the Advertisement for Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award,

Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 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 days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

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

ARTICLE 10 – LIQUIDATED DAMAGES

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

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, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. Application for review of substitute or "or equal" materials or equipment prior to Bidding shall be in accordance with North Carolina General Statutes 133-3 and the following procedures:

No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer prior to end of Question Period as indicated in the Advertisement for Bids. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 Bidders shall submit a list of the Subcontractors and Suppliers proposed for the Work with the bid. If requested by Owner, Bidder shall provide an experience statement experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or

entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

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 shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown. The corporate seal shall be affixed and attested by the corporate secretary or an assistant corporate secretary.

13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.

13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.

13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.

13.07 All names shall be printed in ink below the signatures.

13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.10 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and

qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

14.01 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.02 *Allowances*

A. For cash allowances the Bid price shall be as indicated on the Bid Form.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished the Bid Form and the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED."

15.03 Each Bid must be submitted in a sealed envelope, plainly marked on the outside, addressed and delivered as shown below. <u>The bid bond must be in its own envelope apart from the rest of the bid</u>. If forwarded by mail, the sealed envelopes containing the Bid must be enclosed in another envelope addressed to:

Catawba County
Attn: Purchasing Manager
25 Government Drive (Hand-delivery, FedEx and UPS)
Post Office Box 389 (Mailing – US Postal Service)
Newton, North Carolina 28658

The envelope-containing Bid shall be marked as follows:

Upper left-hand corner -	Lower left-hand corner -
Bidder's Name	NC General Contractor's License No.
Bidder's Address	Classification
	Expiration Date

Bid For: 24-1023

To: Catawba County
Attn: Purchasing Manager
25 Government Dr. (Hand-delivery, FedEx and UPS)
Post Office Box 389 (Mailing – UD Postal Service)
Newton, North Carolina 28658

15.04 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 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 Consistent with N.C.G.S. § 143-129.1, if within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work, as required by law.

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 will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

19.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

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

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within sixty (60) days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

C-201 PROJECT SPECIAL PROVISIONS

Coordination Of Plans, Specifications, Supplementary Conditions and Special Provisions

The Specifications, Drawings, Special Provisions, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are complementary and provide and describe the complete Contract. In case of discrepancy, Notify Engineer.

The scope of work is delineated in the attached Drawings and Specifications, subject to the following Special Provisions:

MBE/WBE Goals:

5% with minority or woman-owned business enterprises (M/WBE Total)

Failure to achieve this goal, or to make a good faith effort to do so, may result in not being awarded the contract.

E-Verify:

Contractor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, if Contractor uses a subcontractor, Contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes.

Iran Divestment:

Catawba County staff are responsible for verifying that the contractor is not listed on the Iran Divestment List or the Companies Boycotting Israel Final Divestment List published by the NC State Treasurer pursuant to N.C.G.S. 147-86-60. The County shall not contract with any company or their affiliates listed on these divestment lists.

Non-Appropriation Clause:

Payment to Contractor for services is expressly conditioned upon availability of funds, and upon the actual receipt of funds, from appropriated revenue sources. If funds are insufficient to meet expected performances hereunder due to non-appropriation or reduction of funds by the source, Work to be provided hereunder may be adjusted by the parties, in writing, to conform with the funds which are actually available. If such adjustment is impractical or would defeat the intent or purpose of this Agreement, same may be terminated accordingly without penalty.

Non-Discrimination:

No Party nor its employees will discriminate against any person based on race; religion; creed; color; sex; gender identity and expression; pregnancy; childbirth; breastfeeding; medical conditions related to pregnancy, childbirth, or breastfeeding; sexual orientation; marital status; age; national origin; ancestry; genetic information; disability; veteran status; or any class protected by local, state, or federal law in bidding on or in their performance related to this Project.

RULES IMPLEMENTING MEDIATED SETTLEMENT CONFERENCES IN CATAWBA COUNTY

Adopted: February 5, 2024

Table of Rules

RULE

1. Initiating Mediated Settlement Conferences
   - A. Purpose of Mandatory Settlement Conferences
   - B. Initiating the Dispute Resolution Process
   - C. Condition Precedent to Litigation

2. Selection of a Mediator
   - A. Selection of a Certified Mediator by Agreement of the Parties
   - B. Withdrawal or Disqualification of a Mediator

3. The Mediated Settlement Conference
   - A. Where the Conference is to be Held
   - B. When the Conference is to be Held
   - C. Requests to Extend the Deadline for Completion
   - D. Recesses
   - E. Postponements
   - F. Construction Projects

4. Duties of Parties and Other Participants
   - A. Attendance
   - B. Finalizing the Agreement
   - C. Mediation Fee
   - D. Failure to Compensate the Mediator

5. Authority and Duties of Mediators
   - A. Authority of Mediators
   - B. Duties of Mediators

6. Compensation of the Mediator

7. Mediator Certification

8. Rule Amendments

9. Time Limits

10. No Recording

RULE 1. INITIATING MEDIATED SETTLEMENT CONFERENCES

A. Purpose of Mandatory Settlement Conferences. Pursuant to Catawba County Code Section 8-35 and NCGS §143-128(f1), these Rules are promulgated to implement a system of settlement events which are designated to focus the parties' attention on settlement rather than on claim preparation and to provide a structured opportunity for settlement negotiations to take place. Nothing herein is intended to limit or prevent the parties from engaging in settlement procedures voluntarily at any time prior to or during commencement of the dispute resolution process.

B. Initiating the Dispute Resolution Process.

1. Any party to a Catawba County contract governed by Catawba County Code Chapter(s) 8 or 30 and who is a party to a dispute arising out of the construction process in which the amount in controversy is at least $15,000 may submit a written request to Catawba County for mediation of the dispute.

2. Prior to submission of a written request for mediation to Catawba County, the parties should give notice of any and all claims in accordance with their respective contracts, obtain decisions on the claims as required or allowed by their respective contracts, and attempt to resolve the dispute according to the terms and conditions in their respective contracts. The Mediator may adjourn any mediated settlement conference if the Mediator believes, in his or her sole discretion, that the parties have not satisfied all of the terms and conditions of their respective contracts and that doing so will enhance the prospects for a negotiated settlement.

C. Condition Precedent to Litigation. Before any party to a Contract may commence a civil action against Catawba County seeking remedies for breach or non-performance of the Contract by the County, said party must first initiate the dispute resolution process under these rules and attend and participate in good faith in the mediated settlement conference.

RULE 2. SELECTION OF A MEDIATOR

A. Selection of a Certified Mediator by Agreement of the Parties. The parties shall select a Certified Mediator within twenty-one (21) days of receipt by the County of the request for mediation. If the Mediator selected is not available or declines to participate for any reason, the parties shall select another Certified Mediator. If the parties are unable to agree on a mediator within twenty-one (21) days of the request for mediation, the County shall have the right in its absolute discretion to appoint a Certified Mediator.

B. Withdrawal or Disqualification of a Mediator. Any party may request replacement of a mediator by Catawba County for good cause. If a mediator withdraws or is disqualified, then the parties shall select another Certified Mediator within three (3) days of the notice of withdrawal or disqualification. A mediator who has withdrawn or been disqualified shall not be entitled to receive an administrative fee, unless the mediation has been commenced. If the parties do not select and designate a mediator within three (3) days from the notice of withdrawal or disqualification, the County shall have the right in its absolute discretion to appoint a Certified Mediator.

RULE 3. THE MEDIATED SETTLEMENT CONFERENCE

A. Where the Conference is to be Held. Unless all parties and the mediator otherwise agree, the mediated settlement conference shall be held in Catawba County. The mediator shall be responsible for reserving a place and making arrangements for the conference and for giving timely notice of the time and location of the conference to all attorneys, unrepresented parties and other persons and entities required to attend.

B. When the Conference is to be Held. The mediation shall be completed within ninety (90) days after selection of the mediator.

C. Request to Extend the Deadline for Completion. A party, or the mediator, may request that Catawba County extend the deadline for completion of the mediated settlement conference. Such request shall state the reasons the extension is sought and shall be served by the moving party upon the other parties and the mediator. If any party does not consent to the request, said party shall promptly communicate its objection, and the reasons for its objection, to Catawba County. Catawba County may grant the request by setting a new deadline for completion of the conference, or deny the request to extend the deadline, resulting in an impasse of the mediation.

D. Recesses. The mediator may recess the mediated settlement conference at any time and may set times for reconvening. If the time for reconvening is set before the conference is recessed, no further notification is required for persons present at the conference.

E. Postponements. A mediated settlement conference session may be postponed for good cause only after notice by the movant to all parties of the reason for the postponement and a finding of good cause by Catawba County.

F. Construction Project. The mediated settlement conference or the matter subject of the mediated settlement conference shall not be cause for the delay of the construction project which is the focus of the dispute.

RULE 4. DUTIES OF PARTIES AND OTHER PARTICIPANTS

A. Attendance.

1. All parties to the dispute must attend the mediated settlement conference. Failure of a party to a construction contract to attend the mediated settlement conference will result in Catawba County's withholding of monthly payment to that party until such party attends the mediated settlement conference.

2. Attendance shall constitute physical attendance, not by telephone or other electronic means. Notwithstanding the foregoing, all parties and persons required to attend a mediated settlement conference may agree to conduct the conference using remote technology, or using a hybrid of in-person attendance and remote technology.

3. Any party that is a nongovernmental entity shall be represented at the mediated settlement conference by an officer, employee, or agent who is not the entity’s outside counsel and who has been authorized to decide whether, and on what terms, to settle the action on behalf of the entity, or who has been authorized to negotiate on behalf of the entity and can promptly communicate during the conference with persons who have decision-making authority to settle the action;

provided, however, that if a specific procedure is required by law (e.g., a statutory pre-audit certificate) or the entity's governing documents (e.g., articles of incorporation, bylaws, partnership agreement, articles of organization, or operating agreement) to approve the terms of the settlement, then the representative shall have the authority to negotiate and make recommendations to the applicable approval authority in accordance with that procedure.

4. Any party that is a governmental entity shall be represented at the mediated settlement conference by an employee or agent who is not the entity's outside counsel and who: (i) has authority to decide on behalf of the entity whether and on what terms to settle the action; (ii) has been authorized to negotiate on behalf of the entity and can promptly communicate during the conference with persons who have decision-making authority to settle the action; or (iii) has authority to negotiate on behalf of the entity and to make a recommendation to the entity's governing board, if under applicable law the proposed settlement terms can be approved only by the entity's governing board. Notwithstanding anything in these rules to the contrary, any agreement reached which involves a governmental entity may be subject to the provisions of NCGS §159-28(a).

5. Attorneys on behalf of parties may attend the mediated settlement conference but are not required to do so.

6. Sureties or insurance company representatives are not required to attend the mediated settlement conference unless any monies paid or to be paid as a result of any agreement reached as a result of mediation require their presence or acquiescence. If such agreement or presence is required, then authorized representatives of the surety or insurance company must attend the mediation.

B. Finalizing the Agreement. If an agreement is reached in the mediated settlement conference, parties to the agreement shall reduce the terms to writing and sign it along with their counsel, if counsel is present, prior to the adjournment of the conference. If additional time is required to formalize an agreement, the mediator may recess the conference and set a time certain for reconvening pursuant to Rule 3(D). The time for reconvening shall be as soon as practicable to allow for formalization of the agreement.

C. Mediation Fee. The mediation fee and any ancillary fees shall be paid in accordance with Rule 6 Compensation of the Mediator.

D. Failure to Compensate the Mediator. Any party's failure to compensate the mediators in accordance with Rule 6 shall subject that party to a withholding of said amount of money from the party's monthly payment by Catawba County.

RULE 5. AUTHORITY AND DUTIES OF MEDIATORS

A. Authority of Mediators.

1. Control of Conference. The mediator shall at all times be in control of the mediated settlement conference and the procedures to be followed.

2. Private Consultation. The mediator may communicate privately with any participant or counsel prior to and during the mediated settlement conference. The fact that

private communications have occurred with a participant shall be disclosed to all other participants at the beginning of the conference.

3. Scheduling the Conference. The mediator shall make a good faith effort to schedule the mediated settlement conference at a time that is convenient with the participants, attorneys and mediator. In the absence of agreement, the mediator shall select the date for the mediated settlement conference.

B. Duties of Mediators.

1. The mediator shall define and describe the following at the beginning of the mediated settlement conference:
   a. The process of mediation;
   b. The difference between mediation and other forms of conflict resolution;
   c. The costs of the mediated settlement conference;
   a. That the mediated settlement conference is not a trial, the mediator is not a judge, and the parties retain their legal rights if they do not reach settlement;
   b. The circumstances under which the mediator may meet and communicate privately with any of the parties or with any other person;
   f. Whether and under what conditions communications with the mediator will be held in confidence during the conference;
   g. The inadmissibility of conduct and statements as provided by NCGS §7A-38.1(l);
   h. The duties and responsibilities of the mediator and the participants; and
   i. Any agreement reached will be reached by mutual consent.

2. Disclosure. The mediator has a duty to be impartial and to advise all participants of any circumstance bearing on possible bias, prejudice or partiality.

3. Declaring an Impasse. It is the duty of the mediator to timely determine that an impasse exists and that the mediated settlement conference should end.

4. Reporting the Results of the Conference. The mediator shall report to Catawba County within ten (10) days of the mediated settlement conference whether or not an agreement was reached by the parties. If an agreement was reached, the report shall state the nature of said agreement. The mediator's report shall inform Catawba County of the absence of any party known to the mediator to have been absent from the mediated settlement conference without permission. Catawba County must require the mediator to provide statistical data for evaluation of the mediated settlement conference program.

5. Scheduling and Holding the Conference. It is the duty of the mediator to schedule the mediated settlement conference and conduct it prior to the deadline of completion set by these Rules. Deadlines for completion of the conference shall be strictly observed by the mediator unless said time limit is changed by a written order from Catawba County.

RULE 6. COMPENSATION OF THE MEDIATOR

The parties shall compensate the mediator for mediation services, and any ancillary fees related to the mediation, at the rate in accordance with the rate charged for Superior Court mediation. The parties shall

also pay to the mediator a one-time per case administration rate in accordance with the rate charged for Superior Court mediation, which is due upon appointment.

RULE 7. MEDIATOR CERTIFICATION

All mediators shall be properly certified in accordance with the rules certifying mediators in Superior Court in North Carolina. (Except when otherwise allowed by Catawba County upon the request of the parties to the mediation.) When selecting mediators, the parties may designate a preference for mediators with a background in construction law or public construction contracting. Such requirements, while preferred, are not mandatory under these Rules. All mediators chosen must either demonstrate they are certified in accordance with the Rules for Mediated Settlement Conferences in Superior Court or must gain the consent of Catawba County to mediate any dispute in accordance with these Rules.

RULE 8. RULE AMENDMENTS

These Rules are subject to amendment by Catawba County at any time the County deems appropriate.

RULE 9. TIME LIMITS

Any time limit provided for by these Rules may be waived or extended by the County for good cause shown.

RULE 10. NO RECORDING

There shall be no stenographic, audio, or video recording of the mediation process by any participant. This prohibition includes recording either surreptitiously or with the agreement of the parties.

BID FORM

HIGHWAY 16 WATERLINE EXTENSION

BID NO. 24-1023

TABLE OF CONTENTS

Page

ARTICLE 1 – Bid Recipient 1
ARTICLE 2 – Bidder's Acknowledgements 1
ARTICLE 3 – Bidder's Representations 1
ARTICLE 4 – Bidder's Certification 2
ARTICLE 5 – Basis of Bid 3
ARTICLE 6 – Time of Completion 4
ARTICLE 7 – Attachments to this Bid 4
ARTICLE 8 – Defined Terms 5
ARTICLE 9 – Bid Submittal 6

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Catawba County
Attn: Purchasing Manager
25 Government Dr.
Newton, North Carolina 28658

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.	**Addendum, Date**
_____	_____
_____	_____
_____	_____
_____	_____

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

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

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

to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

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

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

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

ARTICLE 5 – BASIS OF BID

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

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization, Bonds, Insurance (5% of Total Items 1 - 26)	LS	1		
2	DIP Waterline				
2a	12" CL350DI Waterline - Non-Restrained	LF	6391		
2b	12” CL350 DI Waterline - Restrained	LF	2106		
3	Steel Casing Pipe				
3a	24” Steel Casing Installed via Open Cut	LF	70		
3b	24” Steel Casing Installed via Guaranteed Bore & Jack	LF	110		
4	DIP Fittings	LBS	6,420		
5	12" Gate Valve	EA	10		
6	Fire Hydrant Assembly	EA	17		
7	Combination Air Vacuum Valve	EA	1		
8	Locate and Connect to Ex. Valve	EA	2		
9	Flowable Fill	CY	20		
10	Rock Excavation	CY	250		
11	Stabilization Stone	TN	330		
12	Select Backfill	CY	250		
13	Gravel Driveway Repair	SY	560		

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
14	Gravel Roadway repair	SY	50		
15	Asphalt Roadway repair	SY	175		
16	Asphalt Driveway repair	SY	605		
17	Concrete Driveway repair	SY	35		
18	Clearing and Grubbing	LS	1		
19	Temporary Fencing for Laydown Area	LF	1350		
20	Temporary Erosion Control Measures	LS	1		
21	Temporary Seeding and Mulching	AC	5		
22	Permanent Seeding and Mulching	AC	5		
23	Traffic Control	LS	1		
24	Allowance - Materials Testing	LS	1	$10,000	$10,000
25	Allowance - Contingency	LS	1	$15,000	$15,000
Total of All Lump Sum and Unit Price Bid Items (Items 1 - 25)					$

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

Total of Lump Sum and Unit Price Bids = Total Bid Price $ _____

Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.

ARTICLE 6 – TIME OF COMPLETION

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

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 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 of materials and equipment;

D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

E. Contractor's License No.: _____ ;

F. American Iron and Steel Forms (Section C-433);

G. DBE Affidavits;

H. Bidder Qualifications Statement (EJCDC Form C-451) with supporting data.

I. *[List other documents and edit above as pertinent]*

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____

LIST OF PROPOSED SUBCONTRACTORS

IF ANY OF THE WORK SPECIFICALLY DESCRIBED IN THE LIST BELOW IS NOT APPLICABLE TO THE PROJECT, THE BIDDER SHALL SO INDICATE WITH "N/A" IN THE APPROPRIATE ROW(S).

Work Category	Name and License No.	Corporate Address
Replacement by Open Excavation	Name: _____ _____ State of Licensure: _____ License No.: _____	
Casing Jack and Bore	Name: _____ _____ State of Licensure: _____ License No.: _____	
Paving	Name: _____ _____ State of Licensure: _____ License No.: _____	
Pavement Marking	Name: _____ _____ State of Licensure: _____ License No.: _____	
Work Category	**Name and License No.**	**Corporate Address**
Other:	Name: _____ _____ State of Licensure: _____ License No.: _____	
Other:	Name: _____ _____ State of Licensure: _____ License No.: _____	

Other:	Name: _____ _____ State of Licensure: _____ License No.: _____	

LIST OF PROPOSED MATERIAL AND EQUIPMENT SUPPLIERS

Materials/Equipment*	Supplier/Manufacturer
Ductile Iron Pipe and Fittings	
Fire Hydrants	
Mechanical Joint Restraints	
Gate Valves	

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:

BID

Bid Due Date:

Description *(Project Name— Include Location)*:

BOND

Bond Number:

Date:

Penal sum _____ $ _____

(Words) (Figures)

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

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

Identification of HUB Certified/ Minority Business Participation

I,_____,
(Name of Bidder)
do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

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

State of North Carolina 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 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 business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

State of North Carolina --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 Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

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: _____

SEAL

State of _____, County of _____

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

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

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 HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 5% 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. Minority 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	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority 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:_____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires_____

State of North Carolina 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 5% participation by HUB Certified/ minority 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 Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority 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	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be 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 Minority 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:_____

SEAL

State of _____, County of _____

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

Notary Public_____

My commission expires _____

QUALIFICATIONS STATEMENT

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

1. **SUBMITTED BY:**

   Legal Name of Business: _____

   Address: _____

   _____

   _____

2. **SUBMITTED TO:** _____

3. **SUBMITTED FOR:** _____

   Owner: _____

   Project Name: _____

   _____

   _____

   _____

   TYPE OF WORK:

   _____

   _____

4. **CONTRACTOR'S CONTACT INFORMATION**

   Contact Person: _____

   Title: _____

   Phone: _____

   Email: _____

5. **AFFILIATED COMPANIES [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] Attach additional sheets if needed:**

Name: _____

Address: _____

_____

_____

6. **TYPE OF ORGANIZATION:**

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

_____

_____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

_____

_____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization: _____

Date of Organization: _____

Members: _____

_____

_____

_____

☐ JOINT VENTURE

Sate of Organization: _____

Date of Organization: _____

Form of Organization: _____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

Joint Venture Managing Partner

- Name: _____

- Address: _____

_____

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

_____

Bonding Agent: _____

Address: _____

_____

_____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

_____

Account Manager: _____

Phone: _____

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

11. CONSTRUCTION EXPERIENCE:

Current Experience:

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

Previous Experience:

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

Has business listed in Section 1 ever defaulted on a project or failed to complete a construction contract awarded to it?

☐ YES ☐ NO

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

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

☐ YES ☐ NO

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

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

☐ YES ☐ NO

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

Has business, or a predecessor in interest, or affiliate identified in Paragraph 5:

Been disqualified as a bidder by any local, state or federal agency within the last 5 years?

☐ YES ☐ NO

If YES, attach details regarding the disqualification.

Been barred from contracting by any local, state or federal agency within the last 5 years?

☐ YES ☐ NO

If YES, attach a detailed explanation.

Been released from a bid in the last 5 years?

☐ YES ☐ NO

If YES, attach a detailed explanation.

Refused to construct or refused to provide materials defined in the contract documents or in a change order?

☐ YES ☐ NO

If YES, attach a detailed explanation.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer:_____

Include the following as attachments:

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

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

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

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

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

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

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

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

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

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

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

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

13. EQUIPMENT:

MAJOR EQUIPMENT:

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

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

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20___

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES:_____

REQUIRED ATTACHMENTS

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

SCHEDULE A

CURRENT EXPERIENCE

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

SCHEDULE B

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

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

SCHEDULE B

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

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

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

ITEM	PURCHASE DATE	CONDITION	ACQUIRED VALUE

C-480 NON-COLLUSIVE AFFIDAVIT
(Submit with bid documents)

State of_____)

County of _____)

_____ being first duly sworn, deposes and says that:

(1) He/She is the _____, (Owner, Partner, Officer, Representative or Agent) of _____ the Bidder that has submitted the attached Bid;

(2) He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Work for which the attached Bid has been submitted; or to refrain from bidding in connection with such Work; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Work;

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

BY_____

ITS_____
(Title)

Subscribed and sworn to before me

this _____ day of _____, 20____.

_____

_____

My commission expires _____

END OF SECTION

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE OF AWARD

Date of Issuance:

Owner:	Catawba County	Owner's Contract No.:	
Engineer:	Highfill Infrastructure Engineering	Engineer's Project No.:	CAT2101
Project:	Hwy 16 Waterline Extension	Contract Name:	
	(Bid No. _____)		

Bidder:

Bidder's Address:

TO BIDDER:

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:

Construction of the 12-inch water main system as detailed in the Construction Documents.
[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____, to be paid on a unit price basis as indicated in the Bid Form and Price and Payment Procedures.

[ ] 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. *[revise if multiple copies accompany the Notice of Award]*

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

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

1. Deliver to Owner [____] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

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 days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:**

_____
Authorized Signature

By: _____

Title: _____

Copy: Engineer

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

THIS AGREEMENT is by and between Catawba County, a body politic and corporate subdivision of the state of North Carolina ("Owner") and _____ ("Contractor").

WHEREAS, Owner has applied for and received funds from the United States Government under Public Law No: 117-2 (3/11/2021) American Rescue Plan Act of 2021 (ARPA) providing additional relief to address the continued impact of COVID-19 on the economy, public health, state and local governments, non-profits, individuals, and businesses; and

WHEREAS, the Owner wishes to engage Contractor utilizing certain American Rescue Plan Act (ARPA) funds to construct certain sections of water line, the Work, as more specifically described in the Contract Documents;

NOW, THEREFORE, it is agreed between the parties that;

Vendor will be responsible for completing the Work as more specifically described in the Contract Documents in a manner satisfactory to County and consistent with any standards required as a condition of providing these funds. Such services include the following eligible activities under the ARPA program:

- Construction of Water Infrastructure

Owner and Contractor further agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall provide all labor and materials necessary to complete all Work as specified or indicated in the Contract Documents.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: *installation of a 12-inch waterline extension, valves, hydrants, fittings, and appurtenances between Highway 150 and Highway 16 Bypass along Highway 16 business. This line will close the water distribution loop in this area. The waterline will be owned by Catawba County and operated by the City of Hickory.*

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by HIGHFILL INFRASTRUCTURE ENGINEERING, P.C.

3.02 The Owner has retained HIGHFILL INFRASTRUCTURE ENGINEERING, P.C. ("Engineer") to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, 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 completed within 180 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 210 days after the date when the Contract Times commence to run.

B. Parts of the Work shall be substantially completed on or before the following Milestone(s):

1. None

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 times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or mediation 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 $1,500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $1,000.00 for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4. Milestones: Not Used

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 Work other than Unit Price Work, a lump sum of: $ N/A .

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. 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) as shown on Bid Form.

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.

C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) **$_____.**

D. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

E. **Acknowledgment of Funding**. This is an acknowledgement that ARPA / Federal Grant funding/ "Coronavirus State Fiscal Recovery Fund" or "Coronavirus Local Fiscal Recovery Fund" (together "CSLFRF funds") will be used to fund all or a portion of the Contract. The Contractor will comply with all applicable federal law, regulations, executive orders, policies, procedures, and directives applicable from the awarding agency.

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 account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 10th 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 Work completed (with the balance being retainage). If the Work has been 50 percent 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 but stored on site (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 250 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 in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 Amounts not paid within 45 days after acceptance of Application for Payment by Owner or approval by Engineer shall bear interest at the rate of one percent per month in accordance with NC GS 143-134.1.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

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

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

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

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

F. 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.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. 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.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to ___, inclusive).
2. Performance bond (pages 1 to 3, inclusive).
3. Payment bond (pages 1 to 3, inclusive).
4. General Conditions (pages 1 to 65, inclusive).
5. Supplementary Conditions (pages 1 to 18, inclusive).
6. Project Special Provisions
7. Contracting Requirement Documents, Technical Specifications, and Appendices as listed in the table of contents of the Project Manual.
8. Drawings (not attached but incorporated by reference) consisting of 15 sheets with each sheet bearing the following general title: Highway 16 Waterline Extension.
9. Addenda (numbers ___ to ___, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
    a. Attachment A - Contractor's Bid (pages ___ to ___, inclusive).
    b. Attachment B - Coronavirus State and Local Fiscal Recovery Funds Addendum
    c. Attachment C - Coronavirus State and Local Fiscal Recovery Funds Addendum Certification Regarding Lobbying
11. 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. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, 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 Documents.

10.03 *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.

10.04 *Severability*

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

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

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.

10.06 *Other Provisions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, 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.

[Signatures next page]

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:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
	License No.: _____

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ATTACHMENT B
CORONAVIRUS STATE AND LOCAL FISCAL RECOVERY FUNDS ADDENDUM

Notice: The contract or purchase order to which this addendum is attached is made using federal assistance provided to Catawba County by the US Department of Treasury under the American Rescue Plan Act ("ARPA Funds"), Sections 602(b) and 603(b) of the Social Security Act, Pub. L. No. 117-2 (March 11, 2021). In using such funds, Catawba County must comply with the terms of ARPA, regulations issued by the U.S. Department of the Treasury ("Treasury") governing the expenditure of monies distributed from the ARPA Funds (including, without limitation, the Interim Final Rule (86 Fed. Reg. 26,786 (May 17, 2021) and Final Rule (87 Fed. Reg. 4,338 (Jan. 27, 2022)), the Award Terms and Conditions applicable to the ARPA Funds, and such other guidance as Treasury has issued or may issue governing the expenditure of monies distributed from the ARPA Funds (collectively, the "Regulatory Requirements"). Additionally, pursuant to the Regulatory Requirements, the County must comply with the Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, 2 C.F.R. Part 200 other than such provisions as Treasury has determined or may determine are inapplicable to the ARPA Funds and pursuant to 2 C.F.R. §200.327 the County must include within any contract applicable provisions described in Appendix II to 2 C.F.R. Part 200, each of which is contained in this Addendum.

The following terms and conditions apply to you, the contractor or vendor, as a contractor of Catawba County, according to the County's Award Terms and Conditions signed on May 11, 2021; by ARPA and its implementing regulations; and as established by the US Department of Treasury.

I. Equal Employment Opportunity.

A. If this contract is a Federally Assisted Construction Contract (as defined in 41 C.F.R. §60-1.3) exceeding $10,000, during the performance of this contract, contractor agrees as follows:

1. Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. Contractor will, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
3. Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with Contractor's legal duty to furnish information.
4. Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

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

7. In the event of Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended, in whole or in part, and Contractor may be declared ineligible for further Government contracts or Federally Assisted Construction Contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965. Such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. Contractor will include the portion of the sentence immediately preceding paragraph A.1. of this Section and the provisions of paragraphs A.1. through A.7. in every Subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each Subcontractor or vendor. Contractor will take such action with respect to any Subcontract or purchase order as the Administering Agency may direct as a means of enforcing such provisions, including sanctions for noncompliance.

   Provided, however, that in the event Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Administering Agency, Contractor may request the United States to enter into such litigation to protect the interests of the United States.

   Catawba County further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work. Provided, that the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of Catawba County which does not participate in work on or under this Contract.

9. Catawba County agrees that it will assist and cooperate actively with the Administering Agency and the Secretary of Labor in obtaining the compliance of Contractor and any Subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor; that it will furnish the Administering Agency and the Secretary of Labor such information as they may require for the supervision of such compliance; and that it will otherwise assist the Administering Agency in the discharge of the agency's primary responsibility for securing compliance.

10. Catawba County further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and Federally Assisted Construction Contracts pursuant to the Executive Order and that it will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon Contractor and any Subcontractors by the Administering Agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, Catawba County agrees that if it fails or refuses to comply with these undertakings, the Administering Agency may take any or all of the following actions: Cancel, terminate, or suspend, in whole or in part, this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

II. Copeland "Anti-Kickback" Act. Contractor and any subcontractors performing work under the contract shall comply with 18 U.S.C. §874. Catawba County shall report all suspected or reported violations to Treasury.

III. Rights to Inventions Made Under a Contract or Agreement.

A. The Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use for "Government purposes," any subject data or copyright described below. "Government purposes" means use only for the direct purposes of the Government. Without the copyright owner's consent, the Government may not extend its federal license to any other party.

1. Any subject data developed under the Contract, whether or not a copyright has been obtained, and

2. Any rights of copyright purchased by Contractor using federal assistance funded in whole or in part by the Department of the Treasury.

B. Unless Treasury determines otherwise, a Contractor performing experimental, developmental, or research work required as part of this Contract agrees to permit Treasury to make available to the public either (1) Treasury's license in the copyright to any subject data developed in the course of the Contract or (2) a copy of the subject data first produced under the Contract for which a copyright has not been obtained. If the experimental, developmental, or research work which is the subject of this Contract is not completed for any reason whatsoever, all data developed under the Contract shall become subject data as defined herein and shall be delivered as the Government may direct.

C. Unless prohibited by North Carolina law, upon request by the Government, Contractor agrees to indemnify, save, and hold harmless the Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by Contractor of proprietary rights, copyrights, or right of privacy arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under the Contract. Contractor shall be required to indemnify the Government for any such liability arising out of the wrongful act of any employee, official, or agent of the Contractor.

D. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government under any patent.

E. Data developed by Contractor and financed entirely without using federal assistance provided by the Government that has been incorporated into work required by the underlying Contract is exempt from the requirements herein, provided that Contractor identifies those data in writing at the time of delivery of the Contract work. Contractor agrees to include these requirements in each Subcontract for experimental, developmental, or research work financed in whole or in part with federal assistance.

F. For the purposes of this Section III, "subject data" means "recorded information, whether or not copyrighted, . . . that is delivered or specified to be delivered as required by the Contract." Examples of "subject data" include, but are not limited to, "computer software, standards, specifications, engineering drawings and associated lists, process sheets, manuals, technical reports, catalog item identifications, and related information, but do not include financial reports, cost analyses or other similar information used for performance or administration of the Contract."

IV. Debarment and Suspension.

A. This contract is a covered transaction for purposes of 2 CFR §180.210 and 31 CFR §19.210. Therefore, this Contract is a lower-tier covered transaction for purposes of 2 C.F.R. Part 180 and

31 C.F.R. Part 19 if (1) the amount of this Contract is greater than or equal to $25,000 (2 C.F.R. § 180.220(b)(1); 31 C.F.R. § 19.220(b)(1)); (2) the Contract requires the consent of an official of the Department of the Treasury (2 C.F.R. § 180.220(b)(2); 31 C.F.R. § 19.220(b)(2)); or (3) this Contract is for federally required audit services (2 C.F.R. § 180.220(b)(3); 31 C.F.R. § 19.220(b)(3)).

B. As such, the contractor is required to verify that contractor's principals (defined at 2 CFR § 180.995) or its affiliates (defined at 2 CFR § 180.905) of both contractor and contractor's principals are not excluded (defined at 2 CFR § 180.935) and are not disqualified (defined at 2 CFR § 180.935). If any of the foregoing persons are excluded or disqualified and the Secretary of the Treasury has not granted an exception pursuant to 31 C.F.R. §19.120(a) (a) this contract shall be void; (b) Catawba County shall not make any payments of federal financial assistance to contractor; and (c) Catawba County shall have no obligations to contractor under this contract.

C. The contractor must comply with 2 CFR pt. 180, subpart C and 31 CFR pt. 19, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into. This certification is a material representation of fact relied upon by the County and all liability arising from an erroneous representation shall be borne solely by the contractor.

D. If it is later determined that the contractor did not comply with 2 CFR pt. 180, subpart C and 31 CFR pt. 19, in addition to remedies available to Catawba County, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

V. Byrd Anti-Lobbying Amendment.

A. Contractor certifies that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. §1352. Contractor shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier, up to the recipient who in turn will forward the certification(s) to the awarding agency. This certification is a material representation of fact upon which County has relied when entering into this contract, and all liability arising from an erroneous representation shall be borne solely by contractor.

B. *Purchases over $100,000 - Contractors must sign the certification included as Attachment C and shall cause any subcontractors with a subcontract (at any tier) exceeding $100,000 to file with the tier above it the same certification.

VI. Procurement of Recovered Materials.

A. Section VI.B. shall apply if (1) this Contract involves the purchase of an item designated by the Environmental Protection Agency ("EPA") in 40 C.F.R. Part 247 that exceeds $10,000 or (2) the total value of such designated items acquired during Unit's preceding fiscal year exceeded $10,000.

B. In the performance of the Contract, Contractor shall make maximum use of products containing recovered materials that are EPA-designated items, unless the product cannot (1) be acquired competitively within a timeframe providing for compliance with the Contract performance schedule, (2) meet Contract performance requirements, or (3) be acquired at a reasonable price. Information about this requirement, along with the list of EPA-designated items, is available on EPA's website. Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

VII. Prohibition on Contracting for Covered Telecommunications Equipment or Services.

A. *Definitions*. Unless otherwise defined in this Contract, capitalized terms used in this Section VII shall have the meanings ascribed thereto in this Section VII.A.

1. "Backhaul" means intermediate links between the core network, or backbone network, and the small subnetworks at the edge of the network (e.g., connecting cell phones/towers to the core telephone network). Backhaul can be wireless (e.g., microwave) or wired (e.g., fiber optic, coaxial cable, Ethernet).

2. "Covered Foreign Country" means the People's Republic of China.

3. "Covered Telecommunications Equipment or Services" means (a) telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities); (b) for the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities); (c) telecommunications or video surveillance services provided by such entities or using such equipment; or (d) telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a Covered Foreign Country.

4. "Critical Technology" means (1) defense articles or defense services included on the United States Munitions List set forth in the International Traffic in Arms Regulations under subchapter M of chapter I of title 22, Code of Federal Regulations; (2) items included on the Commerce Control List set forth in Supplement No. 1 to part 774 of the Export Administration Regulations under subchapter C of chapter VII of title 15, Code of Federal Regulations and controlled (a) pursuant to multilateral regimes, including for reasons relating to national security, chemical and biological weapons proliferation, nuclear nonproliferation, or missile technology, or (b) for reasons relating to regional stability or surreptitious listening; (3) specially designed and prepared nuclear equipment, parts and components, materials, software, and technology covered by part 810 of title 10, Code of Federal Regulations (relating to assistance to foreign atomic energy activities); (4) nuclear facilities, equipment, and material covered by part 110 of title 10, Code of Federal Regulations (relating to export and import of nuclear equipment and material); (5) select agents and toxins covered by part 331 of title 7, Code of Federal Regulations; part 121 of title 9 of such Code; or part 73 of title 42 of such Code; or (6) emerging and foundational technologies controlled pursuant to section 1758 of the Export Control Reform Act of 2018 (50 U.S.C. § 4817).

5. "Interconnection Arrangements" means arrangements governing the physical connection of two or more networks to allow the use of another's network to hand off traffic where it is ultimately delivered (e.g., connection of a customer of telephone provider A to a customer of telephone company B) or sharing data and other information resources.

6. "Roaming" means cellular communications services (e.g., voice, video, data) received from a visited network when unable to connect to the facilities of the home network either because signal coverage is too weak or because traffic is too high.

7. "Substantial or Essential Component" means any component necessary for the proper function or performance of a piece of equipment, system, or service.

8. "Telecommunications Equipment or Services" means telecommunications or video surveillance equipment or services, such as, but not limited to, mobile phones, land lines, internet, video surveillance, and cloud services.

B. Prohibitions.

1. Section 889(b) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, and 2 C.F.R. § 200.216 prohibit the head of an executive agency on or after August 13, 2020, from obtaining or expending grant, cooperative agreement, loan, or loan guarantee funds on certain telecommunications products or from certain entities for national security reasons.

2. Unless an exception in Section VII.C. applies, Contractor and any Subcontractors may not use any grant, cooperative agreement, loan, or loan guarantee funds (including, without limitation, Fiscal Recovery Funds) received from a federal government to:

   a. Procure or obtain any equipment, system, or service that uses Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system or as Critical Technology of any system;

   b. Enter into, extend, or renew a contract to procure or obtain any equipment, system, or service that uses Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system or as Critical Technology of any system;

   c. Enter into, extend, or renew contracts with entities that use Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system or as Critical Technology as part of any system; or

   d. Provide, as part of its performance of this Contract, any Subcontract; any other contractual instrument; or any equipment, system, or service that uses Covered Telecommunications Equipment or Services as a Substantial or Essential Component of any system or as Critical Technology as part of any system.

C. Exceptions.

1. This clause does not prohibit Contractor or Subcontractors from providing:

   a. A service that connects to the facilities of a third party, such as Backhaul, Roaming, or Interconnection Agreements, or

   b. Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

2. By necessary implication and regulation, the prohibitions also do not apply to:

   a. Covered telecommunications equipment that:

      i. Is not used as a Substantial or Essential Component of any system and

      ii. Is not used as Critical Technology of any system.

   b. Other telecommunications equipment or services that are not considered Covered Telecommunications Equipment or Services.

D. Reporting Requirement

1. In the event Contractor identifies, during contract performance, covered Telecommunications Equipment or Services used as a Substantial or Essential Component of any system or as Critical Technology as part of any system, or if Contractor is notified of such by a Subcontractor at any Tier or by any other source, Contractor shall report the information in paragraph D.2(d)(2) of this Section VII to Unit, unless procedures for reporting the information are established elsewhere in this Contract.

2. Contractor shall report the following information to Unit pursuant to paragraph D.1 of this Section VII:

   a. Within one business day from the date of such identification or notification: contract number; order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

   b. Within ten business days of submitting the information in paragraph D.2.a. of this Section: any further available information about mitigation actions undertaken or recommended. In addition, Contractor shall describe (i) the efforts it undertook to prevent use or submission of Covered Telecommunications Equipment or Services and (ii) any additional efforts that will be incorporated to prevent future use or submission of Covered Telecommunications Equipment or Services.

E. *Subcontractor*. Contractor shall cause to be inserted into all Subcontracts and other contractual instruments relating to the performance of this Contract the substance of this Section VII, including this paragraph E.

VIII. Domestic Preferences for Procurements.

A. For purposes of this Section VIII, the terms below are defined as follows:

   1. "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coating, occurred in the United States.

   2. "Manufactured Products" means items and construction materials composed, in whole or in part, of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

B. As applicable, and to the extent consistent with law, Contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products or materials Produced in the United States. This includes, but is not limited to, iron, aluminum, steel, cement, and other Manufactured Products. Contractor shall cause any Subcontractors to include the requirements of this Section VIII in any Subcontracts.

IX. Solicitation of Minority and Women-Owned Business Enterprises.

A. If Contractor intends to let any Subcontracts, Contractor shall (1) place qualified small and minority businesses and women's business enterprises on its solicitation lists; (2) assure that small and minority businesses and women's business enterprises are solicited whenever they are potential sources; (3) divide total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises; (4) establish delivery schedules, where the requirement permits, which encourage participation by small and minority businesses and women's business enterprises; (5) use the services and assistance, as appropriate, of the Small Business Administration, the Minority Business Development Agency of the Department of Commerce, and the North Carolina Office for Historically Underutilized Businesses.

B. For the purposes of Section IX..A., an entity shall qualify (1) as a "minority business" or "women's business enterprise" if it is currently certified as a North Carolina "historically underutilized business" under Chapter 143, Section 128.4(a) of the N.C. General Statutes (hereinafter G.S.), and (2) as a "small business" if it is independently owned and operated and is

qualified under the Small Business Administration criteria and size standards at 13 C.F.R. Part 21.

X. Access to Records.

A. Contractor agrees to provide Unit, the Department of the Treasury, the Treasury Office of Inspector General, the Government Accountability Office, and the Comptroller General of the United States, or any authorized representatives of these entities, access to any records (electronic and otherwise) of Contractor which are directly pertinent to this Contract to conduct audits or any other investigations. Contractor agrees to permit any of the foregoing parties to reproduce such records by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

B. Contractor agrees to retain all records covered by this Section X through December 31, 2031, or such longer period as is necessary for the resolution of any litigation, claim, negotiation, audit, or other inquiry involving the Contract.

XI. Conflicts of Interest; Gifts and Favors

A. Contractor understands that (1) Unit will use Fiscal Recovery Funds to pay for the cost of this Contract and (2) the expenditure of Fiscal Recovery Funds is governed by the [*Conflict of Interest Policy*] of the Unit, the Regulatory Requirements (including, without limitation, 2 C.F.R. § 200.318(c)(1)), and North Carolina law (including, without limitation, G.S. 14-234(a)(1) and -234.3(a)).

B. Contractor certifies to Unit that as of the date hereof, to the best of its knowledge after reasonable inquiry, no employee, officer, or agent of Unit involved in the selection, award, or administration of this Contract (each a "Covered Individual"); no member of a Covered Individual's immediate family; no partner of a Covered Individual; and no organization (including Contractor) which employs or is about to employ a Covered Individual has a financial or other interest in, or has received a tangible personal benefit from, Contractor. Should Contractor obtain knowledge of any such interest or any tangible personal benefit described in the preceding sentence after the date hereof, Contractor shall promptly disclose the same to Unit in writing.

C. Contractor certifies to Unit that it has not provided, nor offered to provide, any gratuities, favors, or anything of value to an officer, employee, or agent of Unit. Should Contractor obtain knowledge of the provision, or offer of any provision, of any gratuity, favor, or anything of value to an officer, employee, or agent described in the preceding sentence after the date hereof, Contractor shall promptly disclose the same to Unit in writing.

XII. Assurances of Compliance with Title VI of the Civil Rights Act of 1964.

A. Contractor and any Subcontractor, or the successor, transferee, or assignee of Contractor or any Subcontractor, shall comply with Title VI of the Civil Rights Act of 1964, which prohibits recipients of federal financial assistance from excluding from a program or activity, denying benefits of, or otherwise discriminating against a person on the basis of race, color, or national origin (42 U.S.C. §§ 2000d *et seq.*), as implemented by the Department of the Treasury's Title VI regulations, 31 C.F.R. Part 22, which are herein incorporated by reference and made a part of this Contract. Title VI also provides protection to persons with "Limited English Proficiency" in any program or activity receiving federal financial assistance, 42 U.S.C. §§ 2000d et *seq.*, as

implemented by Treasury's Title VI regulations, 31 C.F.R. Part 22, and herein incorporated by reference and made a part of this Contract.

XIII. Other Non-Discrimination Statutes.

A. Contractor acknowledges that Unit is bound by and agrees, to the extent applicable to Contractor, to abide by the provisions contained in the federal statutes enumerated below and any other federal statutes and regulations that may be applicable to the expenditure of Fiscal Recovery Funds:

1. The Fair Housing Act, Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§ 3601 *et seq.*), which prohibits discrimination in housing on the basis of race, color, religion, national origin, sex, familial status, or disability;
2. Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability under any program or activity receiving federal financial assistance;
3. The Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 *et seq.*), and Treasury's implementing regulations at 31 C.F.R. Part 23, which prohibit discrimination on the basis of age in programs or activities receiving federal financial assistance; and
4. Title II of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. §§ 12101 *et seq.*), which prohibits discrimination on the basis of disability in programs, activities, and services provided or made available by state and local governments or instrumentalities or agencies thereto.

XIV. Miscellaneous.

A. *Increasing Seat Belt Use in the United States*. Pursuant to Executive Order 13043, 62 Fed. Reg. 19,216 (Apr. 18, 1997), Catawba County encourages Contractor to adopt and enforce on-the-job seat belt policies and programs for its employees when operating company-owned, rented, or personally owned vehicles.

B. *Reducing Text Messaging While Driving*. Pursuant to Executive Order 13513, 74 Fed. Reg. 51,225 (Oct. 6, 2009), Unit encourages Contractor to adopt and enforce policies that ban text messaging while driving.

C. *Davis-Bacon Act.* Contractor shall be in compliance with all applicable provisions of the Davis-Bacon Act (29 C.F.R. §5.5(a)(1)-(10)) and Copeland "Anti-Kickback" Act (18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. Part 3) which are incorporated by reference into this Contract. A breach of the contract clauses above may be grounds for termination of the Contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

D. *Clean Air Act.* Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

E. *Procurement of Recovered Materials.* Contractor shall comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired; competitively within a timeframe providing for compliance with the contract performance schedule; meeting contract performance requirements; or at a reasonable price. The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

F. *False Claims Act.* The contractor acknowledges that the Administrative Remedies for False Claims

and Statements (31 U.S.C. Chap. 38) applies to the contractor's actions pertaining to this contract.

XV. Conflicts and Interpretation.

A. To the extent that any portion of this Addendum conflicts with any term or condition of this Contract expressed outside of this Addendum, the terms of this Addendum shall govern.

CONTRACTOR:

By: _____

Name: _____

Title: _____

CATAWBA COUNTY:

By: _____

Name: _____

Title: _____

ATTACHMENT C
CORONAVIRUS STATE AND LOCAL FISCAL RECOVERY FUNDS ADDENDUM
CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of the undersigned's knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, or the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

4. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31 of the U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor,_____, certifies and affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chapter 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

_____
Signature of Contractor's Authorized Official

_____
Name and Title of Contractor's Authorized Official

_____
Date

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

NOTICE TO PROCEED

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:
	Effective Date of Contract:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is_____] ***or*** [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner**:**

_____

Authorized Signature

By: _____

Title: _____

Date Issued: _____

Copy: Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

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

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

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

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

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

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

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

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

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

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

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

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

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

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

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

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

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

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

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

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

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

14. Definitions

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

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

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

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

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

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

16. Modifications to this Bond are as follows:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

    5.1 Claimants who do not have a direct contract with the Contractor,

        5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2 Pay or arrange for payment of any undisputed amounts.

    7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

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

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

(2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

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

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

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

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

18. Modifications to this Bond are as follows:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner): Catawba County	From (Contractor):	Via (Engineer): Highfill Infrastructure Engineering, PC
Project: Highway 16 Waterline Extension	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: CAT2101

Application For Payment
Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

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

By:	Date:

1. ORIGINAL CONTRACT PRICE ..... $ _____
2. Net change by Change Orders ..... $ _____
3. Current Contract Price (Line 1 ± 2) ..... $ _____
4. TOTAL COMPLETED AND STORED TO DATE
(Column F total on Progress Estimates) ..... $ _____
5. RETAINAGE:
a. X _____ **Work Completed.** ..... $ _____
b. X _____ **Stored Material** ..... $ _____
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, PLUS RETAINAGE
(Column G total on Progress Estimates + Line 5.c above) ..... $ _____

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

is recommended by: _____ _____
(Engineer) (Date)

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

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

© 2013 National Society of Professional Engineers for EJCDC. All rights reserved.

Progress Estimate

Contractor's Application

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

A		B				C		D		E		F	G	H	I
Item						Previous Work Completed		Current Work Completed		Total Work Completed					
Item No.	Description	Bid Quantity	Unit Measure	Unit Price	Scheduled Value	Quantity From Previous Application (Column E of Prev. App)	Value From Previous Application (Column E of Prev. App)	Current Quantity	Current Value	Total Quantity (C+D)	Total Value Less Stored Materials (C+D)	Materials Presently Stored (not in C or D)	Total Completed To Date (E+F)	% (G/B)	Balance to Finish (B-G)

Progress Estimate – Unit Price Work

Contractor's Application

For (contract):							Application Number:			
Application Period:							Application Date:			
A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F/ B)	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

© 2007 National Society of Professional Engineers for EJCDC. All rights reserved.

Stored Material Summary

Contractor's Application

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

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

© 2007 National Society of Professional Engineers for EJCDC. All rights reserved.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

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

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

North Carolina Reimbursable Sales and Use Tax Statement

(Paid During This Estimate Period)

Project _____ Project Location_____County Estimate No._____

Name of Contractor _____ Period Ending _____

Date	Vendor	Type of Property Purchased	Invoice Number	Invoice Amount	State Tax 4.75%	County Tax 2.00%	Total Tax 6.75%	County
TOTALS								

The undersigned individual certifies (1) that he or she is an employee or principal of the Contractor that is filing this form with the County to request reimbursement for N.C. State and local sales and use taxes that the Contractor has paid, (2) that the above listed vendors were paid sales tax upon purchases of building materials during the period covered by the construction estimate, and the property upon which such taxes were paid with or will be used in the performance of this contract,(3) that no tax on purchases or rentals of tools and/or equipment is included in the above list, (4) that all of the material above became a part of or is annexed to the building or structure being erected, altered or repaired, and (5) that all of the information on this form, and any additional pages added to this page, if any, is true and accurate.

_____ County, North Carolina

Signed and sworn to (or affirmed) before this day by _____ _____
(name of principal) (signature of principal)

Date: _____ _____
Notary Public's Signature

_____
(Notary's printed or typed name, Notary Public) (Official Seal) My commission expires: _____

North Carolina Reimbursable Sales and Use Tax Statement by Subcontractor

(Paid During This Estimate Period)

Project _____ Project Location_____County Estimate No._____

Name of Subcontractor _____ Period Ending _____

Date	Vendor	Type of Property Purchased	Invoice Number	Invoice Amount	State Tax 5.50%	County Tax 2.25%	Total Tax 7.75%	County
TOTALS								

The undersigned individual certifies (1) that he or she is an employee or principal of the Subcontractor that is submitting this form with the Contractor so that the Contractor may request reimbursement for N.C. State and local sales and use taxes that the Subcontractor has paid, (2) that the above listed vendors were paid sales tax upon purchases of building materials during the period covered by the construction estimate, and the property upon which such taxes were paid with or will be used in the performance of this contract,(3) that no tax on purchases or rentals of tools and/or equipment is included in the above list, (4) that all of the material above became a part of or is annexed to the building or structure being erected, altered or repaired, and (5) that all of the information on this form, and any additional pages added to this page, if any, is true and accurate.

_____ County, North Carolina

Signed and sworn to (or affirmed) before this day by _____ _____

(name of principal) (signature of principal)

Date: _____ _____

Notary Public's Signature

_____

(Notary's printed or typed name, Notary Public) (Official Seal) My commission expires: _____

MODIFIED STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Issued and Published Jointly by

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

National Society of Professional Engineers®

Endorsed by

CSI NUCA
REPRESENTING UTILITY & EXCAVATION CONTRACTORS

EJCDC® C-700 (Rev. 1), Modified Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Copyright © 2013:

National Society of Professional Engineers

1420 King Street, Alexandria, VA 22314-2794

(703) 684-2882

www.nspe.org

American Council of Engineering Companies

1015 15th Street N.W., Washington, DC 20005

(202) 347-7474

www.acec.org

American Society of Civil Engineers

1801 Alexander Bell Drive, Reston, VA 20191-4400

(800) 548-2723

www.asce.org

The copyright for this document is owned jointly by the three sponsoring organizations listed above. The National Society of Professional Engineers is the Copyright Administrator for the EJCDC documents; please direct all inquiries regarding EJCDC copyrights to NSPE.

NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

MODIFIED STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Article 1 – Definitions and Terminology 1

1.01 Defined Terms 1

1.02 Terminology 5

Article 2 – Preliminary Matters 6

2.01 Delivery of Bonds and Evidence of Insurance 6

2.02 Copies of Documents 6

2.03 Before Starting Construction 6

2.04 Preconstruction Conference; Designation of Authorized Representatives 7

2.05 Initial Acceptance of Schedules 7

2.06 Electronic Transmittals 7

Article 3 – Documents: Intent, Requirements, Reuse 8

3.01 Intent 8

3.02 Reference Standards 8

3.03 Reporting and Resolving Discrepancies 8

3.04 Requirements of the Contract Documents 9

3.05 Reuse of Documents 10

Article 4 – Commencement and Progress of the Work 10

4.01 Commencement of Contract Times; Notice to Proceed 10

4.02 Starting the Work 10

4.03 Reference Points 10

4.04 Progress Schedule 10

4.05 Delays in Contractor's Progress 11

Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions 12

5.01 Availability of Lands 12

5.02 Use of Site and Other Areas 12

5.03 Subsurface and Physical Conditions 13

5.04 Differing Subsurface or Physical Conditions 14

5.05 Underground Facilities 15

5.06 Hazardous Environmental Conditions at Site 17

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Article 6 – Bonds and Insurance 19
6.01 Performance, Payment, and Other Bonds 19
6.02 Insurance—General Provisions 19
6.03 Contractor's Insurance 20
6.04 Owner's Liability Insurance 23
6.05 Property Insurance 23
6.06 Waiver of Rights 25
6.07 Receipt and Application of Property Insurance Proceeds 25
Article 7 – Contractor's Responsibilities 26
7.01 Supervision and Superintendence 26
7.02 Labor; Working Hours 26
7.03 Services, Materials, and Equipment 26
7.04 "Or Equals" 27
7.05 Substitutes 28
7.06 Concerning Subcontractors, Suppliers, and Others 29
7.07 Patent Fees and Royalties 31
7.08 Permits 31
7.09 Taxes 32
7.010 Laws and Regulations 32
7.011 Record Documents 32
7.012 Safety and Protection 32
7.013 Safety Representative 33
7.014 Hazard Communication Programs 33
7.015 Emergencies 34
7.016 Shop Drawings, Samples, and Other Submittals 34
7.017 Contractor's General Warranty and Guarantee 36
7.018 Indemnification 37
7.019 Delegation of Professional Design Services 37
Article 8 – Other Work at the Site 38
8.01 Other Work 38
8.02 Coordination 39
8.03 Legal Relationships 39
Article 9 – Owner's Responsibilities 40

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

9.01 Communications to Contractor 40
9.02 Replacement of Engineer 40
9.03 Furnish Data 40
9.04 Pay When Due 40
9.05 Lands and Easements; Reports, Tests, and Drawings 40
9.06 Insurance 40
9.07 Change Orders 40
9.08 Inspections, Tests, and Approvals 41
9.09 Limitations on Owner's Responsibilities 41
9.010 Undisclosed Hazardous Environmental Condition 41
9.011 Evidence of Financial Arrangements 41
9.012 Safety Programs 41
Article 10 – Engineer's Status During Construction 41
10.01 Owner's Representative 41
10.02 Visits to Site 41
10.03 Project Representative 42
10.04 Rejecting Defective Work 42
10.05 Shop Drawings, Change Orders and Payments 42
10.06 Determinations for Unit Price Work 42
10.07 Decisions on Requirements of Contract Documents and Acceptability of Work 42
10.08 Limitations on Engineer's Authority and Responsibilities 42
10.09 Compliance with Safety Program 43
Article 11 – Amending the Contract Documents; Changes in the Work 43
11.01 Amending and Supplementing Contract Documents 43
11.02 Owner-Authorized Changes in the Work 44
11.03 Unauthorized Changes in the Work 44
11.04 Change of Contract Price 44
11.05 Change of Contract Times 45
11.06 Change Proposals 45
11.07 Execution of Change Orders 46
11.08 Notification to Surety 47
Article 12 – Claims 47
12.01 Claims 47

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Article 13 – Cost of the Work; Allowances; Unit Price Work 48
13.01 Cost of the Work 48
13.02 Allowances 50
13.03 Unit Price Work 51
Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work 52
14.01 Access to Work 52
14.02 Tests, Inspections, and Approvals 52
14.03 Defective Work 53
14.04 Acceptance of Defective Work 53
14.05 Uncovering Work 53
14.06 Owner May Stop the Work 54
14.07 Owner May Correct Defective Work 54
Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period 55
15.01 Progress Payments 55
15.02 Contractor's Warranty of Title 58
15.03 Substantial Completion 58
15.04 Partial Use or Occupancy 59
15.05 Final Inspection 59
15.06 Final Payment 59
15.07 Waiver of Claims 61
15.08 Correction Period 61
Article 16 – Suspension of Work and Termination 62
16.01 Owner May Suspend Work 62
16.02 Owner May Terminate for Cause 62
16.03 Owner May Terminate For Convenience 63
16.04 Contractor May Stop Work or Terminate 63
Article 17 – Final Resolution of Disputes 64
17.01 Methods and Procedures 64
Article 18 – Miscellaneous 64
18.01 Giving Notice 64
18.02 Computation of Times 64
18.03 Cumulative Remedies 64
18.04 Limitation of Damages 65

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

18.05 No Waiver 65
18.06 Survival of Obligations 65
18.07 Controlling Law 65
18.08 Headings 65

Page

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

1.02 Terminology

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

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

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

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

2.02 Copies of Documents

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 Before Starting Construction

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

2.04 Preconstruction Conference; Designation of Authorized Representatives

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

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

2.06 Electronic Transmittals

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 Reference Standards

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 Reporting and Resolving Discrepancies

A. *Reporting Discrepancies*:

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Requirements of the Contract Documents

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

3.05 Reuse of Documents

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 Commencement of Contract Times; Notice to Proceed

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

4.02 Starting the Work

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

4.03 Reference Points

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

4.04 Progress Schedule

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

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 Delays in Contractor's Progress

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

5.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 Use of Site and Other Areas

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by ~~arbitration or other dispute resolution proceeding~~ ***mediation,*** or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

5.03 Subsurface and Physical Conditions

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

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

3. Technical Data contained in such reports and drawings.

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5.04 Differing Subsurface or Physical Conditions

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 Underground Facilities

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

B. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

C. *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.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5.06 Hazardous Environmental Conditions at Site

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

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

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

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 6 – BONDS AND INSURANCE

6.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

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

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 Contractor's Insurance

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days' prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

6.04 Owner's Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 Property Insurance

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, false work, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days' prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

6.06 Waiver of Rights

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 Receipt and Application of Property Insurance Proceeds

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 Labor; Working Hours

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

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

7.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 "Or Equals"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. ~~Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted,~~ Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

    a. in the exercise of reasonable judgment Engineer determines that:

        1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

        2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

        3) it has a proven record of performance and availability of responsive service; and

        4) it is not objectionable to Owner.

    b. Contractor certifies that, if approved and incorporated into the Work:

        1) there will be no increase in cost to the Owner or increase in Contract Times; and

        2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by ***Addendum*** ~~an approved Shop Drawing or other written communication~~. Engineer will advise Contractor in writing of any negative determination.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

A. ~~Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted,~~ Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

   a. shall certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design,

      2) be similar in substance to that specified, and

      3) be suited to the same use as that specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from that specified, and

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by **Addendum** ~~a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times~~. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

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

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

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

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

~~B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.~~

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 Permits

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

7.09 Taxes

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

7.10 Laws and Regulations

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

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

7.11 Record Documents

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

7.12 Safety and Protection

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

1. all persons on the Site or who may be affected by the Work;

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 Safety Representative

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

7.14 Hazard Communication Programs

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

7.15 Emergencies

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

7.16 Shop Drawings, Samples, and Other Submittals

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

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

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set- off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

7.18 Indemnification

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 Delegation of Professional Design Services

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

B. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

C. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

D. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 Other Work

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

8.02 Coordination

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 Legal Relationships

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 Communications to Contractor

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

9.02 Replacement of Engineer

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

9.03 Furnish Data

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

9.04 Pay When Due

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

9.05 Lands and Easements; Reports, Tests, and Drawings

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 Insurance

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

9.07 Change Orders

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

9.08 Inspections, Tests, and Approvals

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

9.09 Limitations on Owner's Responsibilities

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

9.10 Undisclosed Hazardous Environmental Condition

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

9.11 Evidence of Financial Arrangements

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

9.12 Safety Programs

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

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 Owner's Representative

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

10.02 Visits to Site

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ~~Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work.~~ Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

10.03 Project Representative

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

10.04 Rejecting Defective Work

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

10.05 Shop Drawings, Change Orders and Payments

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

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

10.06 Determinations for Unit Price Work

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

10.07 Decisions on Requirements of Contract Documents and Acceptability of Work

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

10.08 Limitations on Engineer's Authority and Responsibilities

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 Compliance with Safety Program

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

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

11.01 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

11.02 Owner-Authorized Changes in the Work

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

11.03 Unauthorized Changes in the Work

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

11.04 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 Change Proposals

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 Execution of Change Orders

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

11.08 Notification to Surety

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

ARTICLE 12 – CLAIMS

12.01 Claims

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

   If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 Cost of the Work

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when the Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

2. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, 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.

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. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

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

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

13.2 Allowances

B. 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

C. *Cash Allowances*: Contractor agrees that:

2. 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

3. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

D. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

E. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.3 Unit Price Work

B. 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.

C. 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.

D. 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.

E. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

F. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

2. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

3. there is no corresponding adjustment with respect to any other item of Work; and

4. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

14.01 Access to Work

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

14.02 Tests, Inspections, and Approvals

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

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

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

14.03 Defective Work

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

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

14.05 Uncovering Work

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

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

14.07 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set- offs against payments due under Article 15. Such claims, costs, losses and damages will

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

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

15.01 Progress Payments

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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.

f. Liquidated damages have accrued against Contractor as a result of a delay and/or failure to meet time of completion and no Change Order or adjustment has been approved.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

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

15.02 Contractor's Warranty of Title

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

15.03 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 Final Inspection

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

15.06 Final Payment

A. *Application for Payment*:

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,

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

1. The final Application for Payment shall be accompanied (except as previously delivered) by:

    a. all documentation called for in the Contract Documents;

    b. consent of the surety, if any, to final payment;

    c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

    d. a list of all disputes that Contractor believes are unsettled; and

    e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

2. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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

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

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

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

15.07 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or ~~arbitration~~ ***mediation*** or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 Owner May Suspend Work

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

16.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days' written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 Owner May Terminate For Convenience

A. Upon seven days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (2) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 Computation of Times

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

18.03 Cumulative Remedies

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

18.04 Limitation of Damages

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

18.05 No Waiver

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

18.06 Survival of Obligations

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

18.07 Controlling Law

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

18.08 Headings

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

[This space intentionally blank]

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

MODIFIED SUPPLEMENTARY CONDITIONS

These *Modified* Supplementary Conditions amend or supplement the *Modified* Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

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

The address system used in these Modified Supplementary Conditions is the same as the address system used in the *Modified* General Conditions, with the prefix "SC" added thereto.

TABLE OF CONTENTS

Page

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY 3

SC- 1.01 Defined Terms 3

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE 3

SC- 3.01 Intent 3

ARTICLE 4 – Commencement and PRogress OF THE WORK 3

SC- 4.05 Delays in Contractor's Progress 3

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS 3

SC- 5.03 Subsurface and Physical Conditions 3

SC- 5.05 Underground Facilities 4

SC- 5.06 Hazardous Environmental Conditions 4

ARTICLE 6 – BONDS AND INSURANCE 5

SC- 6.03 Contractor's Insurance 5

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES 7

SC- 7.01 Supervision and Superintendence 7

SC- 7.02 Labor; Working Hours 7

SC- 7.06 Concerning Subcontractors, Suppliers, and Others 8

SC- 7.08 Permits, encroachment agreements, and occupancy agreements 8

SC- 7.09 Taxes 8

SC- 7.10 Laws and Regulations 9

SC- 7.11 Record Documents 10

SC- 7.12 Safety and Protection 11

SC- 7.16 Shop Drawings, Samples, and Other Submittals 11

SC- 7.17 Contractor's General Warranty and Guarantee 11

SC- 7.18 Indemnification 11
ARTICLE 9 – OWNER'S RESPONSIBILITIES 11
SC- 9.02 Replacement of Engineer 11
ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION 12
SC- 10.01 Owner's Representative 12
SC- 10.03 Project Representative 12
ARTICLE 11 – Amending the contract documents; changes in the work 15
SC- 11.05 Change of Contract Times 15
ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK 15
SC- 13.01 Cost of the Work 15
SC- 13.03 Unit Price Work 15
ARTICLE 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work 16
SC- 14.02 Tests, Inspections, and Approvals 16
SC- 14.03 Defective Work 16
SC- 14.06 Owner May Stop Work 16
ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD 16
SC- 15.03 Substantial Completion 16
ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION 17
SC- 16.01 Owner May Suspend Work 17
SC- 16.02 Owner May Terminate for Cause 17
ARTICLE 17 – FINAL RESOLUTION OF DISPUTES 17
SC- 17.02 Dispute Resolution Process 17
SC- 17.03 Attorneys' Fees 17
ARTICLE 18 – MISCELLANEOUS 17
SC- 18.01 Giving Notice 17
SC- 18.09 Withheld Payment for Sedimentation and Erosion Control 17
SC- 18.10 Withheld Payment for Restoration of Unpaved Surfaces 18

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

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

The Application for Payment Form to be used on this Project is EJCDC C-620.

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

The Change Order Form to be used on this Project is EJCDC C-941.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Intent

SC-3.01 Add the following new paragraphs immediately after Paragraph 3.01.E:

F. It is the intent of the Contract Documents to obtain an operable Project. Equipment, components, systems, etc., therein shall be made operable by the Contractor.

G. The Contract Drawings may be supplemented from time to time with additional Drawings by the Engineer as may be required to illustrate the work or, as the work progresses, with additional Drawings, by the Contractor, subject to the approval of the Engineer. Supplementary Drawings, when issued by the Engineer or by the Contractor, after approval by the Engineer, shall be furnished in sufficient quantity to all those who, in the opinion of the Engineer, are affected by such Drawings.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.05 Delays in Contractor's Progress

SC-4.05.H Add the following new paragraph immediately after Paragraph 4.05.G:

H. Time extensions for weather delays due to rain shall only be considered for above average precipitation. Average precipitation shall be derived from the most recent 30-year average data for the nearest NOAA weather reporting station. Average precipitation shall be the mean number of days of precipitation per month of 0.10 inch or more. The Contract Period shall be extended the number of days of 0.10 inch of precipitation the Contractor could not work that exceed the mean number of days of 0.10 inch of rain on a monthly basis.

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

SC-5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of explorations, investigations of existing conditions, and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. Report dated August 24, 2022, prepared by S&ME, Inc., Charlotte, NC, entitled: "Geotechnical Engineering Report Highway 16 Waterline".

D. The explorations, investigations, and tests of subsurface conditions in the reports made available to the Contractor shall not be used to make differing site conditions determinations at locations that have not been explored, or at any location with respect to subsurface conditions that the Geotechnical Engineering Report does not address.

E. The descriptions of subsurface conditions provided in the Geotechnical Engineering Report 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 Geotechnical Engineering Report, nor is the Geotechnical Engineering Report intended to warrant or guarantee the use of specific means or methods of construction.

F. The behavior of the ground during construction depends substantially upon the Contractor's selected means, methods, techniques, sequences, and procedures of construction. If ground behavior conditions are addressed in the Geotechnical Engineering Report, they are based on stated assumptions regarding construction means and methods.

G. The Geotechnical Engineering Report 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-5.05 Underground Facilities

SC-5.05.A.2 Add the following new paragraphs immediately after Paragraph 5.05.A.2.d:

e. following the North Carolina General Statues, Chapter 87, Article 8 Underground Damage Prevention.

f. notifying Owners of underground facilities prior to start of Work.

g. investigating ahead of the Work to verify the existence of Underground Facilities.

h. assuming risks and repairing damage caused by the Work to existing Underground Facilities whether indicated or not in the Contract Documents. Repairs to Underground Facilities shall be done to the satisfaction of the Underground Facility Owner and may require material and methods, which are better than the existing Facility. Underground Facility Owner reserves the right to repair damage by the Contractor to their underground Facilities. If the Owner exercises this right, the Owner's cost of this Work shall be deducted from the money due the Contractor.

i. uncovering Underground Facilities, with that Owners approval, that are located within the Work as necessary for Engineer to determine the requirements for the change in the work.

SC-5.06 Hazardous Environmental Conditions

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.

SC-5.06.I In the first line, insert “North Carolina” between “by” and “Laws”.

SC-5.06.I Add the following to the end of the paragraph:

The parties understand and acknowledge that no North Carolina case, statute, or Constitutional provision authorizes a local government to indemnify a Contractor and that this contract provision may be unenforceable.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.03 Contractor’s Insurance

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

K. An authorized representative of the insurance company(ies) shall certify that all of the required insurance coverages and amounts specified hereinafter are provided by the submitted policies. The certification shall be signed by the authorized representatives of the insurance company(ies) and notarized. The authorized representative of the insurance company(ies) shall specifically indicate with the submittal which of the policies submitted fulfill which specific coverage and amounts specified under Article 5.03 of the Supplementary Conditions. The certification statement and correlation shall be furnished and included with the insurance certificates.

L. One (1) copy of each such insurance policy and certificates indicating each type of coverage mentioned, and the correlation between the insurance furnished and that required, shall be filed with each of the Insured.

M. All policies relating to this Contract shall be so written that each of The Insured shall be notified by the carrier of cancellation or change at least thirty (30) days prior to the effective date of such cancellation or change and ten (10) days for non-payment of premium. Renewal certificates covering the renewal of all policies expiring during the life of the Contract shall be filed with each of The Insured not less than thirty (30) days before the expiration of such policies.

N. The insurance carrier shall notify each of The Insured of the filing of any claims within thirty (30) days of the filing of such claim.

O. 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
Jones Act coverage, if applicable:		
Bodily injury by accident, each accident	$	
Bodily injury by disease, aggregate	$	
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

For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of: $ _____

Foreign voluntary worker compensation: Statutory

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

General Aggregate	$	2,000,000
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	$	5,000,000
General Aggregate	$	5,000,000

5. Contractor's Pollution Liability:

Each Occurrence	$	2,000,000
General Aggregate	$	2,000,000

☐ If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: Catawba County

7. Contractor's Professional Liability:

Each Claim	$ N/A
Annual Aggregate	$ N/A

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.01 Supervision and Superintendence

SC-7.01.C. Add the following new subparagraph immediately after Paragraph 7.01.B:

C. The resident superintendent shall supervise and have authority over all construction crews and subcontractors on site. The resident superintendent shall be on site whenever Work is in progress and shall be responsible for addressing any construction related issues from the Owner, the Engineer, the RPR, the North Carolina Department of Transportation, the North Carolina Railroad, Duke Energy, and any other right-of-way and utility owners.

SC-7.02 Labor; Working Hours

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

1. Regular working hours will be 8:00 AM to 5:00 PM or otherwise arranged with property owners to not block off access roads and/or driveways. Contractor shall review and comply with NCDOT encroachment agreement (see Appendices of Project Manual). All lanes of traffic are to be open during the hours of 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Monday through Friday, during any time of inclement weather, or as directed by the NCDOT District Engineer. From the hours of 7:00 AM to 8:00 AM Contractor will be allowed to set up and prepare to perform Work. From the hours of 5:00 PM to 6:00 PM Contractor will be allowed to move equipment and materials to close-up for the day and prepare for the next day's Work, install and maintain erosion control, and restore and cleanup the site.

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

C. If Contractor is permitted by Owner to Work outside regular hours and on weekends and holidays, whether by a contractual provision or by Owner's consent during the course of the Project, 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. The above will not prevent the Contractor from working outside the above time that will not require the inspector to be present. Such work may include; start up, clean up, seeding, painting (after the base surface has been approved by the inspector), and similar items. Contractor shall obtain approval of Work to be performed outside of the above work hours.

E. If Contractor's Work requires inspection as determined by the Owner more than 10 hours in a work day or 40 hours in a work week, Monday through Friday excluding holidays, or on the weekends he shall submit a written request to the Owner five (5) working days prior to the scheduled Work. Contractor shall pay for the Resident Project Representative's time beyond the above hours and at the rate established in the Owner-Engineer Agreement.

F. Contractor shall not be charged for inspector's time for Work specifically identified by the Contract Documents to be performed outside the above Work time or on weekends.

SC-7.06 Concerning Subcontractors, Suppliers, and Others

SC-7.06 Add the following new paragraph immediately after Paragraph 7.06.O:

P. The Contractor shall not award work valued at more than fifty percent (50%) of the Contract Price to Subcontractor(s), and the Contractor shall perform at least fifty percent (50%) of the labor with its own forces, unless prior written approval is provided by the Owner.

SC-7.08 Permits, encroachment agreements, and occupancy agreements

SC-7.08 Add the following new paragraphs immediately after Paragraph 7.08.A:

B. Owner shall obtain and pay for the following permits, encroachment agreements, and occupancy agreements:

1. Sedimentation and Erosion Control Permit
2. NCDEQ Watermain Extension Permit
3. NCDOT Encroachment Agreement

SC-7.09 Taxes

SC-7.09 Add the following new paragraphs immediately after Paragraph 7.09.A:

B. 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. 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.

C. For the purposes of this section, "sales taxes" shall mean sales and use taxes paid to the State of North Carolina or to local governments in North Carolina.

D. Owner is entitled to a refund from the State of North Carolina for sales taxes. Reimbursable sales tax refunds cover sales and/or use taxes paid on building

materials used by contractors and subcontractors in the performance of contracts with churches, orphanages, hospitals not for profit, educational institutions not operated for profit and other charitable or religious institutions or organizations not operated for profit and incorporated cities, towns and counties in this State. The documentary evidence is to be submitted to the above-named institutions, organizations and governmental units to be included in claims for refunds to be prepared and submitted by them to obtain refunds provided by G.S. 105-164.14 and is to include the purchase of building materials, supplies, fixtures and equipment which become a part of or annexed to buildings or structures being erected, altered or repaired under contracts with such institutions, organizations or governmental units.

E. Contractor shall report sales taxes to Owner so Owner can receive reimbursement.

F. Procedures for Reporting Sales Taxes:

1. Contractor shall furnish Owner documentary evidence showing the materials used and sales tax paid by the Contractor and each of his subcontractors.

2. The documentary evidence shall be the North Carolina Reimbursable Sales and Use Tax Statement (C-627) provided in the Contracting Requirements. This evidence shall consist of a certified statement, by the Contractor and each of his subcontractors individually, showing total purchases of materials from each separate vendor and total sales taxes by each county paid each vendor. The certified statement must show the invoice number(s) covered and inclusive dates of such invoices. State sales tax shall be listed separately from county sales tax. If more than one county is shown, each county shall be listed separately. Invoices shall be provided to substantiate the information on the statement.

3. Materials used from Contractor's or subcontractor's warehouse stock shall be shown in a certified statement at warehouse stock prices.

4. Contractor shall not be required to certify subcontractor's statements.

5. All requests for payment, partial or final, must include a sales tax report submitted in accordance with the procedures outlined above. The sales tax report is required even if the sales tax is zero.

SC-7.10 Laws and Regulations

SC-7.10 Delete Paragraph 7.10.B in its entirety and insert the following in its place:

B. If Contractor observes that the Specifications or Drawings are at variance with any Laws or Regulations, he shall give Engineer prompt written notice thereof. 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 arising therefrom. The Contractor shall, at all times, observe and comply with, and shall cause all his agents, employees, and subcontractors to observe and comply with, all Laws or Regulations, 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 mediation

or other dispute resolution costs) arising out of or relating to such Work or other action.

Add the following new paragraphs immediately after Paragraph 7.10.C

D. Contractor shall be responsible for compliance with the terms and requirements of permits, encroachment agreements, and occupancy agreements issued by Federal, State, and Local regulatory agencies. Compliance with the terms and requirements listed in the permits, encroachment agreements, and occupancy agreements shall be at no additional cost to the Owner. This shall include generating and submitting any reports, designs, certifications, and other documentation that may be required as a condition of the permits, encroachment agreements, and occupancy agreements. All costs for compliance with the terms and requirements of permits, encroachment agreements, and occupancy agreements shall be included in the bid prices of applicable items. Permits, encroachment agreements, and occupancy agreements which have been obtained by the Owner are identified in SC-7.08 - Permits, Encroachment Agreements, and Occupancy Agreements and are included in the Appendices.

E. Notice of Violations

1. Should the Contractor cause the Owner to receive a Notice of Violation from a governmental agency, Contractor shall pay costs associated with Notice of Violation within ten (10) days of receipt of written notification. Costs shall include, but not be limited to:

a. Fines imposed on the Owner by the agency.

b. Required legal newspaper publications concerning violation.

c. Required mailings to customers concerning notification of violation.

d. Administrative and engineering costs associated with resolving the Notice of Violation.

2. Notice of Violations may include, but not be limited to, the following problems:

1. Sewage spill.

2. Inadequate erosion control measures.

3 Equipment failure during the warranty period.

F. In the event of a sewage spill during construction, Contractor shall take the following steps as a minimum:

1. Take immediate action to contain the spill.

2. Notify the Owner and Engineer within 30 minutes of realizing a spill has occurred.

3. Clean up the spill as directed by the Owner. Contractor shall bare all costs associated with the cleanup.

SC-7.11 Record Documents

SC-7.11 Add the following new paragraph immediately after Paragraph 7.11.A:

B. Contractor shall maintain record documents daily and have the record set of documents available on site throughout the construction period. Should the Engineer

or its representative determine the record documents are not maintained satisfactorily and in accordance with these Contract Documents, no approval will be made for subsequent payment requests from the Contractor until the deficiency is corrected to the satisfaction of the Engineer.

SC-7.12 Safety and Protection

SC-7.12 Insert the following after the second sentence of Paragraph 7.12.C:

1. The following Owner safety programs are applicable to the Work:

    a. Contractor shall be required to submit a copy of the company's current written OSHA compliance plan/policy within 48 hours of request. No field work shall take place until the plan has been submitted and reviewed by the Engineer/Owner.

SC-7.16 Shop Drawings, Samples, and Other Submittals

SC-7.16.D Replace the first sentence with the following:

Submittals shall be transmitted to the Engineer in sufficient time to allow the Engineer fifteen working days for review and processing for pipeline projects and twenty working days for review and processing for pump station and facility projects.

SC-7.17 Contractor's General Warranty and Guarantee

SC-7.17.A Add the following immediately after the first sentence:

All materials or equipment delivered to the site shall be accompanied by certificates, signed by an authorized officer of the supplier, and notarized guaranteeing that the materials or equipment conform to specification requirements. Such certificates shall be immediately turned over to the Engineer. Materials or equipment delivered to the site without such certificates will be subject to rejection.

SC-7.18 Indemnification

SC-7.18.A In the first sentence, insert "civil penalties, fines," after "costs".

Add the following sentence to the end of paragraph 7.18.A:

Nothing in the Contract Documents shall create or give to third parties any claim or right of action against the Contractor, the Owner or the Engineer beyond such as may legally exist irrespective of the Contract."

ARTICLE 9 – OWNER'S RESPONSIBILITIES

SC-9.02 Replacement of Engineer

SC-9.02 Delete Paragraph 9.02 in its entirety and insert the following in its place:

A. Owner may at its discretion appoint an engineer to replace Engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.01 Owner's Representative

SC-10.01.A Delete Paragraph 10.01.A in its entirety and insert the following in its place:

A. Engineer will be the Owner's representative during the construction period. His instructions shall be carried out promptly and efficiently.

SC-10.03 Project Representative

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. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings.
3. 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 proper execution of the Work.
4. 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.
5. Shop Drawings and Samples: 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.
6. 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.

7. 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, work accomplished, 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 shall 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 Contractor's work.

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 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.05 Change of Contract Times

SC 11.05.C Add the following new paragraph immediately after Paragraph 11.05.B:

C. Contract time extensions for weather delays do not entitle Contractor to "extended overhead" recovery.

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

SC-13.01 Cost of the Work

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

c. Construction Equipment and Machinery:

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the "Compilation of Rental Rates for Construction Equipment" as published by the Associated Equipment Distributors. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include 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, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools.

SC-13.03 Unit Price Work

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

E. 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 five percent or more of 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 25 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.

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

SC-14.02 Tests, Inspections, and Approvals

SC-14.02 Add the following paragraph immediately following paragraph 14.02.F:

G. Owner reserves the right to independently perform at its own expense, laboratory tests on random samples of material or performance tests on equipment delivered to the site. These tests if made will be conducted in accordance with the appropriate referenced standards or Specification requirements. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements. All rejected materials or equipment shall be removed from the site, whether stored or installed in the Work, and the required replacement shall be made, all at no additional cost to Owner.

SC-14.03 Defective Work

SC-14.03 Add the following paragraph immediately following paragraph 14.02.F:

G. At any time during the progress of the Work and up to the date of final acceptance, the Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for. Any omission or failure on the part of the Engineer to disapprove or reject any Work or materials at the time of inspection shall not be construed as an acceptance of any defective work or materials.

SC-14.06 Owner May Stop the Work

SC-14.06 Amend the first sentence of Paragraph 14.06.A by inserting in the third line “or if the Work interferes with the operation of the existing facility," between “….. Contract Documents,” and “then the owner may …..”.

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

SC-15.03 Substantial Completion

SC-15.03.B Amend the first sentence of Paragraph 15.03.B by replacing “Promptly” with “Within a reasonable amount of time”

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, shall 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 Article 15.

SC-15.03.C Amend the first sentence of Paragraph 15.03.C by inserting “, pending approval by the Owner and final approval by the Engineer,” after “shall fix the date of Substantial Completion”.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

SC-16.01 Owner May Suspend Work

SC-16.01 Add the following paragraph immediately following paragraph 16.01.A:

B. Should the Owner suspend Work due to repeated unsafe Work conducted by the Contractor which is confirmed by subsequent inspection by OSHA, the Contractor shall not be allowed any adjustment in Contract Price or extension of Contract Time attributed to this delay.

SC-16.02 Owner May Terminate for Cause

SC-16.02.A.3 At the end of the first sentence, add the following after "jurisdiction":

", including those governing employee safety."

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

Add the following new paragraphs immediately after Paragraph 17.01.

SC-17.02 Dispute Resolution Process

A. All matters subject to final resolution under this Article will be decided by mediation in accordance with the "Rules Implementing Mediated Settlement Conferences in North Carolina Public Construction Projects". This agreement to mediate will be specifically governed by and enforceable under the prevailing laws of the State of North Carolina.

SC-17.03 Attorneys' Fees

A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings as allowed by applicable law, in an equitable amount to be determined in the discretion of the court, mediator, or other fact finder of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18 – MISCELLANEOUS

SC-18.01 Giving Notice

B. No oral statement of any person whomever shall in any manner or degree modify or otherwise affect the terms of this Contract. Any notice to the Contractor, from Owner and Engineer, relative to any part of this Contract shall be in writing.

Add the following new paragraphs immediately after Paragraph 18.08.

SC-18.09 Withheld Payment for Sedimentation and Erosion Control

A. The Contract includes provisions for payment for sedimentation and erosion controls; however, should any of the erosion control measures be determined to be unsatisfactorily maintained or installed unacceptably by the Engineer or its representative, a deduction of up to 10% of the payment amount for bid items on pipelines installed during the payment period may be withheld as additional retainage.

SC-18.10 Withheld Payment for Restoration of Unpaved Surfaces

A. Contractor shall restore unpaved surfaces as the work progresses in accordance with the requirements in the Contract Documents and as required by the Department of Transportation. In no case shall the excavation for pipelines extended more than 1,000 feet without restoration of unpaved surfaces unless approval is granted by the Owner. Should any of the restoration of unpaved surfaces be determined to be unsatisfactory or unacceptable by the Engineer or its representative, a deduction of up to 10% of the payment amount for bid items on pipelines installed during the payment period may be withheld as additional retainage.

C-825 PRE-AUDIT CERTIFICATION

Execution of this document in the space provided below acknowledges approval of the terms and provisions of this Agreement.

Catawba County

Date: _____ _____
By: (Department Head/Manager)

(Name of Company)

Date: _____ _____
By: (Name/Title)

THIS INSTRUMENT has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act as amended.

Date: _____ _____
Mary Morrison, Chief Financial Officer
Account Number:
Amount:
Source: ARPA: Federal _X_ State ___ Local ___

APPROVED AS TO FORM

Date: _____ _____
Joshua Teague, County Attorney

Date: _____ _____
Jake Robinson, Risk Manager

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Work Change Directive No.

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] [decrease].

Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By:	By:	By:
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title:	Title:	Title:
Date:	Date:	Date:

Approved by Funding Agency (if applicable)

By: Date:

Title:

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Change Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

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

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	**CHANGE IN CONTRACT TIMES** *[note changes in Milestones if applicable]*
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title _____	Title _____
Date: _____	Date _____	Date _____

Approved by Funding Agency (if applicable)

By: _____ Date:

Title: _____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Field Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

Contractor is hereby directed to promptly execute this Field Order, issued in accordance with General Conditions Paragraph 11.01, 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(s) Drawing(s) / Detail(s)

Description:

Attachments:

ISSUED:	RECEIVED:
By: _____	By: _____
Engineer (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____
Date: _____	Date: _____

Copy to: Owner

CONTRACTOR'S FINAL AFFIDAVIT AND WAIVER OF LIEN

PROJECT: _____ OWNER: _____

_____ _____

_____ _____

CONTRACTOR: _____

_____

_____

CONTRACT AMOUNT: _____

STATE OF: _____ CONTRACT DATE: _____

COUNTY OF: _____ DATE: _____

This is to certify that all claims for labor, material, services and any other just claims arising out of the performance of this Contract have been satisfied, except for payment to subcontractors to be made out of retainage presently being held by the Owner, and that no claims or liens exist against this Contractor in connection with this contract; that to the best of our knowledge no claims or liens exist, and if any such claims or liens appear after payment of the retained amount due on the Contract, this Contractor shall save the Owner harmless on account thereof. After payment of the retained amount the undersigned does hereby waive, release and relinquish any and all claims or rights of lien presently held or hereafter accruing upon the above project.

CONTRACTOR: _____

BY: _____

TITLE: _____

Sworn to and subscribed before me this

_____ day of _____, 2024

_____
(Notary Public)

My Commission Expires: _____

CONSENT OF SURETY FOR FINAL PAYMENT

Project Name: _____

Owner: Catawba County

Contract (Number and Date): _____

In accordance with the provision of the Contract between the Owner and the Contractor as indicated above,

We, _____
(Surety Company's Name and Address)

on BOND of _____
(Contractor's Name and Address)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to:

_____
(Owner's Name and Address)

as set forth in said Surety's Bond.

_____
(Surety)

_____
(Surety Authorize Representative Signature)

_____
(Printed Name and Title)

SWORN TO before me and subscribed in my presence this _____ day of _____, 20_____

_____
NOTARY PUBLIC

[Seal]

SECTION 01 11 00
SUMMARY OF WORK
(SINGLE PRIME CONTRACT)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project Overview.

2. Contract Description.

3. Owner-furnished Products.

4. Work Sequence.

5. Specification Conventions.

6. General Arrangement.

1.2 PROJECT OVERVIEW

A. This project consists of the preparation and maintenance of a staging area and secure storage yard on County owned property near the Project and the installation of a 12-inch waterline extension, valves, hydrants, fittings, and appurtenances between Highway 150 and Highway 16 Bypass along Highway 16 business. This line will close the water distribution loop in this area.

1.3 CONTRACT DESCRIPTION

A. Work of the Project includes preparation and maintenance of a staging area and secure storage yard on County owned property near the Project and the installation of approximately 8,500 LF of 12-inch watermain and related structures and appurtenances. The work will include but not be limited to, the installation of 6- to 12-inch watermain, temporary erosion control measures, temporary traffic control, and permanent surface restoration measures

B. Furnish labor, materials, equipment, services and accessories, and install materials, equipment and accessories, necessary to provide a complete and functioning system as shown on the Drawings and specified in the Construction Specifications.

1.4 OWNER-FURNISHED PRODUCTS- None

1.5 WORK SEQUENCE

A. See Drawings for Work sequence.

B. Sequencing of Construction Plan: Before start of construction, submit a detailed Sequencing of Construction Plan regarding phasing of new Work for acceptance by Owner in accordance with Section 01 33 00 – Submittal Procedures. Comply with Project requirements. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing. Work performed out of sequence will not be accepted.

1.6 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

1.7 GENERAL ARRANGEMENT

A. Drawings indicate the extent and general arrangement of Work. If changes to the Drawings are deemed necessary by the Contractor to accommodate the materials and equipment he proposes to furnish, provide details and reasons for changes as soon as practicable to the Engineer for review. The specific equipment proposed for use by the Contractor on the project may require changes, in structures, auxiliary equipment, piping, electrical, mechanical, controls or other work to provide a complete satisfactory operating installation. The Contractor shall submit to the Engineer as soon as practicable for review, Drawings and details showing changes to verify conformance with the overall project structural and architectural requirements and overall project operating performance. Changes shall be made without additional cost to the Owner for changed work or related work under other Contracts of the Project. The price bid shall include all costs in connection with the preparation of new drawings and details and all changes to construction work to accommodate the proposed equipment, including increases in the costs of other Contracts. Submit proposed changes in accordance with the Standard General Conditions of the Construction Contract (EJCDC C-700) Paragraph 7.05 and Construction Specification Section 01 25 00, Substitution Procedures Paragraph 1.4.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 14 00
WORK RESTRICTIONS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access to Site.

2. Work by Owner at the Site.

3. Contractor's Use of Site.

4. Facility Outages.

5. Pipeline Shutdowns.

6. Work in Rights-of-way.

7. Work in Easements.

1.2 ACCESS TO SITE

A. Work Site shall be accessed at the locations indicated on the Drawings. Where Contractor determines additional access areas are beneficial for his particular means and methods, obtain approval for use of those areas and provide written permission from the property or right-of-way owner prior to encroachment into those areas and install required erosion control and other measures necessary to meet regulatory requirements. Access to the Site at locations other than those indicated on the Drawings is at the sole discretion of the Owner.

1.3 WORK BY OWNER AT THE SITE

A. Coordinate Work with Owner operations at the site.

B. Owner will remove and retain possession of the following items before start of Work:

1. None.

C. Remove and deliver to Owner the following items before start of Work:

1. None.

D. Coordinate Work with utilities of Owner and public or private entities.

1.4 CONTRACTOR’S USE OF SITE

A. Confine construction operations, construction facilities, storage of equipment and materials, and all Work to the Construction Limits depicted on the Drawings. Where Contractor determines additional areas are beneficial for his particular means and methods, obtain approval for use of those areas and provide written agreement with the property or right-of-way owner that indicates approval of use of the area and clearly defines the terms and conditions of the approval, including bond requirements, or rents or payments due for use, prior to encroachment into those areas.

B. Do not enter upon private property for any purpose without first obtaining written permission from the property owner. Do not store equipment, materials, and facilities on private property outside of the designated easements without prior approval as indicated above.

C. Obtain permits and encroachment agreements as required by governing authorities for additional construction area, material lay-down yards, and equipment storage yards beyond the Construction Limits. Provide permits and encroachment agreements one week prior to encroachment upon those areas.

D. Time restrictions for performing Work:

1. Unless specified in the Supplementary Conditions, Work shall be performed Monday through Friday from 7:00 am to 6:00 pm except where further restricted for specific locations, conditions, rights-of-way, or easements. Work requiring observation by Owner or Resident Project Representative (RPR) for approval shall be performed from 8:00 am to 5:00 pm except where specifically approved in writing in advance. Submit requests a minimum of 48 hours in advance unless otherwise noted in the General or Supplemental Conditions.

2. Work shall not be performed on days designated as holidays by Owner or on days when inclement weather impacts employee attendance as defined by the Owner unless specifically approved by the Owner. Submit requests a minimum of one week in advance.

3. Work performed outside of these times will not be accepted.

4. The normal time of work for this Contract is limited to 40 hours per week. The Contractor may elect to work beyond 40 hours or on weekends if approved by the Owner, provided that all costs incurred by the Owner for additional engineering services shall be borne by the Contractor. Owner will deduct additional engineering expenses from pay amount due the Contractor.

5. If it shall become imperative to perform work at night, the Owner and Engineer shall be informed a minimum of one week in advance of the start of the Work. Provide temporary lighting and all other necessary facilities for performing and inspecting the work.

6. Stop and protect Work that is subject to damage during inclement, stormy, or freezing weather unless approved by the Owner.

E. Limit use of Site to allow:

1. Work by Others.

2. Use of Site by the public: Work within road rights-of-way shall accommodate traffic in accordance with the Temporary Traffic Control Plan and in accordance with Construction Specifications Section 01 55 26, Temporary Traffic Control.

F. Sound Level Restrictions: Sound pressure level measured at boundary of Site shall not exceed 60 dBA during daylight hours and 50 dBA at night or as required by local noise ordinances.

G. Limit use of Site to performance of the Work and storage of equipment and materials.

H. Confine operations to immediate vicinity of Work.

I. Schedule Work tasks to maintain site security.

J. Coordinate use of Site with Owner.

K. Assume full responsibility for the protection and safekeeping of materials under this contract stored on site, including receiving, unloading and storage.

L. Move materials under Contractor's control that interfere with operations of the Owner or Owner's representatives.

M. Do not use Owner restroom facilities. Provide portable bathroom facility for Contractor and RPR use.

1.5 FACILITY OUTAGES – Not Used

1.6 PIPELINE SHUTDOWNS – Not Used

1.7 INTERRUPTION OF SERVICE

A. Service shall be continuously maintained to customers in the Project areas except for the minimum amount of time required to make connections to the existing system and where pipeline shutdowns are approved by the Owner.

B. Contact Owner to request and coordinate interruption of service. If Owner agrees interruption of service is necessary, the interruption shall be arranged to occur at such a time to cause the least disruption and minimize loss of service.

C. Schedule service interruptions with Owner and document in writing at least one week in advance of interruption.

D. Notify residents in writing at least 48 hours in advance of interruption.

1.8 WORK IN RIGHTS-OF-WAY

A. Owner furnished encroachment agreements are provided in the Appendices. Read and become thoroughly familiar with requirements of the agreements prior to beginning construction operations within the rights-of-way.

B. Comply with encroachment agreement requirements and requirements of authorities having jurisdiction.

1.9 WORK IN EASEMENTS

A. Owner furnished easements are depicted on the Drawings. Requirements for occupation and use of easements are provided in the Appendices. Read and become thoroughly familiar with requirements prior to occupying and beginning construction operations within easements.

B. Comply with requirements of easements, easement owner, and property owner.

PART 2– PRODUCTS –Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Allowances.

2. Schedule of Values.

3. Application for Payment.

4. Change Procedures.

5. Unit Prices.

1.2 ALLOWANCES

A. Cash Allowances:

1. Cash allowances shall be in accordance with the Standard General Conditions of the Construction Contract, Article 13.02 B Cash Allowances.

2. Contractor Responsibilities:

a. Assist the Owner in the selection of products, suppliers, and installers.

b. Obtain proposals from suppliers and installers and offer recommendations.

c. Upon notification of selection by Owner, execute purchase agreement with designated supplier and installer.

d. Arrange for and process Shop Drawings, Product Data, and Samples. Arrange for delivery.

e. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage to supplier.

f. Where the provider covered under an Allowance is defined in the specifications, Contractor shall contact provider to obtain all contractual and payment terms on which the Allowance price is based, and if needed account for any other costs in the Contractor’s Base Bid.

3. Cash Allowances are described in the Unit Price Schedule below and listed in the Bid Form.

B. Contingency Allowances:

1. Contingency allowances shall be in accordance with the Standard General Conditions of the Construction Contract, Article 13.02.C Contingency Allowances, as modified by the Supplementary Conditions.

2. Include in Contract in the amount shown on the Bid Form for use upon Owner's instruction as a contingency allowance.

3. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead, and profit will be included in Change Orders authorizing expenditure of funds from this contingency allowance.

4. Funds will be drawn from contingency allowance only by Change Order.

5. At closeout of Contract, funds remaining in contingency allowance will be credited to Owner by Change Order.

C. Testing and Inspection Allowances:

1. Costs included in Testing and Inspecting Allowances:

a. Cost of engaging testing and inspecting agency.

b. Execution of tests and inspecting.

c. Reporting results.

2. Costs not included in Testing and Inspecting Allowance but included in Contract Sum/Price:

a. Costs of incidental labor and facilities required to assist testing or inspecting agency.

b. Costs of testing services used by Contractor separate from Contract Document requirements.

c. Costs of retesting upon failure of previous tests as determined by Engineer.

3. Payment Procedures:

a. Submit one copy of inspecting or testing firm's invoice with next Application for Payment.

b. Pay invoice upon receipt of payment by Owner.

4. Testing and Inspecting Allowances are described in the Unit Price Schedule below and listed in the Bid Form.

1.3 SCHEDULE OF VALUES

A. See the Standard General Conditions of the Construction Contract, Article 2.03.A Initial Schedules, as modified by the Supplementary Conditions, for schedule of values requirements.

1.4 APPLICATION FOR PAYMENT

A. See the Standard General Conditions of the Construction Contract, Article 15.01 Progress Payments, as modified by the Supplementary Conditions, for payment procedures and requirements.

1.5 CHANGE PROCEDURES

A. See the Standard General Conditions of the Construction Contract, Articles 11 and 12 as modified by the Supplementary Conditions, for change procedures.

1.6 UNIT PRICES

A. See the Standard General Conditions of the Construction Contract, Article 13.03 Unit Price Work, as modified by the Supplementary Conditions, for Unit Price Work requirements.

B. Unit Quantities: Quantities indicated on Bid Form are for Contract purposes only. Actual quantities provided shall determine payment.

C. Payment includes full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.

D. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by the unit sum/price for Work incorporated in or made necessary by the Work.

E. Measurement of Unit Price Work:

1. Measurements shall be made as necessary to allow quantification of the Work at the close of each day's construction. Measurements shall be made by the Contractor.

2. The quantities to be paid for and their respective locations shall be recorded and agreed upon at the close of each week's construction by the Owner's Project Representative or the Resident Project Representative, and the Contractor's personnel in charge. A quantity log will be maintained daily by the Contractor and agreed upon by the Owner's Project Representative or the Resident Project Representative.

3. A copy of the log, which also signifies said agreement, shall be furnished to the Engineer's Project Representative or County's Project Representative daily by the Contractor.

4. The Contractor shall furnish the Owner with a weekly statement of the agreed-upon quantities and their respective locations.

F. Summary:

1. Payments noted above shall constitute full compensation for all Work shown and required by the Drawings and Construction Specifications for this contract.

2. The cost of other auxiliary operations and/or materials required to make a completed project shall be included in the appropriate lump sum or unit price bid.

G. Sales Tax:

1. Requirements for sales tax are provided in the Supplementary Conditions.

H. Unit Price Schedule:

1. Pay Item 1 - Mobilization:

A lump sum payment less than or equal to 5% of the total Bid Price will be allowed for mobilization as a progress payment line item. Mobilization shall include bonds, insurance, move-on expenses, and other start-up costs. Payment for this lump sum Pay Item will be made in two equal payments split between the first and second Applications for Payment.

2. Category 2 – DIP Waterline

By the price per linear foot furnished and installed beginning to end, through valves, fittings, encasements, and specials for configurations specified below. Length shall include the length of pipe, fittings, and valves laid in the main line. The unit price provided shall be the only compensation for furnishing and installing 12" waterline, and includes installing all pipe and appurtenances including excavation, backfill, compaction, concrete blocking, dewatering, shoring, sheeting and bracing, support and reconnection of existing utilities, tree protection, testing and disinfection, removal and replacement of mailboxes and signs, temporary facilities, temporary paving, and all other incidental work necessary to provide a complete and ready-to-use system, except for those items segregated herein.

a. Pay Item 2.a – 12-inch Waterline – Non-restrained

b. Pay Item 2.b – 12-inch Waterline – Restrained

3. Category 3 – Steel Casing Pipe

By the price per linear feet for providing all materials, equipment, and labor necessary to install steel casing and appurtenances for configurations specified below at the locations and alignments shown on the Drawings. Payment is to be full compensation for furnishing and installing steel casing complete and in place as follows, including explorations to determine the location and depth of existing utilities, trenching, shoring, bracing, traffic control where required, drilling of bore where required, dewatering, properly disposing of unsuitable soils offsite, furnishing and placing stone bedding where required, furnishing and installing casing pipe spacers, backfilling with suitable material and consolidating backfill.

a. Pay Item 3.a - 24" Steel Casing Pipe Installed via Open Cut

b. Pay Item 3.b - 24" Steel Casing Pipe Installed via Guaranteed Bore & Jack

4. Pay Item 4 – DIP Fittings

By the number of pounds furnished and installed as shown. Weight shall be calculated by the manufacturer's published weight for each type of fitting used. The price shall include all materials, equipment, and labor required for a complete installation.

5. Pay Item 5 – 12" Gate Valves

By the number furnished and installed complete in place including gate valve, joint restraint, valve box, stem extension, concrete pad or collar, concrete marker, and related appurtenances.

6. Pay Item 6 – Fire Hydrant Assembly

By the number furnished and installed as shown, including the fire hydrant, hydrant tee, hydrant elbow, standpipe extension(s), concrete base, blocking, 6-inch gate valve (including valve box, concrete setting pad and concrete top collar) and 6-inch pipe from the water main to hydrant. Unit price shall include all materials, equipment and labor required for a complete installation.

7. Pay Item 7 – Combination Air Release Vacuum Valve

   By the number furnished and installed as shown. The unit price provided shall be the only compensation for the complete system and includes furnishing and installing a 5-foot diameter pre-cast manhole, frame and cover, 2-inch combination air release vacuum valve, 2-inch tapping saddle, stone base, and all related appurtenances.

8. Pay Item 8 – Locate and Connect to Ex. Valve

   By the number furnished and installed as shown, including excavation, connection to existing valve, rodding or restraint glands, and blocking. Unit price shall include all materials, equipment, and labor for a complete connection.

9. Pay Item 9 - Flowable Fill

   By the number of cubic yards furnished and installed. Unit price shall include all materials, equipment, and labor required to place the flowable fill.

10. Pay Item 10 - Rock Excavation

    By the cubic yards of rock (as defined in Section 31 23 00) excavated and removed offsite from pipe trenches when authorized by the Engineer. The unit price shall include all items required to survey, remove the rock, and dispose of it off-site. Rock excavation width measurements for payments shall be the authorized trench width. Authorized trench width in pipe trenches shall be equal to the nominal pipe diameter plus 2 feet, with a 3-foot minimum width, and to a depth of the pipe invert plus 6 inches. Authorized width for manholes shall be the manhole inside diameter plus 5 feet and to a depth of 8 inches below the manhole base. Excavation of rock beyond limits indicated shall be at the Contractor's expense. The Bid price for this item shall not be less than $25.00 per cubic yard.

11. Pay Item 11 - Stabilization Stone

    By the number of tons as authorized for placement for stabilization stone. The price shall include removal of unsuitable soils and replacement with stabilization stone as measured in place to a width not to exceed the maximum authorized trench width. The authorized trench width shall be equal to the nominal pipe diameter plus 2 feet, with a 3-foot minimum width. This item is to be used only when authorized by the Resident Project Representative.

12. Pay Item 12 - Select Backfill

    By the number of cubic yards as authorized for placement as backfill. The price shall include removal of unsuitable soils and replacement with select backfill as measured in place to a width not to exceed the maximum authorized trench width. The authorized trench width shall be equal to the nominal pipe diameter plus 2 feet, with a 3-foot minimum width. This item is to be used only when authorized by the Resident Project Representative.

13. Pay Item 13 - Gravel Driveway Repair

    By the number of square yards of gravel driveway repaired as shown on the Drawings. Price shall include all materials, equipment, and labor required for subgrade preparation and gravel placement as detailed on the Drawings. Driveway shall be returned to original condition or better.

14. Pay Item 14 - Gravel Roadway Repair

By the number of square yards of gravel roadway repaired as shown on the Drawings. Price shall include all materials, equipment, and labor required for subgrade preparation and gravel placement as detailed on the Drawings. Roadway shall be returned to original condition or better.

15. Pay Item 15 – Asphalt Roadway Repair

By the number of square yards installed for rehabilitation of main roads. Price shall include all materials, equipment, and labor required for removal and disposal of existing asphalt, subgrade preparation, new base course, intermediate course, surface course, and pavement markings as required by details shown in Drawings. Care should be taken to ensure proper compaction of all aggregate and pavement courses.

16. Pay Item 16 – Asphalt Driveway Repair

By the number of square yards of asphalt driveway repaired as shown on the Drawings. Price shall include all materials, equipment and labor required for removal and disposal of existing asphalt, subgrade preparation and asphalt replacement as detailed on the Drawings. Driveway shall be returned to original condition or better.

17. Pay Item 17 – Concrete Driveway Repair

By the number of square yards of concrete driveway repaired as shown on the Drawings. Price shall include all materials, equipment and labor required for removal and disposal of existing concrete, subgrade preparation and concrete replacement as detailed on the Drawings. Driveway shall be returned to original condition or better.

18. Pay Item 18 - Clearing and Grubbing

Lump sum for complete and proper clearing and grubbing performed within the easement or defined limits. The price shall include all materials, equipment, and labor required for the cutting, removal, and satisfactory disposal of all trees, stumps, vegetation, and debris.

19. Pay Item 19 – Temporary Fencing for Laydown Area

By the linear feet of fence, fence posts, and gates installed as shown on the Drawings. The unit price shall include all materials, equipment, and labor required for the installation of new fence, fence posts, gates, concrete, chain and padlock, and all appurtenances as required to secure the laydown area. Unit price shall also include maintenance during construction, removal and clean up.

20. Pay Item 20 – Temporary Erosion Control Measures

Lump sum for installation, maintenance, and removal of temporary erosion control measures including construction entrances, check dams, silt fence, diversion ditches, sediment traps, rock pipe inlet protection, wattles, erosion control matting, and other items as needed to prevent sediment runoff. Up to 75% of price will be paid when all measures are in place, 15% will be paid for on-going maintenance, and 10% will be paid upon removal of measures.

21. Pay Item 21 - Temporary Seeding and Mulching

By the price per acre authorized for temporary seeding and mulching as detailed in the Specifications and on the Drawings. Payment shall be full compensation for providing all materials, equipment and labor necessary for performing temporary seeding and mulching. Areas must be approved by Engineer prior to performing work to receive compensation.

22. Pay Item 22 - Permanent Seeding and Mulching

By the price per acre for permanent seeding and mulching as detailed in the Specifications and on the Drawings. Payment shall be full compensation for providing all materials, equipment and labor necessary for performing seeding and mulching. Areas must be approved by Engineer prior to performing work to receive compensation.

23. Pay Item 23 - Traffic Control:

a. Payment for Temporary Traffic Control shall be at the lump sum price bid which includes all Temporary Traffic Control plans, measures, and devices as specified herein, as shown on the Drawings, and as required for this Project.

i. Partial payments for Temporary Traffic Control will be made as follows:
ii. 25% of the Lump Sum Price when the Project work is 10% complete as indicated by approved progress payments, exclusive of stored materials.
iii. 50% of the Lump Sum Price when the project is 50% complete as indicated by approved progress payments, exclusive of stored materials.
iv. 95% of the Lump Sum Price when the project is substantially complete.

24. Allowance - Materials Testing

An allowance set forth on the Bid Form for materials testing. Work shall be performed by a professional materials testing firm, which shall be selected by the Owner or Engineer. Contractor shall perform all coordination with testing firm.

25. Allowance - Contingency

An allowance set forth on the Bid Form for unforeseen conditions which may be encountered in the work and is only to be used upon written authorization from the Engineer or Owner.

1.7 ALTERNATES – NOT USED

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Quality Assurance.

2. Product Options.

3. Product Substitution Procedures.

4. Additional Engineering Services Related to Substitutions and Contractor Changes.

B. Related Requirements:

1.2 QUALITY ASSURANCE

A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.

B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.

C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01 60 00 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

A. See the Standard General Conditions of the Construction Contract, Article 7.04 “Or-Equals” and Article 7.05 Substitutes, as modified by the Supplementary Conditions, for substitution procedures. This Section supplements those requirements.

B. Technical Specification Section C-200 - Instructions to Bidders specifies time restrictions for submitting requests for “Or-Equals” and substitutions during Bidding period.

C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:

1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.

2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, weight, and other pertinent characteristics.

3. Reference to Article and Paragraph numbers in Specification Section.

4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.

5. Changes required in other Work.

6. Availability and location of maintenance service and source of replacement parts as applicable.

7. Location of technical sales and support representative and service technicians.

8. Location of manufactured components and location of assembly of the product.

9. Product warranties.

10. Number of installations in the state where the project is located, in the US, and in the world. Include client name, contractor name, size or capacity description, and date of installation.

11. Number of years that the product has been in production.

12. Statement of ability to meet FM and UL product requirements.

13. Certified test data to show compliance with performance characteristics specified.

14. Samples when applicable or requested.

15. Other information as necessary to assist Engineer's evaluation.

D. A request constitutes a representation that Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.

2. Will provide same warranty for substitution as for specified product.

3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete.

6. Will reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.

F. See Construction Specification Section 01 33 00, Submittal Procedures for submittal procedure requirements.

1.5 ADDITIONAL ENGINEERING SERVICES RELATED TO SUBSTITUTIONS AND CONTRACTOR CHANGES

A. Reimburse Owner for additional engineering services resulting from:

1. Substitution of materials or equipment by the Contractor.

2. Changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished.

3. Changes proposed by the Contractor for the convenience of the Contractor.

B. Structural design shown on Drawings is based upon typical weights for major items of equipment as indicated on the Contract Documents. If the equipment furnished exceeds the typical weights of equipment, reimburse Owner for additional engineering costs for redesign and additional costs resulting from construction changes required to accommodate the equipment furnished.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preconstruction Meeting.

2. Progress Meetings.

3. Pre-installation Meetings.

1.2 PRECONSTRUCTION MEETING

A. Engineer or Owner will schedule and preside over meeting after Notice of Award but prior to starting work at the site.

B. Attendance Required: Contractor Project Manager and full-time site superintendent, major material suppliers, and Subcontractors (as requested by the Engineer).

C. Engineer will record minutes and distribute electronic copies to participants and those affected by decisions made.

1.3 PROGRESS MEETINGS

A. Engineer or Owner will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

B. Attendance Required: Contractor Project Manager and full-time site superintendent, Subcontractors (as requested by the Engineer), and others as appropriate to agenda topics for each meeting.

C. Minimum Agenda:

1. Review minutes of previous meetings.

2. Review of submittal schedule and status of submittals.

3. Review of Work progress.

4. Maintenance of Progress Schedule.

5. Planned progress during succeeding work period.

6. Other business relating to Work.

D. Engineer will record minutes and distribute electronic copies to participants and those affected by decisions made.

1.4 PRE-INSTALLATION MEETINGS

A. When required in individual Specification Sections, convene pre-installation meetings at Project Site before starting Work of specific Section.

B. Attendance Required: Contractor Project Manager and full-time site superintendent, Subcontractor site superintendent (if applicable), and vendor representative. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Schedule with Owner and Engineer two weeks in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.

2. Review coordination with related Work.

E. Record minutes and distribute electronic copies to participants and those affected by decisions made within one week after meeting.

F. Individual Specification Sections may include additional requirements.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction Progress Schedule.

2. Photographic Documentation.

3. Video Documentation.

B. Related requirements:

1. See Construction Specification Section 01 33 00, Submittal Procedures.

1.2 CONSTRUCTION PROGRESS SCHEDULE

A. Submittals

1. Submit Progress Schedules under transmittal and in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

2. Within 10 days of Notice to Proceed, submit the proposed Progress Schedule in bar chart format. Revise and resubmit the updated schedule in accordance with the Submittal Procedures until it is accepted by the Engineer.

3. Submit an updated Progress Schedule, depicting progress made over the last 30 days, five work days prior to each Progress Meeting, and when requested by the Engineer. Revise and resubmit the Progress Schedule until it is accepted by the Engineer. Pay applications will not be reviewed until the Progress Schedule submitted at the previous progress meeting is accepted.

4. Schedule Updates:

a. Overall percent complete, projected and actual.

b. Completion progress by listed activity and subactivity, to within five working days prior to submittal.

c. Changes in Work scope and activities modified since submittal.

d. Delays in submittals or resubmittals, deliveries, or Work.

e. Adjusted or modified sequences of Work.

f. Other identifiable changes.

g. Revised projections of progress and completion.

5. Narrative Progress Report:

a. Provide verbal or written progress report at each progress meeting or when requested by the Engineer. Include:

i. Summary of Work completed during the past period between reports.
ii. Work planned during the next period.
iii. Explanation of differences between summary of Work completed and Work planned in previously submitted report.
iv. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
v. Corrective action taken or proposed.

B. Quality Assurance

1. Scheduler: Contractor's personnel specializing in CPM scheduling with two years' minimum experience in scheduling construction work of complexity comparable to the Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.

C. Bar Chart Schedules:

1. Format: Bar Chart Schedule, to include at least:

a. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:

i. Subcontract Work.
ii. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
iii. Move-in and other preliminary activities.
iv. Equipment and equipment system test and startup activities.
v. Project closeout and cleanup.
vi. Work sequences, constraints, and milestones.

b. Listings identified by Specification Section number.

c. Identification of the following:

i. Horizontal time frame by year, month, and week.
ii. Duration, early start, and completion for each activity and subactivity.
iii. Critical activities and Project float.
iv. Subschedules to further define critical portions of Work.

D. Review and Evaluation:

1. Participate in joint review and evaluation of schedules with Engineer at each submittal.

2. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

3. After review, revise schedules incorporating results of review, and resubmit within five business days.

E. Updating Schedules:

1. Maintain schedules to record actual start and finish dates of completed activities.

2. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

3. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

4. Upon approval of a Change Order, include the change in the next schedule submittal.

5. Indicate changes required to maintain Dates of Substantial and Final Completion.

6. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

F. Distribution:

1. Following acceptance of the updated progress schedule, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Engineer, Owner, and other concerned parties.

2. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

1.3 PHOTOGRAPHIC DOCUMENTATION

A. Provide photographs of Site and construction throughout progress of Work produced by an experienced photographer acceptable to Engineer.

B. Throughout each week, take photographs as evidence of Project conditions as follows:

1. Pipeline construction: A minimum of 10 showing work in progress (pipe laying) and 10 showing completed construction or restored areas.

C. Photographs shall be taken at different locations and from different perspectives to document relative progress of the Work. Photographs shall be taken at locations that work is in progress showing installation of critical items. Adjust photography as directed by the Engineer.

D. Digital Images: Deliver monthly digital image electronic files on a USB drive to Engineer. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as sensor, uncropped.

1. Digital Images: JPG format, produced by digital camera with minimum sensor size of 4.0 megapixels, and image resolution of not less than 1024 by 768 pixels.

2. Date and Time: Include date and time in filename for each image.

E. Submit photographs monthly with Application for Payment.

1.4 VIDEO DOCUMENTATION

A. Pre-construction Video:

1. Document existing conditions of areas to be disturbed or occupied by the Contractor during construction with audio-video taping so the areas affected by construction can be restored to pre-construction condition.

2. Obtain permission prior to entering private property for videoing purposes. Provide 24 hours advance notice to property owner. If permission to enter is refused, immediately notify Owner who will attempt to obtain permission.

3. Provide audio-video recordings and a brief written summary to Owner of the existing condition of surface features such as drives, sidewalks, curbs, ditches, streets, (including pavement condition for full width), landscaping, trees, culverts, headwalls, retaining walls, fences, visible utilities, poles, and buildings. Of particular concern are any existing fractures, defects, or other imperfections in the existing surface features.

4. Video during times of good visibility. Do not video during periods of visible precipitation or when more than 10 percent of ground area is covered with snow, leaves, or debris.

5. Identify houses and buildings by street number whenever possible, so the progress of the videoing and the proposed Work can be correlated to street, house, and building locations.

6. The video shall be performed in the presence of the RPR or the Owner's representative.

7. Provide video to Engineer on a USB drive prior to the start of construction and before construction materials or equipment are delivered or mobilized to the Project. Any parts of tape coverage deemed unacceptable by Engineer shall be re-videoed by Contractor to the satisfaction of the Engineer.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

1. Definitions.

2. Submittal Procedures.

3. Construction Progress Schedules.

4. Use of Electronic CAD Files of Project Drawings.

5. Shop Drawings.

6. Samples.

7. Closeout Submittals.

8. Test Reports.

9. Manufacturer’s Field Reports

10. Certificates.

11. Construction Photographs.

12. Contractor Review.

13. Engineer Review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Transmit submittals to the Engineer’s address shown on the cover sheet of the Drawings and to the attention of the person identified at the preconstruction meeting.

B. Transmittal Mechanics:

1. Provide electronic copies of each submittal package (including the transmittal letter) in one PDF file not to exceed a file size of 5 MB.

a. For O&M Manuals, submit a PDF copy for initial review. Upon notice, submit 3 hard copies and one electronic copy of the final O+&M Manuals.

b. Where required by Owner or Engineer, provide 5 hard copies of each page for the Engineer, plus the number required by the Contractor. The total number of copies shall not exceed 10. Also provide a PDF electronic copy not to exceed a file size of 5 MB.

2. Utilize a standard transmittal letter to transmit product data, shop drawings, samples, Operation and Maintenance Manuals, and Equipment Record Sheets.

3. Transmittal cover page shall reference the specification section number that the submittal addresses. Also, list the manufacturer and item and/or tag number, if applicable. Assure only one specification section is covered by one letter of transmittal.

4. Number transmittals consecutively beginning with 1. Resubmitted items should retain the original number but with an added suffix letter starting with "A."

5. Provide breakout of each transmittal component. Each component thus defined shall receive specific action by the Engineer.

6. Marks on transmittal by Contractor shall not be in red and shall be duplicated on all copies transmitted. Outline Contractor marks on reproducible transparencies with a rectangular box.

7. Beginning with the second re-submittal on transmittals marked ”REVISE AND RESUBMIT” on any item or system, Owner will deduct costs of performing Engineering reviews from Contractor’s payments.

8. Transmit in sufficient time to allow the Engineer the following review time:

a. Powered equipment and panels: 28 calendar days

b. Materials, non-powered products, and other submittals: 21 calendar days

C. Ensure that transmittals are from Contractor and bear his approval stamp. Transmittals will not be accepted from or returned to subcontractors.

D. Provide submittal information defining specific equipment or materials utilized on the project. Generalized product information not clearly defining specific equipment or materials will be rejected.

E. Calculations required in individual specification sections will be received for information purposes only (informational submittals) and will be returned stamped "NO REVIEW REQUIRED" to acknowledge receipt.

F. Assure submittals meet the following schedule:

1. Subcontractors: List of principal subcontractors within 15 days after Bid Opening by apparent low bidder.

2. Executed Agreement, Bonds, Insurance Certificates, and supporting documents: Prior to Notice to Proceed but within 15 days of receipt from Owner. Resubmit Insurance Certificates when they expire.

3. Project schedule: Prior to Preconstruction Conference and updated at each monthly progress meeting.

4. Schedule of shop drawings/product data: Prior to Preconstruction Conference or within 30 calendar days of Notice to Proceed, whichever comes first.

5. Schedule of Values: Prior to Preconstruction Conference, within 30 calendar days of Notice to Proceed, or prior to first Partial Payment Request, whichever comes first.

6. Shop drawings: Submittal and approval prior to start of contemplated phase of work.

7. Operation and Maintenance Manuals and Data Record Sheets: Initial submittal within 90 days after date shop drawings are reviewed.

8. Field Wiring Diagrams: Prior to final payment request.

9. PLC Program Code: Prior to final payment request.

10. Record Drawings: Prior to final payment request.

11. Warranties: Two executed copies of product warranties prior to final payment request.

12. Consent of Surety to Final Payment and Release or Waiver of Liens: With final payment request.

G. Final payment on the project shall not be made until final approved copies of Operation and Maintenance Manuals, including equipment record sheets (with equipment serial numbers), have been received.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Construction Specification Section 01 32 00, Construction Progress Documentation.

1.5 USE OF ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Comply with Construction Specification Section 01 32 00, Construction Progress Documentation.

1.6 SHOP DRAWINGS/PRODUCT DATA

A. Coordinate and identify shop drawing contents so that items can be easily verified by the Engineer.

B. Identify equipment or material use, tag number, drawing detail reference, weight, and other project specific information.

C. Provide sufficient information, together with technical cuts and technical data, to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.

D. Submit items like equipment brochures, cuts of fixtures, product data sheets, or catalog sheets on 8-1/2-inch x 11-inch pages. Indicate exact item or model and proposed options.

E. Include legible scale details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout drawings, parts catalogs, rough-in diagrams, wiring diagrams, controls, weights, and other pertinent data. Arrange data and performance information in similar format to that provided Contract Documents. Provide, at minimum, the detail provided in the Contract Documents.

F. Verify the submittal meets the specification requirements and stamp submittals as such. If proposed equipment or materials deviate from the Specifications or Drawings, note and justify the deviation in detail in a separate letter immediately following the transmittal sheet. The letter shall also document products being submitted as a substitute or an “or-equal.” If an explanation is not given, shop drawings will be returned as “REVISE AND RESUBMIT.”

1.7 SAMPLES

A. Identify sample as to: manufacturer, item, use, type, project designation, tag number, specification section or drawing detail reference, color, range, texture, finish, and other pertinent data.

B. Include application-specific brochures and installation instructions.

C. Provide Contractor's stamp of approval on samples as indication of his checking and verification of dimensions and coordination with interrelated work.

D. Resubmit samples of rejected items.

E. Approved samples, submitted or constructed, constitute criteria for judging completed work. Finished work or items not equal to samples will be rejected.

F. Samples may be retained for comparison purposes. Remove samples when directed. Include in bid costs of furnishing and removing samples.

1.8 CLOSEOUT SUBMITTALS

A. Comply with Construction Specification Section 01 78 00, Closeout Submittals.

1.9 TEST REPORTS

A. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.10 MANUFACTURER’S FIELD REPORTS

A. Submit a written report detailing field services, observations, recommendations, and approval.

1.11 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer.

B. Indicate whether material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

1.12 CONSTRUCTION PHOTOGRAPHS

A. Comply with Construction Specification Section 01 32 00, Construction Progress Documentation.

1.13 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor Responsible for:

1. Determination and verification of materials, including manufacturer's catalog numbers.

2. Determination and verification of field measurements and field construction criteria.

3. Checking and coordinating information in submittal with requirements of Work and Contract Documents.

4. Determination of accuracy and completeness of dimensions and quantities.

5. Confirmation and coordination of dimensions and field conditions at Site.

6. Construction means, techniques, sequences, and procedures.

7. Safety precautions.

8. Coordination and performance of Work of trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 20 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.

E. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.14 ENGINEER REVIEW

A. Received submittals will receive one of the following Actions:

FURNISH AS SUBMITTED
FURNISH AS REVISED
REVISE AND RESUBMIT
NO REVIEW REQUIRED

B. Transmittals returned with an indication of "FURNISH AS SUBMITTED" or "FURNISH AS REVISED" are considered ready for fabrication and installation.

C. Submittals returned with an indication of “REVISE AND RESUBMIT” indicate that the submittal is unacceptable and the submittal should be resubmitted prior to fabrication and/or purchase.

1. Failure to include any specific information specified under the submittal paragraphs of the specifications shall result in the transmittal being returned to Contractor as “REVISE AND RESUBMIT.”

D. Submittals stamped “NO REVIEW REQUIRED” may include calculations, submittal information which is supplemental, but not essential, to prior submitted information, items of information which have been reviewed and approved in a prior transmittal, or other transmittals which the Engineer considers as not required for submittal.

E. Submittals marked "FURNISH AS SUBMITTED" or "FURNISH AS REVISED" do not authorize changes to Contract requirements unless accompanied by Change Order or Work Change Directive.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Regulatory Requirements.

2. References.

3. Quality Assurance.

4. Quality Control.

5. Special Inspections.

6. Additional Engineering Services.

1.2 REGULATORY REQUIREMENTS

A. Codes, Laws, and Regulations:

1. Perform Work in strict compliance with applicable Federal, State, and local codes, laws, and regulations. Comply with other authorities having jurisdiction. Where Drawings or Construction Specifications conflict with codes, laws, and regulations, notify Engineer immediately.

2. Comply with the requirements of the latest revision of the North Carolina Building Code.

3. As a prerequisite to final acceptance, provide a Certificate of Inspection from inspection agencies having jurisdiction, the local municipality, and the utility companies serving the project.

B. Permits:

1. Owner furnished permits are provided in Appendix A. Read and become thoroughly familiar with requirements of permits prior to beginning construction operations. Comply with permit requirements.

2. Obtain additional permits required by authorities having jurisdiction prior to beginning construction operations. Comply with permit requirements.

C. Fees:

1. Unless stated otherwise, pay permit application fees, licenses, and re-inspection fees resulting from failed inspections.

1.3 REFERENCES

A. General:

1. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

2. Conform to reference standard by date of issue current as of date of advertisement for Bids except where specific date is established by code or by the Contract Documents.

3. Obtain copies of standards and maintain on Site when required by Construction Specification Sections.

4. Furnish evidence satisfactory to the Engineer that materials and methods are in compliance with referenced standards. Provide copies of referenced standards when questions arise from Owner or Engineer related to the conformance with or application of the standards or codes.

5. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

6. Neither contractual relationships, duties, or responsibilities of parties in Contract, nor those of Engineer, shall be altered from Contract Documents by mention or inference in reference documents.

B. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms which may be used in the Construction Specifications:

AC	Asbestos Cement
CI	Cast Iron
DI	Ductile Iron
FPVC	Fusible Poly Vinyl Chloride
HDD	Horizontal Directional Drill
HDPE	High Density Polyethylene
PE	Polyethylene
PVC	Poly Vinyl Chloride
RC	Reinforced Concrete
RPR	Resident Project Representative
SDS	Safety Data Sheet

2. The following is a partial list of typical abbreviations and acronyms which may be used in the Construction Specifications and the organizations to which they refer:

NASTT	North American Society for Trenchless Technology
NCDEQ	North Carolina Department of Environmental Quality
NCDOT	North Carolina Department of Transportation
OSHA	Occupational Safety and Health Administration

C. Reference Standards:

1. The following is a partial list of typical referenced standards which may be used in the Construction Specifications and the organizations to which they refer:

AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ACIFS	American Cast Iron Flange Standards
ACPA	American Concrete Pipe Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
FM	Factory Mutual System
FS	Federal Specifications
HI	Hydraulic Institute
ISO	Insurance Services Offices
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association

NSF	National Sanitation Federation International
PPI	Plastics Pipe Institute
UL	Underwriters Laboratories, Inc.

1.4 QUALITY ASSURANCE

A. Manufacturers Field Services:

1. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment, and commissioning as applicable, and to initiate instructions when necessary.

2. Submit qualifications of observer to Engineer 60 days in advance of required observations. Observer is subject to approval of Engineer and Owner.

3. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

4. Refer to Construction Specification Section 01 33 00, Submittal Procedures, Article 1.10 - Manufacturer's Field Reports

1.5 QUALITY CONTROL

A. General:

1. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

2. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

3. Perform Work using persons qualified to produce required and specified quality.

4. Products, materials, and equipment shall be subject to inspection by Engineer and Owner at place of manufacture or fabrication if requested. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

5. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

B. Testing and Inspection Services:

1. The soil testing agency and laboratory shall be approved by Owner.

2. Geotechnical Testing Agency Qualifications: Independent testing agency qualified according to the following:

a. ASTM D 3740, Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

b. ASTM E 329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

c. ASTM E 548, Standard Guide for General Criteria Used for Evaluating Laboratory Competence.

3. Employment and Payment:

a. Unless otherwise noted, Employ and pay for services of an independent testing agency or laboratory.

i. Before starting Work, submit testing laboratory name, address, telephone number, and names of full-time Professional Engineer or specialist, as required by the Construction Specifications, and responsible officer.
ii. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

b. When Owner will pay through an allowance, Owner will select services of an independent firm to perform testing and inspection. Contractor shall pay for services from cash allowances specified in Section 01 20 00 - Price and Payment Procedures.

c. Owner will contract with and pay for the following specified services of an independent firm:

i. None.

4. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer, Owner, or authorities having jurisdiction.

a. Laboratory: Authorized to operate in State of project location.

b. Laboratory Staff: Maintain full-time Professional Engineer or specialist, as required by the Construction Specifications, on staff to review services.

c. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

5. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

6. Reports shall be submitted by independent firm to Engineer, Owner, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.

a. Submit final report indicating correction of Work previously reported as noncompliant.

7. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

a. Notify Engineer and independent firm 48 hours before expected time for operations requiring services.

b. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

8. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

9. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

10. Agency Responsibilities:

a. Test Samples of mixes submitted by Contractor.

b. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.

c. Perform indicated sampling and testing of products according to specified standards.

d. Ascertain compliance of materials and mixes with requirements of Contract Documents.

e. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.

f. Perform additional tests required by Engineer.

g. Attend preconstruction meetings and progress meetings.

11. Agency Reports: After each test, promptly submit one copy of report to Engineer, Contractor, Owner, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:

a. Date issued.

b. Project title and number.

c. Name of inspector.

d. Date and time of sampling or inspection.

e. Identification of product and Specification Section.

f. Location in Project.

g. Type of inspection or test.

h. Date of test.

i. Results of tests.

j. Conformance with Contract Documents.

12. Limits on Testing Authority:

a. Agency or laboratory may not release, revoke, alter, or enlarge any requirements of Contract Documents.

b. Agency or laboratory may not approve or accept any portion of the Work.

c. Agency or laboratory may not assume duties of Contractor.

d. Agency or laboratory has no authority to stop the Work.

1.6 SPECIAL INSPECTIONS

A. None

1.7 ADDITIONAL ENGINEERING SERVICES

A. Reimburse Owner for additional engineering services resulting from Contractor's errors, omissions, or failure to conform to the requirements of the Contract Documents.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 55 26
TEMPORARY TRAFFIC CONTROL (NC)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Transportation Management Plan.

2. Temporary Traffic Control Plan.

3. Temporary Traffic Control Devices.

1.2 REFERENCES

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

NTPEP	National Transportation Product Evaluation Program
TMP	Transportation Management Plan
TTCP	Temporary Traffic Control Plan

B. Definitions: Not used

C. Reference Standards:

1. The following is a partial list of typical reference standards used in this section. See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

CFR	Code of Federal Regulations
MUTCD	Manual on Uniform Traffic Control Devices

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Product Data/Shop Drawings: None.

C. Manufacturer's Affidavits: When requested by NCDOT, local municipality, or Owner, stating materials and products provided have been manufactured and tested in accordance with the requirements of the applicable referenced standards.

D. Material Certifications: When requested by NCDOT, local municipality, or Owner, in accordance with NCDOT Standard Specification Section 106-3.

E. Certification of flagger training: Upon request prior to beginning work on the project. Provide a Qualification Statement that flaggers used on the project have been properly trained through an NCDOT approved training resource.

F. Transportation Management Plan:

1. Provide when not provided in the Contract Documents or when alternate measures are proposed.

2. Submit to NCDOT (for NCDOT right of ways), local municipality (for City or Town right of ways) for approval. Work shall not begin within NCDOT or municipal right of ways without an approved TMP.

3. Comply with the MUTCD, NCDOT Standard Specifications for Roads and Structures, 23 CFR 630 Subparts J and K (Title 23, Chapter I, Subchapter G, Part 630, Subpart J – Work Zone Safety and Mobility and Subpart K – Temporary Traffic Control Devices), and the requirements of the City.

4. In NCDOT right-of-way, comply with the NCDOT Encroachment Agreement executed for the project.

5. TMPs shall include a Temporary Traffic Control Plan (TTCP) component. A TTCP describes Temporary Traffic Control (TTC) measures to be used for facilitating road users through a work zone area. TTCPs shall provide continuity of effective road user flow when a work zone temporarily disrupts normal road user flow.

6. The NCDOT or local municipality may require a Transportation Operations Plan on a case-by-case basis. The Transportation Operations Plan shall indicate operational requirements for the TTCP.

7. The NCDOT or local municipality may require a Public Information Plan on a case-by-case basis. The Public Information Plan shall disseminate information to the public to assist in the safe and efficient movement of people and goods through the work area. Provide the public travel information related to construction that will allow them to make educated decisions about travel times, routes, and modes. Coordinate the plan with the City Public Information Officer. Use methods of notification and communication as required by the City.

G. Temporary Traffic Control Plan:

1. Provide when not provided in the Contract Documents or when alternate measures are proposed.

2. Temporary Traffic Control Plans shall incorporate MUTCD Typical Applications where appropriate and apply those to the specific Site situation. Where temporary traffic control deviates from those applications, or an appropriate typical application is not provided in the MUTCD, a detailed TTCP shall be provided in accordance with the MUTCD which is signed and sealed by a Professional Engineer licensed in the State of North Carolina. Traffic control is subject to the approval of the NCDOT, local municipality, and Owner.

3. Include, as a minimum, project notes, phasing, MUTCD Typical Applications for Temporary Traffic Control or site-specific detail sheets, and other supporting information typically found in a TTCP.

H. Transportation Operations Plan:

1. The Transportation Operations Plan shall include General Notes, which apply at all times during the project, and Local Notes which apply only for the specific times and locations that they are referred to in the phasing and detail sheets. Project notes shall address the following as a minimum:

a. Coordination and notifications of closures.

b. Time restrictions.

c. Road, lane, and shoulder closure requirements.

d. Pavement edge drop off requirements.

e. Signing.

f. Implementation of traffic control devices.

g. Pavement markings and markers.

h. Maintenance of access for property and business owners, pedestrians, and bike traffic (where applicable).

2. Phasing shall indicate whether separate projects may be performed simultaneously in the same areas".

I. Alternate TMP:

1. Contractor may submit an alternate TMP for consideration by NCDOT or local municipality, and Owner. Submit a minimum of 60 calendar days in advance of the implementation to allow for adequate review time. Alternate TMP shall not be implemented until approved in writing by the NCDOT or local municipality and Owner.

2. Make adjustments to construction means and methods and impacts to subsequent phases of the Work that result from implementation of the alternate TMP.

3. No adjustment in compensation or extension of the completion date(s) will be allowed due to the review time required by the alternate TMP, adjustments to construction means and methods, impacts to subsequent phases of the Work, or any other impacts to the Contractor or the Work.

1.4 QUALITY ASSURANCE

A. Comply with codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

B. Provide a qualified Work Zone Supervisor who shall have the overall responsibility for the proper implementation of the TMP and ensure employees working inside the municipal or NCDOT right-of-way have received the proper training appropriate to the job decisions each individual is required to make. The Work Zone Supervisor is not required to be on site at all times, but shall be available to address concerns of the County. Provide the name and contact information of the work zone supervisor at the preconstruction conference. Work Zone Supervisors shall be trained by an NCDOT approved training agency or other approved training provider accepted by NCDOT. Work Zone Supervisors will be considered qualified when they have received training as specified and they

demonstrate the ability to implement and maintain temporary traffic control measures in accordance with the TMP.

C. Flaggers shall be trained by an NCDOT approved training agency or other approved training provider accepted by NCDOT. Flaggers will be considered qualified when they have received training as specified and demonstrate proper flagging in accordance with the TMP.

1.5 COORDINATION

A. When traffic signals or their appurtenances are likely to be damaged or interfered with as a result of the construction, coordinate temporary operation with the NCDOT. For signals on NCDOT roadways, notify the municipality and Owner and coordinate temporary operation with NCDOT. Provide a minimum of 48 hours' notice prior to anticipated disturbance or interruption.

B. Provide notifications in writing, or in a manner acceptable to the notified entity, in accordance with the following schedule, unless specifically listed otherwise in the Owner-obtained encroachment agreement.

Table 015526-1: Notification Schedule

TTC Measure	Notified Party	Advance Notification
Road Closure/Altering Traffic Pattern	Municipality, NCDOT, Local Fire and Police, 911 Operator	21 calendar days
Lane Closure	Municipality, NCDOT, Local Fire and Police, 911 Operator	14 calendar days
Signal disturbance or interruption	Municipality, NCDOT, Local Fire and Police, 911 Operator	7 calendar days
Parking Space Removal	Local Police	24 hours
Work within the right-of-way	Municipality, NCDOT	7 calendar days
Work within one-half mile of an NCDOT signal	NCDOT Traffic Engineer	7 calendar days
Work within 1,000 feet of a bridge, box culvert, or storm sewer larger than 48 inches in diameter	NCDOT Division Bridge Engineer	24 hours
Sidewalk Impacts	Municipality	7 calendar days
Property and Driveway Impacts	Business or resident	First: 7 calendar days Second: 24 hours

C. Notifications shall be updated daily when the Contractor's schedule is delayed.

PART 2– PRODUCTS

2.1 TEMPORARY TRAFFIC CONTROL DEVICES

A. Temporary traffic control devices shall conform to the requirements of the MUTCD, NCDOT Standard Specifications for Roads and Structures Section 1089 – Traffic Control, 23 CFR 630 Subpart K (Title 23, Chapter I, Subchapter G, Part 630, Subpart K – Temporary Traffic Control Devices), and the requirements of the local municipality.

B. Provide temporary traffic control devices that are on the NCDOT Approved Product List.

PART 3– EXECUTION

3.1 GENERAL REQUIREMENTS

A. Work within NCDOT or municipal right of ways shall conform to and comply with the MUTCD, NCDOT Standard Specifications for Roads and Structures, 23 CFR 630 Subparts J and K (Title 23, Chapter I, Subchapter G, Part 630, Subpart J – Work Zone Safety and Mobility and Subpart K – Temporary Traffic Control Devices), traffic laws, and the requirements of NCDOT and the local municipality.

B. Maintain traffic in accordance with the TMP, TTCP, MUTCD, NCDOT Standard Specifications for Roads and Structures Division 11 – Work Zone Traffic Control, and the NCDOT Encroachment Agreement (for NCDOT right of ways.

3.2 EXAMINATION

A. Prior to establishment of temporary traffic control, examine the project site to confirm the project conditions are as indicated on Drawings. Note any deviation to the Engineer immediately and provide a modified TMP to NCDOT or local municipality and Owner.

B. If the TTC does not cover a particular work function, notify the Engineer and provide a modified TMP to NCDOT or local municipality and Owner.

3.3 IMPLEMENTATION OF TEMPORARY TRAFFIC CONTROL MEASURES

A. Provide, maintain, relocate, and remove temporary traffic control devices in accordance with the TMP. Temporary traffic control devices furnished by the Contractor shall remain the property of the Contractor, unless otherwise specified in the contract.

B. Install temporary traffic control devices before construction operations begin and during the proper phase of construction. Maintain and relocate temporary traffic control devices during the time they are in use. Keep devices in place as long as they are needed and immediately remove when operations are complete. When operations are performed in stages, install only those devices that apply to the present stage.

C. Unless shown otherwise, when portable work zone signs and portable work zone sign stands are not in use for periods longer than 30 minutes, cover, collapse, or remove sign stands. Reinstall once work begins again.

3.4 FLAGGER OPERATIONS

A. Properly equip qualified flaggers with hats, vests, STOP/SLOW paddles, and any other incidentals necessary for proper traffic control.

B. Provide flaggers at necessary times and locations for the control and protection of vehicular, bike, and pedestrian traffic.

3.5 WATER-FILLED BARRIERS

A. Provide a water-filled barrier that acts as its own free-standing, non-redirective end treatment. Use environmentally safe anti-freezing agent in the water per manufacturer specifications and recover agent when the barrier is drained. Dispose of water and agent properly. Do not drain water-filled barrier into or across an existing travel lane. Provide barrier units that are capable of being lifted and moved when filled, if draining is not possible. Use any of several alternate delineator types for barrier (see NCDOT Roadway Standard Drawings) that are on the NCDOT Approved Product List.

B. When required by the plans, anchor barrier by an approved method as shown in the NCDOT Roadway Standard Drawings.

C. Use one type of barrier on any continuous run of barrier within the project.

D. Provide water-filled barrier units as shown in the plans and per manufacturer specifications on roadways with posted speed limits of 45 mph or less.

E. Provide delineators for barrier.

3.6 EXCAVATIONS WITHIN TRAVELWAY

A. During the process of excavating in a travel-way, make provisions to backfill and repair any excavated or damaged pavement before allowing traffic to proceed over the affected lanes. In low speed areas (35 mph or less), metal plates may be used to temporarily cover excavated areas where approved by NCDOT or the local municipality.

3.7 REQUIREMENTS DURING NON-WORK HOURS

A. If approval has been granted to leave a trench open beyond daily work hours, provide suitable signs, barricades, rails, other devices, and lighting to protect the public to the satisfaction of NCDOT or the local municipality and Owner. Operate warning lights during hours from dusk to dawn.

3.8 MATERIAL AND EQUIPMENT STORAGE AND PARKING

A. When work is not in progress, keep personnel, equipment, machinery, tools, construction debris, and supplies at least 40 feet away from active travel lanes. When vehicles, equipment, and materials are protected by concrete barrier or guardrail, offset at least five feet from the barrier or guardrail.

3.9 VEHICULAR ACCESS

A. Maintain continuous and safe vehicular access, including but not limited to, residences, businesses, schools, police and fire stations, hydrants, other emergency services, hospitals, and mailboxes. Conduct operations so as to limit the inconvenience to property owners.

B. Where specifically called for in the TMP, provide bridges over excavations to provide vehicular access.

3.10 PEDESTRIAN ACCESS

A. Maintain pedestrian access at all times as shown on the Drawings. When existing pedestrian facilities are disrupted, closed, or relocated, provide temporary facilities that are detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Avoid pedestrian detours.

B. Inspect the work zone regularly so effective pedestrian traffic is maintained.

C. When pedestrian movement through or around a work site is necessary, provide a separate, usable footpath. If the previous pedestrian facility was accessible to pedestrians with disabilities, provide a footpath during temporary traffic control that is accessible to pedestrians with disabilities. Do not have any abrupt changes in grade or terrain that could cause a tripping hazard or could be a barrier to wheelchair use. Provide barriers and channelizing devices that are detectable to pedestrians who have visual disabilities.

D. Where specifically called for in the TMP, provide temporary pedestrian facilities that are made of concrete, asphalt, or other suitable material as approved by NCDOT or the local municipality and Owner at locations where the existing sidewalks have been removed for construction operations.

E. Where specifically called for in the TMP, provide bridges over excavations to provide pedestrian access.

F. Do not sever or move pedestrian facilities for non-construction activities such as parking for vehicles and equipment. Separate pedestrian movements from both work site activity and vehicular traffic.

3.11 INCLEMENT WEATHER/LOW VISIBILITY

A. Provide, operate, and maintain warning lights during inclement weather and periods of low visibility to the satisfaction of NCDOT or the local municipality and Owner.

3.12 MAINTENANCE

A. Perform continuous and expeditious maintenance and daily scheduled inspections of temporary traffic control devices. Review and maintain traffic handling measures to ensure that adequate provisions are in place for public and workers' safety.

B. Maintenance activities shall include, but not be limited to, cleaning, plumbing of leaning signs, replacement of broken supports, replacement due to loss of reflectivity, repair of defaced sheeting and legend, and additional repair or replacement of temporary traffic control devices which, in the opinion of NCDOT or the local municipality and Owner are damaged, torn, crushed, discolored, displaced, or deteriorated beyond effectiveness.

C. Weeds, brush, trees, construction materials, equipment, etc., shall not be allowed to obscure any traffic control device while in use.

D. Failure to maintain traffic control devices in a satisfactory condition may be cause for suspension of construction operations until proper traffic control is re-established.

3.13 REMOVAL AND RESTORATION

A. Temporary traffic control shall be removed upon completion of the Work unless otherwise specified by NCDOT or the local municipality and Owner.

B. Rights of way and public or private property shall be restored to preconstruction conditions.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Products.

2. Product Delivery Requirements.

3. Product Storage and Handling Requirements.

4. Product Options.

1.2 PRODUCTS

A. The City of Hickory, who operates Catawba County's sewer system, maintains standard specifications and details which may also include approved manufacturers. The Engineering Department Manual of Practice (City of Hickory), as it relates to this project, shall be used in conjunction with these specifications. Products, materials, and aspects of the project construction shall conform to Catawba County/City of Hickory standards unless specifically noted otherwise. It is the Contractor's responsibility to obtain this document from City of Hickory. It can be obtained on the internet at Engineering | City of Hickory (hickorync.gov).

B. In the event of a discrepancy between these specifications and the Owner's standards, notify the Engineer of the discrepancy. Use the more stringent of the two documents.

C. At minimum, comply with specified requirements and reference standards.

D. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

E. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

F. Domestic Products: Where the project's special provisions or Supplementary Conditions require "Buy American," except where specified otherwise, domestic products are required and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.

G. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

H. Furnish interchangeable components from same manufacturer for replacement components.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Comply with delivery requirements in each Construction Specification Section.

B. Transport and handle products according to manufacturer's instructions.

C. Promptly inspect shipments to ensure that products comply with requirements, are undamaged, and that quantities are correct.

D. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with intact and legible seals and labels.

C. Store sensitive products in weather-tight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Provide off-Site storage (bonded, if required by Owner) and protection when Site does not permit on-Site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose, granular materials on solid, flat surfaces in well-drained areas. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers and stating that no like, equivalent, or “or-equal” item or substitution is permitted: Products of one of the manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers: Products of one of the manufacturers named and complying with Specifications; “or-equal” and substitutions permitted in accordance with the “or-equal” and substitutions requirements of the Contract Documents.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 71 00
EXAMINATION AND PREPARATION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mobilization.

2. Survey and Layout.

B. Related Requirements:

1.2 MOBILIZATION

A. Prior to mobilization, complete at least the following:

1. Comply with the requirements of the Standard General Conditions of the Construction Contract Article 2 – Preliminary Matters.

2. Provide list of principal subcontractors.

3. Execute Agreement and provide Bonds, Insurance Certificates, and supporting documents.

4. Obtain Notice to Proceed.

5. Provide preliminary Project Schedule.

6. Provide Schedule of Values.

7. Attend preconstruction conference.

8. Provide preconstruction video.

1.3 SURVEY AND LAYOUT

A. General:

1. Provide a site layout survey for the proposed facilities so that the Work can be constructed to the lines and grades shown on the Drawings.

2. Acquire the services of a Professional Land Surveyor, experienced in providing site layout surveys (also known as construction staking) for the construction of infrastructure facilities. Provide the name and qualifications of the proposed Professional Land Surveyor prior to commencing work.

B. Information Provided to the Contractor:

1. Project Drawings:

a. Engineer will furnish the Contractor-dimensioned Drawings delineating the location of the proposed facilities, pipelines, and appurtenances to be constructed. Drawings will provide distances and offsets from features that are identifiable in the field or that can be established by survey. State Plane Grid Coordinates will be provided for established

benchmarks and control points. Some control points will be referenced and dimensioned with respect to existing landmarks. Some of the original control points may be in place, but the accuracy of those points is unknown. Base site layout survey on the benchmarks provided and re-establish control points as necessary for layout of the Work.

b. Elevations of existing ground, structures, and appurtenances are believed to be reasonably correct, but not guaranteed to be absolute, and therefore are presented only as an approximation. Notify Engineer immediately of any errors or apparent discrepancies in the data shown or omissions of data required for accurately accomplishing the site layout survey.

2. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:

a. Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.

b. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.

c. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.

d. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.

e. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

f. Receiver shall agree not to use Drawings and Data, in whole or in part, for any other purpose other than the referenced project. Use of the Data for modification, extension, or expansion of the project or any other project, unless under the direction of Engineer shall be without liability to Engineer and Engineer subconsultants. Field verify dimensions critical to Work.

C. Site Layout Survey:

1. Furnish personnel, materials, and equipment necessary for layout of the Work.

2. Establish base lines for the location of the principal component parts of the Work together with a suitable number of benchmarks adjacent to the work. Based upon the information provided by the Drawings, develop and make detail surveys necessary for construction including: permanent and temporary construction easements, boundary staking and flagging at 50 feet on-center maximum spacing, slope stakes, stakes for working points, alignment and elevations.

3. Carefully preserve bench marks, reference points, and stakes.

4. Existing or new control points, bench marks, property markers, and monuments destroyed during construction shall be reestablished.

5. Make minor adjustments to the proposed pipeline alignment, far enough in advance to allow enough room to install valve manholes or other structures adjacent to existing parallel utilities. Notify Engineer of adjustments prior to the work for approval.

6. Exercise care establishing the pipe alignment where future connections are indicated to ensure accurate location.

D. Checking by the Engineer:

1. Engineer may check a portion or all of the layout work at any time during construction. Afford necessary assistance to Engineer in carrying out such checks. Immediately make corrections to the Work. Checking by Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of the work.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Progress Cleaning and Waste Removal.

2. Site Maintenance.

3. Construction Waste Management and Disposal.

4. Restoration.

5. Failure to Clean, Maintain, and Restore Site.

6. Final Cleaning.

B. Related Requirements:

1. Construction Specification Section 02 41 13 Selective Site Demolition.

1.2 PROGRESS CLEANING AND WASTE REMOVAL

A. Clean the Project Site daily. Collect waste materials, debris, and rubbish and store in designated locations out of sight of the public.

B. Remove waste materials, debris, and rubbish from the Site weekly and legally dispose off-site. Clean and manage waste to the satisfaction of the Engineer.

C. Regularly (and before enclosing spaces) remove waste, debris, and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces.

D. Any dumpsters used on site must follow Catawba County Code/Ordinance and Franchise Agreement.

1.3 SITE MAINTENANCE

A. Maintain areas free of waste materials, debris, surplus materials, and rubbish. Maintain Site in clean and orderly condition.

B. Propose locations for various construction materials and debris to the Owner and Engineer for approval. Materials shall be kept in their storage locations, except as needed for the Work. Material debris shall be promptly and regularly collected and deposited in the specified location.

C. Mounds of unusable soil, large stones, boulders, and debris shall be removed from the Site or relocated to areas designated for temporary storage of construction debris so that the site presents a neat appearance.

D. Store construction waste materials to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination of stored materials.

E. When working on the shoulders of paved roads, keep the pavement clean of loose earth, dust, mud, gravel, and other debris. Restore roadway shoulders and ditches as required by Owner and owner of right-of-way.

F. Remove spillage of excavated materials, debris, and dust from public roads daily by methods approved by the Owner and roadway owner. Provide a broom tractor and a water truck to remove debris and dust. Sprinkle water at locations, in sufficient quantity and frequency, to control dust and prevent it from becoming a nuisance as determined by the Engineer.

G. Broom streets, sidewalks, driveways, parking lots, and other paved or concrete areas on the last day of the week that Work is performed to provide clean surfaces prior to weekends and periods of no work.

H. Keep the surface over and along roadways and other graded areas in a safe and satisfactory condition during the progress of the Work. Contractor will be held responsible for accidents that occur resulting from the deteriorated condition of roadway surfaces.

I. Where temporary pavement cuts are not required to be restored with asphalt pavement daily, maintain stone daily so that the surface is flush with the existing pavement and ruts and potholes do not develop. Pavement cuts will be reviewed with the Engineer and restored on the last day of the week that Work is performed to provide flush surfaces prior to weekends and periods of no work. Continue to maintain these areas as necessary during weekends and periods of no work. Review pavement cuts after storm events that erode or damage stone, including weekends, to prevent hazardous driving conditions.

J. Store unused equipment and tools at the Contractor’s yard or base of operations.

1.4 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

A. Separate recyclable materials from non-recyclable trash and place in bins prior to disposal. Deliver recyclable construction waste to waste recycling facilities.

B. Dispose of construction waste not capable of being recycled by delivery to landfill, incinerator, or another legal disposal facility. Obtain receipt for deliveries.

C. When the Contract includes requirements for recycling and adaptively reusing construction waste as an alternative to landfill disposal, provide a Construction Waste Management Plan.

1.5 RESTORATION

A. When the work involves installation of pipelines, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, Contractor shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the property. Follow requirements for temporary paving of streets, walks, and driveways, specified elsewhere.

B. Restore disturbed areas immediately following the installation or completion of the utilities and facilities. Where partially completed utilities and facilities must remain incomplete for some time due to unforeseen circumstances, restore as directed by the Engineer.

C. Upon completion of grading operations, fine grade the site to drain, removing surplus excavated material, leaving the area free from surface irregularities. Dispose of surplus

material, dirt, and rubbish from the site and keep the site free of mud and dust to the satisfaction of the Engineer.

D. Restore Work Site in accordance with the Drawings, this Section, and other Construction Specification Sections.

E. Restore Work Site to a condition and appearance equal or superior to that which existed just prior to construction.

1.6 FAILURE TO CLEAN, MAINTAIN, AND RESTORE SITE

A. If Contractor fails to cleanup, maintain, and restore of the Site in accordance with this Section to the satisfaction of the Engineer, the Owner may, upon five (5) days prior written notice to Contractor, retain the services of a contractor to cleanup, maintain, and restore of the Site. Costs incurred by the Owner to retain the contractor and pay for the cleanup and restoration will be charged to the Contractor and deducted from the payments due to Contractor.

1.7 FINAL CLEANING

A. After Work is complete, remove remaining waste, debris, rubbish, and surplus materials which resulted from construction operations, including construction facilities, equipment, tools, sheds, sanitary enclosures, and other equipment, leaving the site free of these items, clean, and in good condition.

B. Execute final cleaning prior to final completion review.

C. Final Cleaning of Facilities:

1. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

2. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

3. Clean debris from roofs, gutters, downspouts, and drainage systems.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Substantial Completion.

2. Final Completion.

B. Related Requirements:

1. See Construction Specification Section 01 78 00, Closeout Submittals.

1.2 SUBSTANTIAL COMPLETION

A. Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work. This is a partial list of items. It shall be the Contractor's responsibility to submit other items which are required for substantial completion in the Contract Documents.

1. Correct or replace defective work, either known by the Contractor or identified by the Engineer, including completion of items previously overlooked or work which remains incomplete.

2. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.

3. Test results of project components.

4. Certification of equipment or materials in compliance with Contract Documents.

5. Any special guarantees or bonds (submit to Owner).

6. Notify other Contractors of completion of work such that connections and/or coordination between different projects can be made.

7. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for incompletion, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.

8. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.

9. Deliver tools, spare parts, extra stock of materials, and similar physical items to Owner.

10. Make final change-over of locks, eliminating construction master-key system, and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.

11. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools and similar elements.

12. Perform final cleaning in accordance with Construction Specification Section 01 74 00, Cleaning and Waste Management.

B. Request Certification of Substantial Completion in accordance with the Standard General Conditions of the Construction Contract Article 15.03, Substantial Completion.

1.3 FINAL COMPLETION

A. Complete following items before requesting final acceptance and final payment. This is a partial list of items. It shall be the Contractor's responsibility to submit other items which are required for final completion in the Contract Documents.

1. When Contractor considers Work to be complete, submit written certification that:

a. Contract Documents have been reviewed.

b. Work has been examined for compliance with Contract Documents.

c. Work has been completed according to Contract Documents.

d. Work is completed and ready for final inspection.

2. Submit the following:

a. Final punch list indicating all items have been completed or corrected.

b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.

d. Accounting statement for final changes to Contract Sum.

e. Contractor's affidavit of payment of debts and claims on AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.

f. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens.

g. Contractor affidavit of release of liens on AIA G706A - Contractor's Affidavit of Release of Liens from subcontractors.

h. Consent of surety to final payment on AIA G707 - Consent of Surety to Final Payment Form.

3. Perform final cleaning in accordance with Construction Specification Section 01 74 00, Cleaning and Waste Management.

B. Request Final Acceptance and Final Payment in accordance with the Standard General Conditions of the Construction Contract Article 15.05, Final Inspection and Article 15.06, Final Payment.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Record Drawings.

2. Extended Product Warranties and Bonds.

3. Items Required for Substantial Completion and Final Completion.

B. Related Requirements:

1. See Construction Specification Section 01 77 00, Closeout Procedures.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical Samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action.

1.3 RECORD DRAWINGS

A. Maintain a complete set of full size contract drawings for mark-up purposes throughout the project. Mark up drawings in red during the work to show changes made, clarifications, and existing conditions that differ from what is shown to sufficiently form a complete record of construction. Give particular attention to work which will be concealed and difficult to measure and record at a later time.

1.4 EXTENDED PRODUCT WARRANTIES AND BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three-inch D ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.5 ITEMS REQUIRED FOR SUBSTANTIAL COMPLETION AND FINAL COMPLETION

A. Provide items required for Substantial and Final Completion in accordance with Construction Specification Section 01 77 00, Closeout Requirements.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 02 01 00
MAINTENANCE OF EXISTING CONDITIONS

PART 1– GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protection of existing utilities and structures.

2. Protection of surface features.

3. Protection of persons and property.

4. Protection of benchmarks and monuments.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements, for a list of abbreviations and acronyms used throughout the Contract Documents.

B. Definitions:

1. Existing utilities: Publicly and privately-owned utilities including, but not limited to, electric power and lighting, telephone, cable TV, water, wastewater force mains, sanitary sewer, gas, storm drains, and appurtenant lines and structures.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements, for a list of reference standards used throughout the Contract Documents.

1.3 COORDINATION

A. Notify utility companies when working in the vicinity of their utilities.

B. Work within one-half mile of an NCDOT traffic signal requires the notification of the NCDOT Traffic Services Division.

1.4 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions are as indicated on Drawings. Notify Engineer immediately of changed conditions.

3.2 GENERAL

A. Plan construction to minimize disturbance to properties adjacent to the project site. Conduct work to insure the least possible inconvenience to the residents in the vicinity of the work and to the general public.

B. Provide full access to public and private premises, fire hydrants, street crossings, sidewalks, and other points as designated by the Owner to prevent interruption of travel.

C. Repair fences disturbed by Contractor with new materials to a condition equal to or better than original condition or to the satisfaction of the Owner at Contractor's expense.

D. Provide barricades, fences, coverings, or other types of protection necessary to prevent damage to existing facilities, structures, and other items not indicated to be removed, as well as to facilities, structures, and other items on adjoining property. Facilities, structures, and items damaged by Contractor shall be restored to their original condition or to a condition acceptable to the Owner, the property owner, or other parties or authorities having jurisdiction.

3.3 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. Engineer has attempted to locate and indicate existing utilities and facilities on the Drawings; however, locations shown on the Drawings are approximate and based on available information. This information is shown only for the convenience of Contractor. Engineer and Owner assume no responsibility for the locations of utilities shown or not shown. Omission of utilities on the Drawings does not constitute non-existence of utilities. Inclusion of located utilities on the Drawings does not constitute definite location or presence.

B. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before digging for locates of existing utilities. Confirm utilities have been located prior to excavating.

C. Determine the size, depth, material, and exact location of existing underground utilities prior to construction. Protect existing utilities and structures from damage resulting from construction activities.

D. Field verify the location and elevation of existing utilities and structures which cross the Work site or which are affected by Contractor's operations. Excavate to verify exact locations or elevations of utilities or other interferences to assure proper protection of existing utilities or structures. No extra payment will be made for such field verification or excavations, or for other work or expense incurred by Contractor in properly locating and protecting utilities or other interferences.

E. Anticipate and locate underground utilities and obstructions. When construction appears to be in proximity to existing utilities, test pits shall be placed a sufficient distance ahead of the work to verify the exact locations and inverts of the utilities to avoid damage and allow for changes in grade or relocation of the utility if deemed necessary by the Engineer.

F. If existing utilities are encountered which are not shown on the Drawings, immediately notify the Engineer and Owner and take necessary precautions to protect the utility and maintain service.

G. If existing utilities are found to interfere with the facilities under construction, immediately notify the Engineer and Owner and obtain instructions for resolving the interference. Do not proceed with temporary or permanent relocation of utilities until instructions are received from the Engineer or Owner.

H. Take necessary precautions to protect existing structures from damage due to construction activity. Locate existing structures (above or below ground) before excavation starts and coordinate the work with structure owners.

I. Existing gas pipes, water pipes, steam pipes, telephone lines, cable TV lines, electrical conduits, sewers, drains, fire hydrants, and other structures which, in the opinion of the utility owner, do not require relocation, shall be carefully supported and shored up. Flow shall be maintained, if applicable, and the main protected from damage by Contractor. Protect existing septic systems located outside the construction limits.

J. Repairing Damaged Utilities:

1. Give immediate notice to the owner and to proper authorities when utilities are damaged.

2. It is the sole responsibility of Contractor to repair or replace existing utilities damaged by Contractor during construction operations at Contractor's expense.

3. For private utilities, the utility shall be restored by the utility owner to original or better condition, at Contractor's expense.

4. Repair damaged water and sewer utility services immediately in accordance with Construction Specification Section 33 14 17, Water Utility Service Connections, or Construction Specification Section 33 31 11, Sanitary Sewerage Gravity Piping, as appropriate at Contractor's expense. If in the opinion of the Owner, Contractor does not take appropriate action to repair existing water and sewer services, Owner may elect to repair damaged services without prior notice to Contractor and bill Contractor for those services.

K. Where excavations for the Work require utility lines or appurtenant structures to be temporarily supported and protected during the Work, support and protection shall be provided directly by Contractor or through coordination with the utility owner. Support and protection shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over the Work. If Contractor fails to provide proper support or protection to an existing utility, the Engineer may, at his discretion, have the respective authority provide such support or protection as necessary to protect the utility. The cost for supporting and protecting utility lines and appurtenant structures shall be paid by Contractor.

L. Work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to existing utilities. Provide temporary connections, as required, to prevent interruption of service.

M. Contractor shall be responsible for damage to persons or property caused by damaged utilities.

N. Keep fire hydrants on or adjacent to the work accessible to fire-fighting equipment at all times. Fire hydrants that either are abandoned or are not in service shall be bagged by the Owner.

3.4 PROTECTION OF SURFACE FEATURES

A. Whenever construction is planned in the vicinity of a paved street, provide pads or take necessary precautions to protect the pavement from damage by the construction equipment. Pavement damaged by cleated or tracked equipment, or by other means, shall be repaired by Contractor at his expense to the satisfaction of the street owner.

B. Where joining existing pavements, use care to cut the existing pavement in straight, sharp, neat lines. Coordinate repair and replacement with roadway owner and comply with owner requirements.

C. Make temporary provisions to ensure the proper functioning of gutters, sewer inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the governing authority.

D. Protect creeks and streams located outside the construction limits.

3.5 PROTECTION OF PERSONS AND PROPERTY

A. Preserve and protect property adjacent to the work site against damage or injury as a result of construction operations including pipes, poles, conduits, walls, trees, buildings and other structures, utilities, and property in the vicinity of his work. Preserve and protect as required by the Company or party owning the structure or agency controlling it. Contractor shall be responsible for damage to property whether shown on the Drawings or not, and for injury to persons caused by his operations.

B. Promptly comply with safety regulations as directed by the Owner or local authorities having jurisdiction. Properly correct unsafe conditions or unsafe practices. If Contractor fails to comply, Owner may take the necessary measures to correct the conditions or practices of concern. Costs for these measures shall be deducted from payment due Contractor. Failure of the Owner to direct the correction of unsafe conditions or practices shall not relieve Contractor of his responsibility hereunder.

C. In the event of claims for damage or alleged damage to property as a result of Contractor's operations and performance of the Work, Contractor shall be responsible for costs in connection with the settlement of or defense against such claims.

D. Prior to commencing work in the vicinity of property adjacent to the project site, take surveys as necessary to establish the existing condition of the property. Before final payment can be made, furnish satisfactory evidence that claims for damage have been legally settled, that sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

E. Protect trees, shrubs, hedges, or other ornamental plantings located outside of the construction limits, easements, or public rights-of-way. Owner reserves the right to designate certain trees located within the construction limits for protection.

F. Barricade open holes and depressions occurring as part of the Work and post warning lights on property adjacent to or part of public access. Operate warning lights from dusk to dawn each day and as otherwise required for inclement weather and visibility.

G. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by construction-related operations.

H. Contractor shall be responsible for damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in his manner or method of executing said Work, from his non-execution of work, or from defective work or materials. He shall not be released from said responsibility until the work has been completed and accepted.

I. Where direct or indirect damage or injury is inflicted on public or private property by or because of any act, omission, neglect, or misconduct in the execution of the Work, Contractor shall restore such property, at his own expense, by repairing, rebuilding, or otherwise restoring, to a condition equal to or better than that which existed before such damage or injury was done. Contractor may also be directed to make reparations for such damage or injury in an acceptable manner.

3.6 PROTECTION OF BENCHMARKS AND MONUMENTS

A. Protect and maintain benchmarks, monuments or other established reference points and property corners. If disturbed or destroyed, benchmarks, monuments, reference points, property corners, etc. shall be replaced at Contractor's expense by a Professional Land Surveyor licensed in the State of North Carolina to the satisfaction of owner and County.

B. No monuments or property markers shall be intentionally removed without the approval of the local jurisdiction and until an authorized agent has witnessed or otherwise referenced their locations and provided direction for removal and restoration.

END OF SECTION

SECTION 02 32 00
GEOTECHNICAL INVESTIGATIONS

PART 1– GENERAL

1.1 SUMMARY

A. Section Includes:

1. Geotechnical Subsurface Investigation Report.

1.2 GEOTECHNICAL SUBSURFACE INVESTIGATION REPORT

A. The Owner has obtained geotechnical subsurface investigations in connection with this project for the benefit of the Owner. A report has been prepared and is included in Appendix B.

B. Geotechnical subsurface data is offered in good faith solely to place the Bidder and Contractor in receipt of all information available to the Owner and is not to be considered as part of the Contract Documents. In making this data available, the Owner makes no guarantee, either expressed or implied, as to their accuracy or to the accuracy of any interpretation thereof.

C. The Bidder and Contractor shall interpret geotechnical data according to his own judgment and shall acknowledge that he is not relying upon the geotechnical data as accurately describing the subsurface conditions which may be found to exist. The test logs present factual information of the subsurface conditions at the specific test location only.

D. Geotechnical data is not intended as a representation or warranty of the continuity of such conditions between borings or sampling locations. The Bidder and Contractor should not consider, or conclude, that the subsurface conditions will be consistent between test locations. It shall be expressly understood that the Owner will not be responsible for any interpretations or conclusions drawn from the geotechnical data by the Bidder and Contractor.

E. The Bidder and Contractor further acknowledge assumption of all risk contingent upon the nature of the subsurface conditions to be actually encountered in performing the work covered by the Contract, even though such actual conditions may result in the Bidder and Contractor performing more or less work than originally anticipated.

F. In addition to any geotechnical data which is made available, the Bidder and Contractor are responsible for performing, at no additional cost to the Owner, all additional soil investigations deemed necessary for proper evaluation of the site for the purposes of planning, bidding, or designing components of the Project.

PART 2– PRODUCTS – Not Used

PART 3– EXECUTION – Not Used

END OF SECTION

SECTION 03 30 53
MISCELLANEOUS CONCRETE BELOW GRADE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Job Mixed Concrete.

2. Ready Mixed Concrete.

3. Flowable Fill.

B. Related Requirements:

1. Additional specifications may be shown on the Drawings. In the case of conflicts, the Drawing notes shall take precedence.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions – Not Used.

C. Reference Standards:

1. The following is a partial list of referenced standards and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete

ACI 305 Guide to Hot Weather Concreting/Standard Specification for Hot Weather Concreting

ACI 306 Guide to Cold Weather Concreting/Standard Specification for Cold Weather Concreting

ACI 315 Details and Detailing of Concrete Reinforcement

ACI 347 Recommended Practice for Concrete Formwork

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate sequencing and scheduling of Work with Owner and Engineer.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that all materials and products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings:

1. Submit product data/shop drawings for cement, aggregates, admixtures, and appurtenances. Include manufacturer’s installation instructions.

D. Design Data: Concrete Mix Designs.

E. Test and Evaluation Reports.

F. Source Quality Control Submittals.

G. Field Quality Control Submittals.

1.5 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Construct and erect concrete formwork in accordance with ACI 347.

C. Perform concrete reinforcing work in accordance with ACI 315 and CRSI Manual of Practice.

D. Perform cast-in-place concrete work in accordance with ACI 305 and ACI 306.1.

E. Perform Work in accordance with the North Carolina Building Code.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00 - Product Requirements for transporting, handling, storing, and protecting products.

B. Delivery and Acceptance Requirements - measure, mix, and transport concrete in accordance with ACI 304, ACI 305, and ACI 306.

PART 2– PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type 1.

B. Aggregates: Fine aggregate shall be well-graded natural sand and coarse aggregate shall be crushed stone or gravel in accordance with ASTM C 33. Coarse aggregate shall be of designated size 1 inch to No. 4. Local aggregates of proven durability may be used when acceptable to the Engineer.

C. Water: clean, drinkable.

D. No admixtures containing calcium chloride may be used. Use Pozzolith by Master Builders, Plastiment or Platicrete by Sika, Chemstrong A, R, or W by Castle Chemical Company, or approved equal.

2.2 REINFORCEMENT MATERIALS

A. Reinforcing Steel: New billit steel meeting ASTM A615, Grade 60, deformed.

B. Chairs, Bolsters, Bar Supports, Spacers: sized and shaped for support of reinforcing; plastic-tipped or non-corroding for supports in slabs forming finished ceilings or where supports are exposed to weather.

C. Detail and fabricate concrete reinforcement in accordance with CRSI Manual of Practice, ACI 315, ACI 318, and the North Carolina Building Code.

D. Weld reinforcement in accordance with AWS D1.4.

E. All bar splices shall be Class “B” tension splices per ACI 318 unless otherwise shown.

2.3 FORM MATERIALS

A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

B. Use material to suit project conditions.

2.4 JOB MIX CONCRETE PROPORTIONING

A. Shall be as follows:

Job Mix Concrete Parameter	Class A	Class B
Minimum cement content, sacks per cu. yd. with rounded course aggregate	6.0	5.0
Minimum cement content, sacks per cu. yd. with angular course aggregate	6.5	5.5
Maximum water-cement ratio gal. per sack	5.7	6.8
Slump range	2-inch to 4-inch	2-inch to 4-inch
Minimum strength - 28 days psi.	3,500	2,500

B. The above specifications are minimum rather than design strengths. The mix shall be approximately 1 part cement, 2 parts sand, and 2 parts coarse aggregate for Class A concrete, and approximately 1:3:4, respectively, for Class B concrete by weight, with adjustments made to give the best workability while maintaining the specified water cement ratios.

C. If necessary to obtain proper workability, cement in addition to the minimum specified sacks per cubic yard of concrete shall be added. The Contractor shall submit affidavits from the concrete supplier certifying that the proposed mix to be supplied has been proven to satisfy the above specifications. Such affidavits shall be subject to the approval of the Engineer and, in lieu of the same, the Contractor shall have test cylinders made of the concrete mix he proposes to use and submit strength test certificates from an approved laboratory prior to placing concrete.

D. Class A concrete shall be used for structures requiring relatively precise formwork and accurate placement for reinforcing steel.

E. Class B concrete shall be used for pipe encasement, concrete arches, and thrust blocks.

2.5 READY MIXED CONCRETE

A. Ready mixed concrete may be used in lieu of job mixed concrete if the facilities comply with Standard Specifications for Ready Mixed Concrete, ASTM C94. The plant shall certify that materials and strengths meet the requirements stated herein and shall be subject to the approval of the Engineer. Batch deliveries shall not exceed the rated capacity specified for the mixer by the equipment manufacturer.

2.6 FLOWABLE FILL

A. Flowable fill shall only be used where shown on the Drawings and shall consist of a lean concrete mix conforming to the following requirements:

Flowable Fill Parameter	Value
28-day Compressive strength (psi)	80-120
Total Cementitious Material (lbs/cy)	365
Cement	65
Fly Ash	300
Fine Aggregate (NCDOT, Standard Size 2S), SSD (lbs/cy)	2,635
Water (lbs/cy)	500

B. Other mixes resulting in the same compressive strength range may be submitted to the Engineer for approval. Periodic testing by the Engineer for verification of strength, unit weight, slump, and air content will be made.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

B. Verify suitability of grading, elevations, and existing conditions prior to installing formwork. Examine the areas and conditions under which concrete shall be cast-in-place and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions.

B. Subgrade:

1. Prepare in accordance with the requirements Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfilling.

2. The surface of the subgrade shall be dry and clean of all foreign substances. Ruts, soft yielding materials, and areas that do not meet compaction requirements shall be corrected by removing and replacing the material and properly compacting to the lines and grades shown on the Drawings.

3. Subgrade shall be approved by Engineer prior to placement of concrete.

3.3 FORMWORK

A. Forms for concrete shall be sound, true and tight, and sufficiently rigid to prevent displacement and sagging between supports.

B. Forms shall be left in place until the concrete has set sufficiently to permit their removal without danger to the structure. No forms shall be removed until permission to do so has been given by the Engineer.

C. For Class A concrete, no form ties shall be used that will leave metal within 1 inch of the finished surface of the concrete, and lumber used for exposed faces shall be of seasoned stock which has been coated with an approved lubricant.

D. For Class B concrete, where the concrete is not required to be poured against undisturbed material, it shall be contained by sandbags, stones, brick, or lumber to provide the required shape.

3.4 MIXING AND PLACING CONCRETE

A. Concrete shall be mixed in an approved rotating type mixer for at least 1 1/2 minutes after all ingredients are assembled. It shall be deposited immediately after mixing and compacted by use of approved mechanical vibrators supplemented by spading. Forms shall be thoroughly clean and wet before concrete is placed. Forms shall not be removed until the concrete has hardened sufficiently to prevent injury. All exposed finished surfaces shall be kept moist and covered for a period of at least 8 days.

3.5 QUALITY CONTROL TESTING

A. Sampling and testing for quality control during placement of concrete shall include the following or as directed by Engineer:

B. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of truck discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above, and each time a set of compression test specimens made.

4. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required. The Contractor shall provide the testing laboratory with an approved container to store test cylinders on site for 24 hours.

5. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding five cubic yards plus additional sets for each 100 cubic yards over and above the first 50 cubic yards of each concrete class placed in any one day and not less

than one for each 5,000 square feet of surface areas for slabs or walls; one specimen tested at seven days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

6. When frequency of testing will provide less than five strength tests over the life of the project for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

C. Test results will be reported in writing to the Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

D. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

E. Substandard Concrete: Any concrete furnished under this Specification that fails to reach the required design compressive strength after 28 days as evidenced by the compressive strength test specified herein shall be considered substandard.

1. The procedure specified in ACI 318 for the Evaluation and Acceptance of Concrete shall be used to determine if the substandard concrete is to be removed and replaced. The Engineer shall make the final decision. Any substandard concrete which is removed and replaced shall be done so at the Contractor’s expense.

F. Non-Conforming Work:

1. Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as directed by the Engineer.

3.6 PROTECTION

A. Protect finished concrete from damage from construction activities. Repair or replace damaged concrete in a manner acceptable to the Engineer.

END OF SECTION

SECTION 31 05 00
COMMON RESULTS FOR EARTHWORK

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Materials for earthwork

B. Related Requirements

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions:

1. Geotechnical Engineer: A Professional Engineer, licensed in the state in which the Work is performed, with engineering expertise in the analysis, design and construction of foundations, slopes, retaining structures, embankments, tunnels, levees, wharves, landfills and other systems that are made of or are supported by soil or rock. The Geotechnical Engineer is the Professional hired by the Contractor, Owner, or Engineer as applicable.

2. Borrow: Fill material hauled in from off-site that has been approved by the Engineer.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

B. Preconstruction Meeting: Attend prior to mobilization, clearing, excavating, or grading.

C. Sequencing

D. Scheduling

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that all materials provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for materials.

D. Material Test Reports: Provide soil and aggregate material test reports and evaluation of compliance from a qualified testing agency as follows:

1. Classification of each on-site or borrow soil proposed for backfill in accordance with ASTM D2487, unless otherwise directed by Engineer.

2. Laboratory compaction curve according to ASTM D698 and ASTM D1557 for each on-site or borrow soil material proposed for fill or backfill.

1.5 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Furnish each material from a single source throughout the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

1.7 SITE CONDITIONS

A. Existing Conditions

1. See Construction Specification Section 02 32 00, Geotechnical Investigations.

PART 2– PRODUCTS

2.1 OWNER-FURNISHED BORROW AREAS

A. None.

2.2 SUBSOIL MATERIALS:

A. Satisfactory Subsoils: Non-plastic soils as defined by ASTM D 2487 soil classification group (Unified Soil Classification System) (GW, GP, SW, SP, GW-GC, SP-SM, GM, GC, SM, and SC); free of rock or gravel larger than 3 inches in any dimension, debris, organic matter, waste, frozen materials, muck, roots, vegetation, and other deleterious matter.

B. Unsatisfactory Subsoils: Plastic soils as defined by ASTM D 2487 soil classification group (such as ML, CL CH, MH, OH, OL and PT); soils which contain rock or gravel larger than 3 inches in any dimension, debris, organic matter, waste frozen materials, vegetation, and other deleterious matter. Unsatisfactory soils also include satisfactory soils not maintained within +/- 3% of optimum moisture content at time of compaction, unless otherwise approved by the Engineer and Geotechnical Engineer.

C. Structural Fill: Material shall be clean soil material with USCS classifications of GW, GM, SW, SP, or SM with a Standard Proctor (ASTM D698) maximum dry density of at least 100 PCF, maximum Liquid Limit of 40, Plasticity Index of 20 or less, less than 3% by weight organic or foreign matter content and no roots greater than 1/4 inch in diameter, and no rocks greater than 3 inches diameter or greater than 30% retained on the 3/4 inch sieve.

2.3 TOPSOIL MATERIALS:

A. Native, imported, or modified soil which is friable in texture and primarily organic in nature, free of subsoil, clumps of clayey soils, rocks, stones, and other objects over 3/4 inch diameter, and without weeds, roots, gravel, and other objectionable material.

2.4 COARSE AGGREGATES:

A. Class #57 Stone: NCDOT Table 1005-1 Aggregate Gradation - Coarse Aggregates for Standard Size #57 and Standard Specifications for Roads and Structures Sections 1005 and 1006.

B. Class #67 Stone: NCDOT Table 1005-1 Aggregate Gradation - Coarse Aggregates for Standard Size #67 and Standard Specifications for Roads and Structures Sections 1005 and 1006.

2.5 RIP RAP:

A. NCDOT Standard Specifications Section 1042 – Rip Rap Materials, Class A, B, 1, or 2 as indicated on the Drawings.

B. Rip Rap shall be in compliance with the North Carolina Erosion and Sediment Control Planning and Design Manual.

2.6 GEOSYNTHETICS

A. Geosynthetics shall be protected from mud, dirt, dust, sunlight, and debris during transport and storage. Material shall be inert to commonly encountered chemicals; resistant to mildew, rot, insects, and rodents; and biologically and thermally stable. Geotextile fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours before or during installation.

B. Soil Stabilization Fabric: NCDOT Standard Specifications for Roadways and Structures Section 1056 – Geosynthetics, for Type 4 soil stabilization fabric. However, provide fabric meeting Geotechnical Engineers recommendations for the application and use intended.

C. Fabric for Subsurface Drains: Non-woven needle-punched fabric shall conform to NCDOT Standard Specifications for Roadways and Structures Section 1056 – Geosynthetics for Type 1 engineering fabric.

PART 3– EXECUTION

3.1 SUBSOIL MATERIALS

A. See Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfill, for installation of subsoil materials.

3.2 TOPSOIL MATERIALS

A. See Construction Specification Section 31 22 00, Grading and Section 31 23 33, Trenching and Backfill, for placement of topsoil.

3.3 AGGREGATES

A. See Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfill, for installation of aggregates for earthwork.

3.4 RIP RAP

A. See Construction Specification Section 31 23 00, Excavation and Fill for installation of rip rap.

3.5 GEOSYNTHETICS

A. The use of geosynthetic materials for subgrade stabilization shall be approved by the Engineer and Geotechnical Engineer.

B. See Construction Specification Section 31 23 00, Excavation and Fill for installation of geosynthetics for earthwork.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clearing

2. Grubbing

3. Removing and disposing of vegetation and debris

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions

1. Clearing: Clearing shall consist in the felling, cutting, removal, and satisfactory disposal of all trees, down timber, brush, rocks, projected roots, stumps, rubbish, and other material within right-of-ways and easements designated for removal to a maximum height of six inches above grade in accordance with these specifications.

2. Grubbing: Grubbing shall consist of the removal of roots 1 1/2 inch and larger, organic matter, debris, stumps, rocks greater than 3 inches in diameter to a minimum depth of 18 inches below grade and the disposal thereof.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

1.4 SITE CONDITIONS

A. Environmental

1. Crossing, disturbing, and encroaching into wetlands and other jurisdictional waters shall be subject to the approval, permitting requirements, and permit conditions of the agencies with jurisdictional oversight, which are USACE, DWR, and in Areas of Environmental Concern, DCM.

2. Before crossing or entering a jurisdictional wetland, verify that a wetlands permit has been obtained and review and comply with the conditions of the permit. Prevent draining or modifying wetlands beyond permitting limits. For permitted disturbances, restore the disturbed areas as indicated in the Contract Documents and permit(s).

3. Before crossing streams or ditches, or working within 50 feet of streams, rivers, ponds, lakes, or Class SA waters, verify that a permit has been obtained and review and comply with the conditions of the permit. Unless otherwise permitted, shown on the Drawings, or exempted by NCDENR, roadways and utilities crossing stream, river, pond, or lake buffers or Class SA water shall be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Do not disturb more than 50 linear feet (longitudinal) of riparian buffer without approval from NCDENR. Review the NCDENR permit for specific requirements.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

3.2 PROTECTION

A. Protection of In-Place Conditions

1. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions.

2. Provide barricades, fences, coverings, or other types of protection necessary to prevent damage to existing improvements, not indicated to be removed, and improvements on adjoining property. All improvements damaged by this work shall be restored to their original condition or to a condition acceptable to the owner or other parties or authorities having jurisdiction.

B. Protection of Existing Improvements:

1. Provide protection necessary to prevent damage to existing improvements not indicated to be removed.

2. Protect improvements on adjoining properties and on Owner's easements.

3. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

C. Protection of Existing Trees and Vegetation:

1. Protect existing trees and other vegetation, which is to remain in place, against unnecessary cutting, breaking, or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. When such damage does occur, all rough edges of scarred areas shall be removed in accordance with accepted horticultural practices. Provide temporary guards to protect trees and vegetation to be left standing.

2. Trees and vegetation designated to remain or outside of the construction limits, shall be repaired or replaced at Contractor’s expense in a manner acceptable to Owner if they are damaged by construction operations. Repair tree damage as directed by a qualified tree arborist.

D. Protection of Drainage Channels

1. Protect vegetation along existing drainage channels unless Drawings indicate those areas to be cleared.

E. Protection of Wetlands and Adjacent Waters

1. Take extensive precautions during construction activities to prevent the release of sediment into wetlands or receiving waters and an increase in turbidity.

F. Implement the Erosion & Sedimentation Control Plan prior to land disturbance other than that required to install erosion and sedimentation control measures. A copy of the approved plan shall be maintained on the site at all times.

3.3 DEMOLITION

A. See Construction Specification Section 02 41 13, Selective Site Demolition for demolition requirements.

B. Demolish and completely remove from the site existing utilities, structures, or surface features indicated on the Drawings to be removed and dispose of off-site. Coordinate with applicable utility companies to shut off services if lines are active.

C. Comply with applicable codes and ordinances concerning demolition operations.

D. The use of explosives will not be permitted.

E. Maintain existing utilities and protect from damage during demolition operations. Do not interrupt existing utilities. Provide temporary services to maintain service except where Contract Documents allow service interruptions.

F. Fill below-grade areas and voids resulting from demolition operations with satisfactory soil materials in accordance with Construction Specification Section 31 23 00, Excavation and Fill, unless further excavation or earthwork is indicated in those areas.

3.4 GENERAL

A. Remove vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on the site or premises as specifically indicated. Removal includes stumps and roots.

B. Carefully and cleanly cut roots and branches of trees not indicated to be removed where such roots and branches obstruct new construction.

C. Clearing Permanent Construction Easements in Wooded Areas: Clear the entire area within the limits of the construction easements unless indicated otherwise. Remove all trees, stumps, root mat, brush, undergrowth, and other material to permit the work to progress in an unobstructed manner.

D. Clearing Permanent Easements in Lawn Areas: Remove existing trees, shrubs, and lawn only to the extent necessary to permit the work to progress in an unobstructed manner. Do not indiscriminately clear vegetation.

E. Clearing Temporary Construction Easements: Clear the area within the limits of the temporary construction easements only to the extent necessary to accomplish the work and protect new construction from future damage.

3.5 CLEARING AND GRUBBING

A. Clear and grub the area within the construction limits as designated on the Drawings, of all trees, stumps, roots, brush, undergrowth, hedges, heavy growth of grasses or weeds, debris and rubbish of any nature that, in the opinion of the Engineer, is unsuitable for foundation material. Nonperishable items that are not deleterious to the project and will be a minimum of 5 feet below the finish elevation of the earthwork or slope of the embankment may be left in place.

B. Clearing consists of the felling and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring within the areas to be cleared. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off a minimum of 6 inches below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

C. In areas designated as selective clearing limits, all trees 6 inches and larger shall remain. All other vegetation shall be removed as specified above.

D. Unless otherwise noted, trees within the construction limits shall become the property of the Contractor and shall be removed from the site.

E. Carefully and cleanly, cut roots and branches of trees indicated to remain where the roots and branches obstruct construction of a proposed utility line. Provide protection for roots and branches over 1 ½ inches diameter that are cut during construction operations. Coat the cut faces with emulsified asphalt, or other coating especially formulated for horticultural use on cut or damaged plant tissues. Temporarily cover all exposed roots with wet burlap to prevent roots from drying out. Provide earth cover as soon as possible.

F. The method of stripping, clearing, and grubbing the site shall be at the discretion of the Contractor. However, all stumps, roots and other debris protruding through the ground surface or in excavated areas shall be completely removed and disposed of off the site.

G. When clearing up to the clearing limits, remove any tree where the roots are cut and the tree could be rendered unstable by the effects of high winds and in danger of toppling into either the right-of-way or onto private property.

3.6 STRIPPIING OF TOPSOIL

A. Remove the existing topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. Strip topsoil in a manner to prevent intermingling with underlying subsoil. The topsoil shall be stored in stockpiles separate from the excavated trench material if the topsoil is to be utilized on site. Otherwise, the topsoil shall be disposed of off-site. Maintain topsoil in accordance with the approved Sedimentation and Erosion Control Plan.

3.7 DISPOSAL

A. Brush, treetops, stumps, debris, and other cleared and grubbed material shall be hauled away and disposed of in accordance with applicable laws and regulations. Clean up debris resulting from clearing operations continuously with the progress of the work. Promptly remove all salvageable material that becomes the property of the Contractor and is not to be reused in construction. Do not sale material on site.

B. Dispose of cleared material in a NCDENR approved and permitted land clearing and inert debris type landfill. The Contractor shall obtain applicable permits and paying fees for the disposal of material.

C. Burning is not permitted on the site.

3.8 PROTECTION OF PAVEMENT

A. Remove debris in a manner that prevents spillage onto pavement.

B. Keep pavement and area adjacent to site clean and free from mud, dirt, dust, and debris.

END OF SECTION

SECTION 31 22 00
GRADING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes

1. Grading

2. Pavement Subbase Course

3. Spreading of Topsoil

B. Related Requirements

1. Construction Specification Section 31 23 00, Excavation and Fill

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions: Not Used

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before grading for locates of existing utilities. Confirm utilities have been located prior to grading.

1.4 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

1.6 SITE CONDITIONS

A. Existing Conditions

1. See Construction Specification Section 02 32 00, Geotechnical Investigations for subsurface data available through Owner.

B. Environmental

1. Crossing, disturbing, and encroaching into wetlands and other jurisdictional waters shall be subject to the approval, permitting requirements, and permit conditions of the agencies with jurisdictional oversight, which are USACE, DWR, and in Areas of Environmental Concern, DCM.

2. Before crossing or entering a jurisdictional wetland, verify that a wetlands permit has been obtained and review and comply with the conditions of the permit. Prevent draining or modifying wetlands beyond permitting limits. For permitted disturbances, restore the disturbed areas as indicated in the Contract Documents and permit(s).

3. Before crossing streams or ditches, or working within 50 feet of streams, rivers, ponds, lakes, or Class SA waters, verify that a permit has been obtained and review and comply with the conditions of the permit. Unless otherwise permitted, shown on the Drawings, or exempted by NCDENR, roadways and utilities crossing stream, river, pond, or lake buffers or Class SA water shall be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Do not disturb more than 50 linear feet (longitudinal) of riparian buffer without approval from NCDENR. Review the NCDENR permit for specific requirements.

PART 2– PRODUCTS

2.1 Provide materials in accordance with Construction Specification Section 31 05 00, Common Results for Earthwork.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

B. Test subsoils, fills, and backfills in accordance with Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfill, prior to beginning grading operations.

C. Verify suitability of existing conditions prior to beginning grading operations. Examine the areas and conditions under which grading and compaction are to be performed and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Install sedimentation and erosion control in accordance with the Drawings, Construction Specification Section 31 25 00, Erosion and Sedimentation Controls, and the Erosion and Sedimentation Control Permit.

B. Vegetated Areas

1. Prior to beginning excavating or embankment operations, perform clearing and grubbing in that area in accordance with Construction Specification Section 31 10 00, Site Clearing.

2. Strip topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. Strip topsoil in a manner to prevent intermingling

with underlying subsoil. The topsoil shall be stored in stockpiles separate from excavated or graded materials if the topsoil is to be utilized on site. Otherwise, the topsoil shall be disposed of off-site. Maintain topsoil in accordance with the approved Sedimentation and Erosion Control Plan.

3. Remove, demolish and dispose of, or relocate existing structures and utilities as indicated on the Drawings and in accordance with Construction Specification Section 02 40 00, Selective Site Demolition and Salvage. Remove, store, and protect structures and incidental items that are not scheduled for demolition or relocation for reinstallation upon completion of pipe installation.

C. Paved areas

1. Remove and dispose of existing pavement, base, and curb and gutter within the limits indicated on the Drawings and in accordance with Construction Specification Section 02 40 00 – Selective Site Demolition and Salvage.

D. Protection

1. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions and Section 31 10 00, Site Clearing.

3.3 SUBSOIL EXCAVATION AND FILL

A. Excavate and fill in accordance with Construction Specification Section 31 23 00, Excavation and Fill.

3.4 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

C. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation.

3.5 COMPACTION

A. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

B. See Construction Specification Section 31 23 00, Excavation and Fill for compaction requirements.

3.6 PAVEMENT SUBBASE COURSE

A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course. See Division 32 Construction Specification Sections for paving requirements.

B. Grade Control: Maintain lines and grades including crown and cross slope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12 inch width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section of thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

E. When a compacted subbase course is shown to be 6 inches thick or less, place material in a single layer. When shown to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness.

3.7 SPREADING OF TOPSOIL

A. Reuse existing topsoil to extent available. Provide and pay for additional topsoil to provide a minimum of six inches of topsoil in the areas to be grassed. Establish graded surfaces sufficiently to accept topsoil blanket and to achieve established grade where additional soil is required. Spread topsoil to a uniform compacted, raked, smooth surface for proposed lawn areas. Compact firmly. Grade and reroll surface free of humps, ruts, or depressions until a smooth satisfactory grade is obtained.

3.8 TOLERANCES

A. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below required subgrade elevations.

2. Walks: Shape surface or areas under walks to line, grade and cross section, with finish surface not more than 0.10 feet above or below required subgrade elevation.

3. Pavements: Shape surface of areas under pavement to line, grade and cross section, with finish surface not more than ½ inch above or below required subgrade elevation.

4. Building Slabs: Provide final grades within a tolerance of ½ inch when tested with a 10 foot straightedge.

3.9 FIELD QUALITY CONTROL

A. Perform field tests and inspections in accordance with Construction Specification Section 31 23 00, Excavation and Fill.

B. Non-Conforming Work

1. If test reports indicate sub-grade or fills have been placed below the specified density, provide additional compaction and testing at no cost to the Owner.

END OF SECTION

SECTION 31 23 00
EXCAVATION AND FILL

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavation for foundations, structures, road construction, parking areas, slabs-on-grade, construction operations, and other Work.

2. Backfilling building perimeter and structures to subgrade elevations.

3. Fills under roads, slabs-on-grade, paving, and over-excavation.

B. Related Requirements

1. For excavation and backfilling of utility trenches, see Construction Specification Section 31 23 33, Trenching and Backfilling.

2. Construction Specification Section 31 23 19, Dewatering.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions

1. Excavation: All material excavated, regardless of its nature or composition, shall be classified as unclassified excavation with the exception of Rock Excavation as defined below. Excavation shall include the removal of all soil, rock not meeting the requirements stated below, rocks of all types, boulders, and all other obstacles encountered and shown to be removed within the limits of excavation shown on the Drawings or specified herein. The cost of excavation shall be included in the appropriate Unit or Lump Sum Bid Price and no additional payment will be made for the removal of obstacles encountered within the excavation limits shown on the Drawings and specified herein.

a. Rock Excavation:

i. Consists of blasting (if necessary) and removal of rock material for the purpose of establishing the required subgrade elevation for pipe trenches, and shall include stockpiling excavated material and subsequent placement or disposal of same.

ii. When rock is encountered, it will be the responsibility of the Contractor to establish the top elevation of rock by test digging with an excavator at not less than 100-foot intervals in the presence of the Engineer. The Engineer shall then establish the top elevation of the rock layer and compute the quantity of material to be classified as rock, and the Contractor shall be paid accordingly.

iii. Rock is defined as material that cannot be removed with a Caterpillar Model 330 hydraulic excavator or equivalent machinery. This classification does not include loose rock,

concrete, cemented gravel, or other materials that can be removed by means other than hoe-ramming or blasting, but for reasons of economy the Contractor chooses to remove said material by hoe-ramming or blasting. Rock does not include boulders smaller than 1 CY in volume.

iv. Authorized rock excavation in pipe trenches shall be limited to a width equal to the pipe diameter plus 3 feet and to a depth of the pipe invert plus 6 inches.

v. Authorized rock excavation for manholes shall be limited to the manhole outer diameter plus 4 feet to a depth of 8 inches below the manhole base.

vi. Excavation of rock beyond limited indicated, as well as remedial work required in connection with such over excavation, shall be at the Contractor's expense.

vii. There shall be no payment for rock excavated if the Engineer has not been notified to prepare measurements and confirm quantities in advance of such excavation.

2. Geotechnical Engineer: A Professional Engineer, licensed in the state in which the Work is performed, with engineering expertise in the analysis, design, and construction of foundations, slopes, retaining structures, embankments, tunnels, levees, wharves, landfills, and other systems that are made of or supported by soil or rock. The Geotechnical Engineer is the Professional hired by the Contractor, Owner, or Engineer as applicable.

3. Unauthorized Excavation: Consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction by the Resident Project Representative. Unauthorized excavation, as well as remedial work directed by Resident Project Representative, shall be at Contractor's expense. Backfill and compact unauthorized excavations as specified for authorized of same classification, unless otherwise directed by Resident Project Representative.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before grading for locates of existing utilities. Confirm utilities have been located prior to grading.

B. Preconstruction Meeting: Attend prior to mobilization, clearing, excavating, or grading.

C. Sequencing

D. Scheduling

1.4 ACTION SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Provide submittals for materials in accordance with Construction Specification Section 31 05 00, Common Results for Earthwork.

1.5 INFORMATIONAL SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan. Prepare under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

1.6 CLOSEOUT SUBMITTALS

A. Record Documentation: Accurately record as-built elevations and slope gradients.

1.7 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

C. Furnish each material from a single source throughout the Work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

1.9 SITE CONDITIONS

A. Existing Conditions

B. Environmental:

1. Crossing, disturbing, and encroaching into wetlands and other jurisdictional waters shall be subject to the approval, permitting requirements, and permit conditions of the agencies with jurisdictional oversight, which are USACE, DWR, and in Areas of Environmental Concern, DCM.

2. Before crossing or entering a jurisdictional wetland, verify that a wetlands permit has been obtained and review and comply with the conditions of the permit. Prevent draining or modifying wetlands beyond permitting limits. For permitted disturbances, restore the disturbed areas as indicated in the Contract Documents and permit(s).

3. Before crossing streams or ditches, or working within 50 feet of streams, rivers, ponds, lakes, or Class SA waters, verify that a permit has been obtained and review and comply with the conditions of the permit. Unless otherwise permitted, shown on the Drawings, or exempted by NCDENR, roadways and utilities crossing streams, rivers, ponds, lake buffers, or Class SA water shall be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Do not disturb more than 50 linear feet (longitudinal) of riparian buffer without approval from NCDENR. Review the NCDENR permit for specific requirements.

PART 2 – PRODUCTS

2.1 MATERIALS: Provide materials in accordance with Construction Specification Section 31 05 00, Common Results for Earthwork.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

B. Verify suitability of existing conditions prior to beginning excavation and fill operations. Examine the areas and conditions under which excavation, backfilling, filling, and compaction are to be performed and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Install sedimentation and erosion control in accordance with the Drawings, Construction Specification Section 31 25 00, Erosion and Sedimentation Controls, and the Erosion and Sedimentation Control Permit.

B. Vegetated Areas

1. Prior to beginning excavating or embankment operations, perform clearing and grubbing in the area in accordance with Construction Specification Section 31 10 00, Site Clearing.

2. Strip topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. Strip topsoil in a manner to prevent intermingling with underlying subsoil. The topsoil shall be stored in stockpiles separate from excavated or graded materials if the topsoil is to be utilized on site. Otherwise, the topsoil shall be disposed of off-site. Maintain topsoil in accordance with the approved Sedimentation and Erosion Control Plan.

3. Remove, demolish, and dispose of, or relocate existing structures and utilities as indicated on the Drawings and in accordance with Construction Specification Section 02 40 00, Selective Site Demolition. Remove, store, and protect structures and incidental items that are not scheduled for demolition or relocation for reinstallation upon completion of pipe installation.

C. Paved areas

1. Remove and dispose of existing pavement, base, and curb and gutter within the limits indicated on the Drawings and in accordance with Construction Specification Section 02 40 00, Selective Site Demolition.

D. Protection

1. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions and Section 31 10 00, Site Clearing.

2. Underpin adjacent structures which may be damaged by excavation work.

3. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards caused by earthwork operations.

5. Provide traffic control in accordance with Construction Specification Section 01 55 00, Temporary Facilities and Control.

6. Comply with Owner and NCDOT requirements when working within or adjacent to roads within their respective jurisdictions.

3.3 EXCAVATION

A. Excavate subsoil in accordance with the lines and grades provided on the Drawings and as specified in the Contract Documents.

B. Excavate subsoil to accommodate foundations, structures, road construction, parking areas, slabs-on-grade, construction operations, and other Work. Allow sufficient width for construction, installation of forms, and inspection.

C. Excavations shall be made in the dry. Provide dewatering in accordance with Construction Specification Section 31 23 19, Dewatering.

D. The bottom of all excavations for structures and pipes shall be examined by the Geotechnical Engineer for bearing value and the presence of unsuitable material. Dewater to a minimum of one foot below the bottom of excavations prior to determination of suitability of soils. If, in the opinion of the Engineer, additional excavation is required due to the low bearing value of the subgrade material, or if the in-place soils are soft, yielding, pumping, and wet as determined by the Engineer, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill or crushed stone as directed by the Engineer. Payment for such additional Work ordered by the Engineer shall be made as an extra by a Change Order in accordance with the General Conditions and Division 1 Construction Specification Sections or by unit price if applicable. No payment will be made for subgrade disturbance caused by inadequate dewatering or improper construction methods.

E. Excavate to allow structures to bear on an aggregate base 6 inches deep, or deeper if otherwise shown.

F. Slope excavation walls to maintain safe conditions and prevent slides or provide bracing and shoring as required. Excavation slopes shall be flat enough to avoid slides that will cause disturbance of the subgrade or damage of adjacent areas.

G. Sheeting and Bracing

1. Contractor shall furnish, place, and maintain sheeting and bracing as necessary to support sides of excavation and structures from possible damage and to provide safe working conditions. If the Owner is of the opinion that sufficient or proper supports have not been provided, he may order additional supports put in at the expense of Contractor. Contractor shall be responsible for the adequacy of all sheeting and bracing and for all damage resulting from sheeting and bracing failure or from placing, maintaining, and removing sheeting and bracing.

2. Contractor shall exercise caution in the installation and removal of sheeting to ensure that excessive or unusual loadings are not transmitted to any new or

existing structure. Contractor shall promptly repair at his expense damage resulting from sheeting and bracing installation and removal.

3. Remove sheeting and bracing upon completion of the Work except where indicated on the Drawings to remain. Sheeting and bracing left in place shall be cut off at least two feet below the finished ground surface or as directed by the Engineer.

H. Contractor shall intercept and collect surface runoff both at the top and bottom of cut slopes. The intersection of slopes with natural ground surfaces, including the beginning and ending of cut slopes, shall be uniformly rounded as shown on the Drawings or as required by the Engineer.

I. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

J. Excavate to working elevation for piling work.

K. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity.

L. Do not interfere with 45 degree bearing splay of foundations.

M. Grade top perimeter of excavation to prevent surface water from draining into excavation.

N. Trim excavation. Remove loose matter.

O. Notify Engineer of unexpected subsurface conditions.

P. Correct over-excavated areas with structural fill as directed by Engineer.

Q. Suitable material removed during excavation shall be used as far as practicable in the formation of embankments, subgrades, and shoulders, and at other places as indicated on the Drawings or by the Engineer. No excavation shall be wasted except as permitted by the Engineer.

R. Suitability of excavated materials will be determined by the testing firm or Engineer. Contractor shall dispose of unsuitable materials off-site.

S. Where suitable materials containing excessive moisture are encountered above grade in cuts, the Contractor shall construct above grade ditch drains prior to the excavation of the cut material when, in the opinion of the Engineer, such measures are necessary to provide proper construction.

T. Stockpile excavated subsoil on site for future use and protect from erosion. Remove excess and unsuitable material from site.

3.4 FILL

A. Examination

1. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

2. Verify structural ability of unsupported walls to support loads imposed by fill.

B. Preparation

1. Compact subgrade to density requirements for subsequent backfill materials.

2. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural or granular fill as required by the Engineer and compact to density equal to or greater than requirements for subsequent fill material.

3. Scarify subgrade surface to depth of 12 inches.

4. Proof roll exposed sub-grade with tandem-wheeled dump truck with a minimum weight of 25 tons once finished grades have been established. A representative of the soils testing firm shall be present for proof rolling. Fill areas that have been cleared and grubbed shall be proof rolled as well.

5. If unsuitable bearing material is encountered, excavate to undercut poor soils as directed by the Geotechnical Engineer and Engineer and replace with suitable material. Payment to Contractor shall be by Change Order unless Unit Prices for over-excavation or undercut is provided for on the Bid Form.

C. Backfilling

1. Backfill excavations as promptly as work permits, but not until completion of the following:

   a. Construction below finish grade.

   b. Recording locations of pipe and appurtenances.

   c. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven to remain below bottom of structures or remove in manner to prevent settlement of the structure or utilities. All sheeting supports that pass through structures shall be removed.

   d. Removal of trash and debris.

2. Backfill areas to contours and elevations with unfrozen materials.

3. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

4. Place geotextile fabric over structural or granular fill prior to placing next lift of fill.

5. Place material in continuous layers as follows:

   a. Subsoil Fill: Maximum 8 inches compacted depth.

   b. Granular Fill: Maximum 6 inches compacted depth.

6. Structural Fill

   a. Maintain positive drainage throughout subgrade preparations from all structural foot prints, including areas under and within 10 feet of structure foot prints and under and within 5 feet of pavements,

   b. Seal fill material surface with smooth drum roller prior to precipitation events to enhance drainage and protect fill material.

c. Place Structural Fill as follows:

i. Place material in loose lift thickness of 8” maximum depth.
ii. Soil moisture content at time of compaction shall be within 3% of the optimum moisture content.

7. Employ placement method that does not disturb or damage other work.

8. Maintain optimum moisture content of backfill materials to attain required compaction density.

9. Backfill against supported foundation walls.

10. Backfill simultaneously on each side of unsupported foundation walls until supports are in place. Do not backfill against one side of unsupported foundation walls.

11. Slope grade away from building at a minimum 2 percent slope for minimum distance of 10 feet, unless noted otherwise.

12. Make gradual grade changes. Blend slope into level areas.

13. Remove surplus backfill materials from site.

14. Leave fill material stockpile areas free of excess fill materials.

D. Borrow

1. Borrow shall not be used until all suitable, on-site, excavated material has been placed and approval has been obtained from the Engineer.

2. Unless otherwise designated in the Contract Documents, Contractor shall make arrangements for obtaining subsoil borrow material and pay all costs involved. If Contractor places more borrow than is required and causes a waste of excavation, the amount of waste will not be included for payment.

3.5 COMPACTION

A. General: Control soil compaction during construction. Provide minimum percentage of density specified for each area classification.

B. Compaction Methods: Vary method of compaction with the nature of the soils encountered. Provide sufficiently diversified equipment to obtain optimum compaction regardless of the nature of the soil. Methods include, but are not limited to, mechanical or pneumatic tamps, vibrating rollers, flooding in conjunction with poling with immersion type vibrators, or water jetting and vibrator. The method of compaction and the equipment used shall be appropriate for the material to be compacted and shall not transmit damaging shocks to structures or pipe. At no time shall the Contractor use the bucket of the backhoe or similar equipment to achieve compaction.

C. Percentage of Maximum Density Requirements: provide not less than the following percentages of maximum dry density, determined in accordance with AASHTO T99:

1. Structural Slabs: Compact each layer of backfill or fill material at 95% maximum dry density except that the top 12 inches shall be compacted to 98% maximum dry density.

2. Pipes and Related Structures: Backfill and compact trenches in uniform layers to one foot above the crown of the pipe to 95% maximum dry density. Backfill from one foot above the crown of the pipe to finish grade as required for the area classification or to 95% maximum dry density.

3. Lawn or Unpaved Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material at 90% maximum dry density.

4. Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material at 95% maximum dry density or 90% relative dry density.

5. Pavements: Compact top 12 inches of subbase and each layer of backfill or fill material at 98% maximum dry density.

6. Crushed Aggregate Base Course: Compact top 12 inches of subgrade and each 4 inch layer of crushed aggregate base course material to 100% maximum dry density.

D. Moisture Control:

1. Where subgrade or layer of soil material must be moisture-conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water from appearing on surface during or subsequent to compaction operations.

2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Removal, manipulation, aeration, replacement, and re-compaction of suitable materials necessary to obtain the required density shall be considered as incidental to the construction operations, and shall be performed at no additional cost to the Owner.

3. Soil material that has been removed because it is too wet to permit compaction shall be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.6 PLACEMENT OF SOIL STABILIZATION FABRIC

A. Placement of soil stabilization fabric shall conform to the requirements of Section 270 – Geotextile for Soil Stabilization of the NCDOT Standard Specifications for Roadways and Structures and in accordance with the recommendations of the Geotechnical Engineer for the application and use intended.

3.7 RIP RAP

A. Grade locations for rip rap as shown in the plans. Use filtration geotextiles under rip rap when shown in the Drawings and as directed. Do not leave geotextiles exposed for more than 7 days before covering with rip rap. Place filtration geotextiles on surfaces free of obstructions, debris, and soft pockets.

B. Overlap adjacent geotextiles at least 18 inches in the downhill and downstream direction to prevent flow from lifting the edge of the top geotextile. Place filtration geotextiles in slight tension free of kinks, folds, wrinkles, or creases. Use wire staples or anchor pins as needed to hold geotextiles in place until covered. Do not displace or damage filtration geotextiles while placing rip rap. Replace any damaged geotextiles to the satisfaction of the Engineer.

C. For rip rap at pipe outlets, place rip rap immediately after installing pipes. When rip rap is required for channel changes and drainage ditches, place rip rap before diverting water into channels and ditches.

D. Place rip rap such that the smaller stones are uniformly distributed throughout rip rap. Install rip rap with mechanical methods and, if necessary, by hand to form a well-graded, dense, and neat layer.

3.8 TOLERANCES

A. Finish surfaces free from irregular surface changes as follows:

1. Lawn or unpaved areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.

2. Walks: Shape surface or areas under walks to line, grade, and cross section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

3. Pavements: Shape surface of areas under pavement to line, grade and cross section, with finish surface not more than 1/2 inch above or below required subgrade elevation.

4. Building slabs: Provide final grades within a tolerance of 1/2 inch when tested with a 10 foot straightedge.

3.9 FIELD QUALITY CONTROL

A. Field Tests and Inspections

1. Contractor shall be responsible for scheduling and coordinating soils testing with the Geotechnical Engineer and Engineer.

2. Perform the following tests for each material used. Provide additional tests for each source change.

a. Fill and Backfill Material Testing: Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits and standard proctor AASHTO T99 and ASTM D 698 for moisture density relations. Perform one density curve for each soil type used.

b. Select Material Testing: Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits and ASTM D 698 for moisture density relations. Perform one density curve for each soil type used.

c. Density Tests: Test density in accordance with ASTM D 1556 or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already tested in accordance with ASTM D 2922 and ASTM D 3017 as specified herein. Perform an ASTM D 1556 density test at the start of the job and for every 10 ASTM D 2922 and ASTM D 3017 density tests thereafter.

i. Test each lift at randomly selected locations every 1,500 linear feet in each lift for bedding and backfill in trenches under pavement.
ii. Test each lift at randomly selected locations every 3,000 linear feet in each lift for bedding and backfill in trenches not-under pavement.
iii. Test subgrade at each structure at randomly selected locations determined by testing firm. When fill is placed under structures, test every 2,500 square feet per lift or at least 2 tests per lift at randomly selected locations at each structure.
iv. Test embankments for each 500 cubic yards placed.

B. Non-Conforming Work

1. If test reports indicate sub-grade or fills have been placed below the specified density, provide additional compaction and testing at no cost to the Owner.

3.10 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

D. Protect sub-grade and satisfactory stock piles from freezing and degradation from rainfall or area run-off.

E. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 31 23 19
DEWATERING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary dewatering and surface water control systems for open excavations, trenches, bored crossings, and tunnels.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions

1. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

2. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1. Dewatering in the NCDOT Right-of-Way: Provide submittals to NCDOT as requested and comply with NCDOT standards and requirements.

2. Railroad Right-of-Ways: Provide submittals to Railroad Owner as requested and comply with Railroad standards and requirements.

3. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before digging for locates of existing utilities. Confirm utilities have been located prior to excavating.

B. Sequencing and Scheduling

1. Sequence and schedule the Work to allow sufficient time for dewatering prior to construction operations. Additional time will not be allowed due to delays resulting from dewatering.

1.4 QUALITY ASSURANCE

A. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

B. When Owner permits do not cover discharge of water, obtain permit from EPA under National Pollutant Discharge Elimination System (NPDES), for storm water discharge from construction sites.

C. Furnish standby equipment stored at Project site and ready for immediate use upon failure of dewatering equipment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

1.6 SITE CONDITIONS

A. See Construction Specification Section 02 32 00, Geotechnical Investigations for subsurface data available through Owner.

1.7 WARRANTY OR BONDS

A. Bonds

1. Provide bonds as directed by NCDOT or railroad entities related to dewatering within their right-of-ways.

PART 2– PRODUCTS

2.1 DEWATERING EQUIPMENT

A. Select dewatering equipment to meet specified design and performance requirements.

2.2 ACCESSORIES

A. Provide accessories to meet specified design and performance requirements.

B. Valves and Fittings: Furnish valves and fittings to isolate each well from header pipe and to prevent loss of pump prime.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

3.2 PREPARATION

A. Identify discharge location prior to installation of dewatering equipment and confirm existing permits are sufficient or obtain additional permits as necessary.

3.3 GENERAL

A. Provide dewatering and surface water control systems to permit the Work to be completed on dry and stable subgrade.

B. Excavation to subgrade, placement of bedding, pipe and structure installation and backfilling shall be performed in the dry.

C. No pipe shall be constructed in water and water shall not be allowed to drain through the pipe. The open end of the pipe shall be kept closed with a tight fitting plug to prevent washing of any foreign matter into the line.

D. No structure shall be constructed in water and water shall not be allowed to flow over or rise upon any concrete masonry structure until the work has been accepted.

E. Where underground streams or springs are encountered, provide temporary drainage, well pointing, or bailing. Notify the Engineer of such conditions immediately.

F. Locate dewatering system components to allow continuous dewatering operations without interfering with installation of permanent Work and existing public rights-of-way, sidewalks, and adjacent buildings, structures, and improvements.

G. Install dewatering systems in accordance with City, State, and Federal agency requirements.

3.4 SURFACE WATER

A. Control surface runoff and prevent entry or accumulation of water in excavations. Do not use excavated trenches as temporary drainage ditches. Install a dewatering system to keep subgrades dry and convey ground water away from excavations.

B. Prevent surface water from ponding on prepared subgrades and from flooding project site and the surrounding area. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation. Reroute surface water runoff away from or around excavated areas.

3.5 GROUND WATER

A. When ground water is encountered in trenches or pits, furnish, install and operate necessary machinery, appliances, and equipment to remove the water that accumulates by pumping, bailing, well-pointing, or other approved dewatering method, to the satisfaction of the Engineer. The Contractor shall perform work necessary to keep the trenches and pits entirely clear from water while bedding is being placed, the pipe is being laid, masonry units are being placed, and structures are either being set or constructed.

B. Installed and operate dewatering systems so that the ground water level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. Before dewatering is started, obtain the approval of the Engineer for the method, installation and operation of the dewatering system.

C. Maintain the dewatering system until no longer required. Release groundwater to its static level in such a manner to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted fill or backfill, and prevent flotation or movement of any structures, pipelines and sewers.

3.6 SYSTEM OPERATION AND MAINTENANCE

A. Operate dewatering system continuously until backfill is minimum 4 feet above normal ground water table elevation.

B. Conduct daily observation of dewatering system and monitoring system. Make required repairs and perform scheduled maintenance.

C. Fill fuel tanks before tanks reach 25 percent capacity.

D. When dewatering system cannot control water within excavation, notify the Engineer and stop excavation work. Supplement or modify dewatering system and provide other remedial measures to control water within excavation. Demonstrate dewatering system operation complies with performance requirements before resuming excavation operations.

E. Modify dewatering and surface water control systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.

F. Correct unanticipated pressure conditions affecting dewatering system performance.

3.7 DISPOSAL

A. Surface water and water removed from the trench or excavations shall be conveyed in a proper manner to a suitable point of discharge and shall comply with applicable erosion and sediment control laws as well as applicable stormwater regulations.

B. Dispose of surface and ground water in such a manner to cause no injury to public health, public or private property, Work completed or in progress, street surfaces, or which may cause any interference with the use of the streets. Water, if odorless and sediment free, may be discharged into an existing storm drain, channel, or street gutter in a manner approved by the Owner. When water is not odorless and sediment free, a means shall be provided for desilting (filtering) the water before discharge. Under no circumstances shall water be discharged to a sanitary sewer.

3.8 SYSTEM REMOVAL

A. Remove or abandon all dewatering system components in accordance with City, State, and Federal requirements. Abandon dewatering system components only when approved by Owner, and right-of-way, easement, and property owner.

END OF SECTION

SECTION 31 23 33
TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities.

2. Backfilling and compaction.

B. Related Requirements

1. Construction Specification Section 31 23 19, Dewatering.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions

1. Backfill

a. Initial Backfill: Soil or aggregate materials placed in an excavated trench from the pipe springline to a point 12 inches above the top of the pipe.

b. Final Backfill: Soil or aggregate materials placed in an excavated trench from the initial backfill to finished grade.

c. Select Backfill: Select backfill shall consist of approved material imported from off-site for use as backfill. Select backfill shall not be used until all suitable trench excavation material has been placed in the trench, unless authorized by the Resident Project Representative. Unless otherwise designated on the Drawings and in the contract documents, the Contractor shall make his own arrangements for obtaining select backfill borrow and pay all costs involved.

2. Bedding: Soil or aggregate materials placed in an excavated trench from the subgrade/foundation to the base of the pipe.

3. Borrow: Fill material hauled in from off-site that has been approved by the Engineer.

4. Competent Person: As defined by 29 CFR 1926.32(f): “one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.”

5. Foundation: Soil or aggregate materials placed in an excavated trench below the subgrade where undercut excavation has been performed.

6. Geotechnical Engineer: A Professional Engineer, licensed in the state in which the Work is performed, with engineering expertise in the analysis, design and construction of foundations, slopes, retaining structures, embankments, tunnels,

levees, wharves, landfills and other systems that are made of or are supported by soil or rock. The Geotechnical Engineer is the Professional hired by the Contractor, Owner, or Engineer as applicable.

7. Haunching: Soil or aggregate materials placed from the pipe invert (top of bedding) to the springline of the pipe.

8. Pipe Embedment: The area around a pipe in an excavated trench which includes the bedding, haunching, and initial backfill as depicted in ASTM D 2321.

9. Springline: The midpoint or horizontal centerline elevation of the pipe.

10. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

11. Subgrade: Surface or elevation remaining after completing the trench excavation or, the top surface of the backfill (stone or soil) immediately below the pipe conduit or pipe bedding, as applicable.

12. Topsoil: Native, imported, or modified soil which is friable in texture and primarily organic in nature, free of subsoil, clumps of clayey soils, rocks, stones, and other objects over 3/4 inch diameter, and without weeds, roots, gravel, and other objectionable material.

13. Undercut Excavation: Removal and satisfactory disposal of all unsuitable material located below subgrade elevation performed only at the direction of the Resident Project Representative. Unauthorized undercut excavation, as well as remedial work directed by Resident Project Representative, shall be at Contractor's expense.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before grading for locates of existing utilities. Confirm utilities have been located prior to excavating.

B. Preconstruction Meeting: Attend prior to mobilization, clearing, excavating, or grading.

1.4 ACTION SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Provide submittals for materials in accordance with Construction Specification Section 31 05 00, Common Results for Earthwork.

C. Dewatering Plan: In accordance with Construction Specification Section 31 23 19, Dewatering.

1.5 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

C. Qualifications

1. A Certified Competent Person designated by the Contractor shall be on-site at all times when excavation or pipe installation is being conducted.

D. Furnish each material from a single source throughout the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

1.7 SITE CONDITIONS

A. Environmental

1. Crossing, disturbing, and encroaching into wetlands and other jurisdictional waters shall be subject to the approval, permitting requirements, and permit conditions of the agencies with jurisdictional oversight, which are USACE, DWR, and in Areas of Environmental Concern, DCM.

2. Before crossing or entering a jurisdictional wetland, verify that a wetlands permit has been obtained and review and comply with the conditions of the permit. Prevent draining or modifying wetlands beyond permitting limits. For permitted disturbances, restore the disturbed areas as indicated in the Contract Documents and permit(s).

3. Before crossing streams or ditches, or working within 50 feet of streams, rivers, ponds, lakes, or Class SA waters, verify that a permit has been obtained and review and comply with the conditions of the permit. Unless otherwise permitted, shown on the Drawings, or exempted by NCDENR, roadways and utilities crossing stream, river, pond, or lake buffers or Class SA water shall be as near perpendicular as possible (the crossing is considered to be perpendicular if it intersects the stream or surface water between an angle of 75 and 105 degrees). Do not disturb more than 50 linear feet (longitudinal) of riparian buffer without approval from NCDENR. Review the NCDENR permit for specific requirements.

PART 2– PRODUCTS

2.1 SOIL AND AGGREGATE MATERIAL CLASSIFICATIONS FOR FOUNDATION, EMBEDMENT, AND BACKFILL

A. Materials listed herein include aggregates classified in accordance with NCDOT Standard Specifications Section 1005 and soils classified in accordance with the Unified Soil Classification System (ASTM Method D 2487 and D 2488.)

B. Class of embedment and backfill materials: In accordance with ASTM D 2321.

2.2 SOIL AND AGGREGATE MATERIALS

A. Acceptable use of soils and aggregates for foundation, embedment, and backfill shall be in accordance with ASTM D 2321.

B. Foundation/Stabilization Stone: NCDOT Class 57 or 67 stone or ASTM D 2321 Class 1.

C. Bedding: In accordance with the pipe embedment/laying condition type.

D. Haunching: In accordance with the pipe embedment/laying condition type.

E. Initial Backfill: In accordance with the pipe embedment/laying condition type.

F. Final Backfill: Material shall be ASTM D 2321 Class II, III, or IV-A soils (GW, GP, SW, SP, GM, GC, SM, SC, ML, CL), or a combination of these; free of rock or gravel greater than 3 inches in any dimension, debris, waste, frozen materials, vegetation, or any other deleterious matter from on-site excavations.

G. Select Backfill: Material shall be clean soil material with USCS classifications of GW, GM, SW, SP, or SM with a Standard Proctor (ASTM D698) maximum dry density of at least 100 PCF, maximum Liquid Limit of 40, Plasticity Index of 20 or less, less than 3% by weight organic or foreign matter content and no roots greater than 1/4 inch in diameter, and no rocks greater than 3 inches in diameter or greater than 30% retained on the 3/4 inch sieve. Material shall also meet the requirements of NCDOT Class III, Type 2 Select Material as specified in Section 1016 of the NCDOT Standard Specifications for Roads and Structures and be approved by NCDOT prior to use when used within NCDOT roadways.

H. Flowable Fill: See Construction Specification Section 03 00 00, Concrete.

I. Borrow: Material approved by the Engineer from an off-site source.

J. Topsoil: Obtained on-site or from an off-site source.

2.3 PIPE EMBEDMENT / LAYING CONDITION TYPES

A. Pressure Pipelines

1. DI Pipe

a. 12-inch diameter and less where concrete blocking is used for restraint: Type 1 unless indicated otherwise on the Drawings.

b. 14-inch diameter and greater or where mechanical restraint is used: Type 4 or 5 as indicated on the Drawings with pressure class as indicated on the Drawings.

2.4 GEOSYNTHETIC MATERIALS

A. See Construction Specification Section 31 05 00, Common Work Results for Earthwork for geosynthetic material specifications.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

B. Verify suitability of existing conditions prior to beginning excavation and backfill operations. Examine the areas and conditions under which excavation, backfilling, and compaction are to be performed and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Install sedimentation and erosion control in accordance with the Drawings, Construction Specification Section 31 25 00, Erosion and Sedimentation Controls, and the Erosion and Sedimentation Control Permit.

B. Vegetated Areas

1. Perform clearing and grubbing in accordance with Construction Specification Section 31 10 00, Site Clearing.

2. Strip topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. Strip topsoil in a manner to prevent intermingling with underlying subsoil. The topsoil shall be stored in stockpiles separate from excavated or graded materials if the topsoil is to be utilized on site. Otherwise, the topsoil shall be disposed of off-site. Maintain topsoil in accordance with the approved Sedimentation and Erosion Control Plan.

3. Remove, demolish and dispose of, or relocate existing structures and utilities as indicated on the Drawings and in accordance with Construction Specification Section 02 40 00, Selective Site Demolition. Remove, store, and protect structures and incidental items that are not scheduled for demolition or relocation for reinstallation upon completion of pipe installation.

C. Paved areas

1. Remove and dispose of existing pavement, base, and curb and gutter within the limits indicated on the Drawings and in accordance with Construction Specification Section 02 40 00, Selective Site Demolition.

D. Protection

1. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions and Section 31 10 00, Site Clearing.

2. Underpin adjacent structures which may be damaged by excavation work.

3. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards caused by earthwork operations.

5. Provide traffic control in accordance with Construction Specification Section 01 55 00, Temporary Facilities and Control.

6. Comply with Owner and NCDOT requirements when working within or adjacent to roads within their respective jurisdictions.

3.3 MINIMUM PIPE COVER

A. Comply with local authorities having jurisdiction.

B. Minimum cover from top of pipe to proposed finished grade shall be 36 inches unless shown otherwise in the Contract Documents. Where the minimum cover cannot be provided, install DI pipe or encase the pipe in concrete as directed by the Engineer.

3.4 TRENCHING

A. Trenching shall be performed in accordance with OSHA Standard 29 CFR Part 1926, OSHA Subpart P “Excavation and Trenching.”

B. Accomplish trenching with equipment suitable for utility installation. Excavate trenches as required to install pipes to the lines and grades indicated on the Drawings.

C. Trenches for water mains may be curved within the limits of curvature of the pipe and allowable deflection angles. The trench alignment shall not exceed the allowable vertical or horizontal pipe deflection recommended by the pipe manufacturer.

D. Trench width

1. The width of the trench at the top of the pipe shall be a width that will permit the proper construction of joints and compaction of backfill around the pipe and shall be equal to the largest outside diameter of the pipe plus 12 inches on each side of the pipe, measured at the top of the pipe.

2. Every effort shall be made to maintain the width of the pipe plus 24 inches; however, the trench width must be wide enough to provide adequate space for laying and joining pipe and appurtenances. Sufficient space shall be allowed at the joints for the free use of wrenches for tightening of bolts.

3. The minimum trench width should generally be no less than 36 inches in order to accommodate a “Rammax” type tamp.

E. The sides of the trenches shall be uniform and vertical. Vertical walls shall project at least 2 feet above the top of the pipe unless the height to finished grade is less than 2 feet. Decreasing the trench wall height may require a change in pipe material, pipe embedment or laying condition.

F. Use of boards or other materials to jack up or support the pipe will not be permitted.

G. Excavated Material

1. Place excavated material:

a. Away from the roadway.

b. A minimum of 2 feet from the edge of excavation.

c. In a manner that will not endanger the work and that will provide access at all times to all parts of the trench.

d. To provide access at all times to fire hydrants, and gate valves located in the vicinity of the Work.

e. To minimize inconvenience to the public to the greatest extent practicable.

2. Stockpiling excavated material adjacent to the trench in a manner to prevent surcharging and potentially rendering the excavation unstable.

3. Evaluate excavated material for acceptability as trench backfill. Separate material that is acceptable for initial backfill and reserved for that use. Separate material that is acceptable for final backfill and reserved for that use.

4. Material that does not meet the requirements for backfill shall be considered unsuitable material. Unsuitable material shall be removed from the project site and disposed of in accordance with applicable laws and ordinances at the Contractor's expense.

5. Where removal of unsatisfactory material results from inadequate shoring or bracing, failure to dewater, improper material storage exposing it to rain or flooding, or other types of failure to meet Contract Documents, the work shall be performed at no additional cost to the Owner. If additional material is required to replace this material, supply it from an approved borrow site at no additional cost to the Owner.

6. Excess material shall be removed from project site and disposed at the Contractor's expense.

H. Once the trench has been excavated, proceed immediately to prepare the subgrade, place the bedding, install the pipe, and backfill the excavation. Excavating, pipe laying, and backfilling shall move forward at approximately equal rates of progress. Contractor shall excavate only as much trench as he can completely install pipe, backfill, compact, and cleanup within that working day. String out only the amount of pipe that can be installed in one day.

I. Trenches shall not be left open without proper supervision during working hours or steel plating completely covering the excavation. Prepare for and schedule the work so that trenches are not left open for a longer period of time than is reasonably necessary as determined by the Engineer.

J. Protect excavation bottoms from freezing when the atmospheric temperature is less than 35 degrees F.

K. Conduct the work to insure that solids and mud are contained within the trench and to ensure that solids and mud do not enter the existing system.

3.5 CHANGE OF TRENCH LOCATION

A. If the Engineer directs that the location of a trench be changed from that shown on the Drawings to a relatively similar location as determined by the Engineer, or if a changed location shall be authorized upon Contractor's request, Contractor shall not be entitled to extra compensation or to a claim for damage, provided that the change is made before the excavation is begun. If the change is made at the direction of the Engineer involves the abandonment of excavation already made, the abandoned excavation will be paid for as additional excavation. Backfill in this case shall be a negotiated extra work item. In the event that the trench is abandoned in favor of a new location at the Contractor's request, the abandoned excavation and backfill shall be at the Contractor's expense. Backfill shall conform to the requirements of this Section.

3.6 TRENCHING IN FILLS

A. In areas where trenching for pipes will be in fills, the fills shall be brought to an elevation of at least 12 inches above the top of the pipe and compacted. The trench shall be excavated in the compacted fill as specified in this section.

3.7 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be in accordance with the requirements for trenches.

B. Excavate to minimum depth of 6 or 8 inches below the required bottom elevation of the structure as indicated in the details for placement of bedding.

C. Excavate to provide a minimum of 2 feet of horizontal clearance between the outer surface of the structure and the trench wall.

3.8 EXCAVATION FOR THRUST BLOCKING

A. Excavate area to receive poured in place concrete blocking to dimensions shown in the details. Blocking shall be placed in undisturbed residual soils.

3.9 PITS FOR TRENCHLESS INSTALLATIONS

A. Pits for trenchless installations shall be excavated and maintained in accordance with the requirements for trenches.

B. Pits shall not be left open without proper supervision during working hours or without steel plating completely covering the excavation after the work has been completed for the day. Prepare for and schedule the work so that pits are not left open for a longer period of time than is reasonably necessary as determined by the Engineer.

3.10 SHEETING AND BRACING

A. Where conditions permit, trench walls may have vertical sides up to a maximum depth as allowed by OSHA. Above this depth, either the entire trench wall shall be laid back in accordance with OSHA requirements, a trench box shall be used that is certified for the trench depth, or the trench shall be sheeted and braced in accordance with OSHA requirements. Furnish, install, and maintain sheeting, bracing, shoring, etc. as required to safely support the sides of the trenches.

B. Trenches in proximity to structures shall be sheeted and braced to prevent settlement or other disturbance of those structures.

C. Trenches and other excavations shall be properly sheeted and braced where necessary to accomplish the following:

1. Keep excavations within the easement and right-of-way limits, or other limits shown on the Drawings

2. Prevent shifting of materials resulting in damage to pavements, structures, pipe and utilities

3. Provide safe working conditions

D. All sheeting shall be in designed and installed in accordance with OSHA requirements, State law, and local ordinances.

E. Contractor shall be responsible for the adequacy of sheeting and bracing, for damage resulting from sheeting and bracing failure, and for placement, maintenance and removal.

F. Furnishing, placing, maintaining, and withdrawing sheeting where required shall be included in the Unit Price of the pipe or structure, and no additional payment will be made.

G. Submit detailed plans of sheeting and bracing. If the Owner is of the opinion that sufficient or proper supports have not been provided, or that additional areas must be sheeted and braced, he may order additional supports or sheeting and bracing to be installed at the expense of the Contractor.

H. All sheeting and bracing in excavations shall be withdrawn as the backfilling is performed, unless indicated otherwise on the Drawings. Where sheeting and bracing is to be removed, it shall be carefully pulled to prevent damage to the pipe or structure. Voids remaining after sheeting has been pulled shall be filled with suitable material as approved by the Engineer. The Owner may order the whole or a part of sheeting and bracing to be left in place or he may permit it to be left in place at the request and expense of the Contractor. Compensation for sheeting and bracing ordered to be left in place shall be negotiated as a change order. Unless otherwise directed, all sheeting and bracing left in place shall be cut off at least 2-feet below the finished surface of the ground or pavement.

3.11 DEWATERING

A. Comply with Construction Specification Section 31 23 19, Dewatering for control of surface and ground water.

3.12 ROCK

A. Notify Engineer immediately when rock is encountered in the trench and before any rock has been blasted or removed.

B. After removal of the rock, bedding shall be placed as required for the pipe embedment or laying condition type.

C. Special precautions shall be exercised to prevent any pipe from resting on rock or any other hard projection that might cause failure of the pipe. At no time shall the pipe bell or barrel rest on rock. A minimum of 6 inches of Class 57 or 67 stone is required between the barrel of the pipe and rock. A minimum of 12 inches of clearance is required between the sides of the pipe and the rock. Thicker bedding may be required for deeper pipe. This condition shall be considered by the Engineer on a case-by-case basis.

D. Where a cast-in-place manhole, precast structure (such as a manhole or vault), or other structure will bear over rock, remove the rock to a minimum of 8 inches below the foundation or footing of the structure and place an 8-inch layer of Class 57 or 67 stone over the rock.

3.13 TRENCH SUBGRADE PREPARATION

A. All trenches shall be excavated to accommodate the bedding as shown in the details and as required in this Section.

B. Trenches for water mains shall be graded to avoid local high points. Trenches shall be graded either level or on a continuous upslope to the high points designated on the Drawings. Trenches shall be of sufficient depth to provide the minimum cover over the top of the pipe.

C. For installations on a flat bottom trench, the trench shall be excavated to the depth required to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes, except that it will be permissible to disturb and otherwise modify the finished surface over a maximum length of 18" near the middle of each length of pipe for the withdrawal of pipe slings or other lifting tackle.

D. The trench bottom shall be uniform in grade and remain static during backfilling and under all subsequent trench conditions. To assure a uniform depth of stone, the bottom of the trench shall be graded to within 0.04 foot (1/2-inch) of the plan specified grade. The stone foundation or bedding shall be graded to the same tolerance.

E. Excavate a space under each bell to sufficient length to relieve it of any load and to allow ample space for filling and finishing the joint.

F. In no case shall the pipe be brought to uniform grade by blocking up under the barrel or bell.

3.14 UNDERCUT EXCAVATION OF UNSUITABLE SUBGRADE

A. Subgrade soils which are Class V material, yielding, unstable, inadequately supporting, mucky, or otherwise unsuitable, shall be excavated a minimum of 8 inches below the specified subgrade. Remove the unsuitable material for the full width of the trench and stabilize the trench to provide an acceptable foundation. The excavated material shall be replaced with compacted foundation stone. The trench bottom shall provide a stable and continuous support for the pipe system with bell holes provided to permit jointing.

B. When the Contractor identifies potential unsuitable subgrade material, he shall notify the Engineer immediately and request review and approval for removal of the material. He shall define the limits of the material by drawing station locations and limits on the Drawings. Dewater the trench below the subgrade elevation so that the subgrade can be evaluated when dry. Wet subgrade shall not constitute unsuitable subgrade material.

C. Undercut excavation shall be approved by the Engineer prior to excavation. No payment will be made for undercut excavation that proceeds without the prior approval of the Engineer.

3.15 UNAUTHORIZED OVER-EXCAVATION

A. Care shall be taken not to over-excavate the trench. Removal of material beyond indicated trench subgrade elevations or side dimensions, without specific approval of the Engineer shall be considered unauthorized over-excavation. Trenches excavated below grade or wider that specified shall be backfilled as directed by the Engineer. No extra compensation will allowed for this work.

B. In no case shall the pipe be brought to grade by blocking under the barrel of the pipe.

3.16 FOUNDATION STABILIZATION

A. Unsuitable subgrade material shall be replaced by placement of foundation stone as directed by the Engineer.

B. Install foundation stone to no greater depth than is necessary to provide a stabilized ditch bottom, but in no case less than 8 inches deep.

C. The volume of foundation stone shall be determined by multiplying the depth of undercut excavation authorized, by the allowable trench width, and then by the length of trench authorized. Foundation stone quantities shall be agreed upon at the close of each day's construction and the Resident Project Representative and the Contractor shall sign the tabulation of agreed quantities.

D. Where conversion from cubic yardage to tonnage is necessary, it shall be computed at the rate of 1 cubic yard of foundation stone weighing 4,000 pounds.

3.17 PLACEMENT OF BEDDING

A. Trenches

1. Place bedding in uniform layers and hand shape as required so that the bottom of the pipe rests uniformly upon the material for the entire length of the pipe. Bell holes and depressions required for joining the pipe shall be dug after the bedding has been graded, shaped and compacted. Depressions shall be only the length, depth, and width required to make the joint properly.

2. After placing the pipe, carefully hand tamp the bedding material with rods and shovels as required to fill the voids beneath the pipe haunches and provide full support under and around the pipe.

B. Structures

Place bedding in uniform layers. Shape, grade, and compact the bedding so that the entire bottom area of the structure rests level on the bedding.

3.18 BACKFILLING

A. Conduct backfill operations of open-cut trenches closely following bedding, laying, and jointing of pipe.

B. Embedment Backfill: Backfill by hand or mechanical means acceptable to the Engineer, from the top of the bedding to the crown of the pipe with materials as specified in Part 2. Do not backfill on muddy or frozen material. Place layers of backfill material in even 6-inch lifts on both sides of the pipe. Do not move, injure or disturb the pipe. Insure that uniform side support is provided throughout the length of pipe. Use only hand tamping for compaction. Exercise extreme care to avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, or distortion. Repair damages, distortions, or misalignments to full satisfaction of the Engineer. Remove pipe broken or damaged during installation.

C. Backfilling Over the Pipe: Backfill from the top of the pipe to a minimum depth of 12 inches above the crown of the pipe with materials as specified in Part 2, providing sufficient care to prevent injuring or moving the pipe. Place backfill in even layers and compact to specified density by hand or approved mechanical means. Place layers of backfill in 6-inch lifts.

D. Backfilling to Street Subgrade: Backfill and compact from 12 inches above the crown of the pipe to the street subgrade with final backfill from native materials as specified in Article 2.2 Soil and Aggregate Materials, compacting to the required density. Compact with vibratory compaction devices such as a Rammax or jumping jack tamp. PLATE TAMPS SHALL NOT BE ALLOWED. Layers of backfill material shall be placed in maximum 12-inch lifts. Increased layer thickness may be permitted for non-cohesive material provided the Contractor demonstrates to the satisfaction of the Engineer that the specified compaction will be obtained. Contractor shall be held responsible for settlement over all trenches and he shall be required to add material and compact as directed if settlements occur.

E. Heavy equipment shall not be operated over any pipe until it has been properly backfilled and compacted with a vibratory compaction device such as a Rammax or jumping jack tamp and the minimum cover has been provided as required by the Drawings. Pipe that is misaligned, shows excessive settlement, or has been otherwise damaged by the Contractor’s operations, shall be removed and replaced at no cost to the Owner.

F. Structure Backfill: Backfill placed within 2 feet of manholes and other special structures shall be of the same quality as that specified for backfill around pipelines. Prevent wedging action of the backfill against structure by placing the material uniformly around the structure so that approximately the same elevation is maintained in each lift. Material

shall be solidly tamped with a mechanical or pneumatic tamper in a manner that does not damage the structure or produce unequal pressures. Refill all excavations as rapidly as practical after completion of the structural work therein, or after the excavations have served their purpose.

G. Use of Select Backfill

1. In the event that the native materials are determined to be unsuitable for backfill by the Engineer, select backfill shall be placed in the trench. The placement of select backfill materials will not be allowed when the Engineer determines that the native soil materials are suitable for backfill and shall not be used to relieve the Contractor of exercising reasonable effort to dewater, segregate, dry, and compact native soil materials as specified.

2. The Engineer shall be the sole judge as to whether the use of select backfill is allowed. Use of select backfill shall be authorized in advance of placement.

3. For each location where select backfill is authorized, the volume shall be determined by the average depth of the fill area times the average of the bottom and top trench width times the length of the fill area authorized. Select backfill quantities shall be agreed upon at the close of each day's construction and the Resident Project Representative and the Contractor shall sign the tabulation of the agreed upon quantities. The location of each authorized use of select backfill shall be recorded by Drawing Sheet number and Station number on the tabulation. The tabulations shall be made on duplicate copies. Copies shall accompany each application for payment for this material.

H. Re-excavate trenches that have been improperly backfilled, to a depth as required for proper backfill and compaction. Backfill and compact as specified or correct to the approval of the Engineer.

I. Work performed shall not be covered prior to inspection, testing, and approval. Should any of the Work be covered prior to approval, it shall be exposed and then backfilled and compacted as specified at no additional cost to the Owner.

3.19 COMPACTION REQUIREMENTS

A. Thoroughly compact each lift in accordance with the requirements of the governing authority (NCDOT for NCDOT roadways and local municipality for municipal roadways) and the following minimum criteria:

Material Classification	AASHTO T99/ASTM D 698 Density
NCDOT Class 57 or 67 Stone Bedding	95% Standard Proctor
Initial Backfill	As per pipe embedment or laying condition type requirements
Select Backfill	95% Standard Proctor
Final Backfill – Beneath pavement, curb and gutter, and driveways up to the top 12 inches	95% Standard Proctor
Final Backfill – Top 12 inches beneath pavement, curb and gutter, and driveways	98% Standard Proctor
Final Backfill – Beneath vegetated areas	90% Standard Proctor
Aggregate Base Course	100% Standard Proctor
Backfill Around Structures	95% Standard Proctor

3.20 GRADING

A. All pipe areas shall be graded and maintained so that erosion or saturation will not damage the pipe bed or backfill.

B. All areas within the limits designated on the Drawings, including adjacent transition areas, shall be uniformly graded. Finish surfaces within the specified tolerances with uniform levels or slopes between points where elevations or existing grades are shown.

C. Protect newly graded areas from traffic and erosion, and repair and re-establish the grade in settled, eroded, or rutted areas. Where compacted areas are disturbed by subsequent construction or adverse weather, scarify the surface, reshape, and re-compact to the required density. If the Contractor fails to maintain any trench within 2 days after receipt of written notice from the Owner, the Owner may backfill said depressions and the cost of such work may be retained from monies due the Contractor. In case of emergency, the Owner may backfill any dangerous depressions without prior notice to the Contractor.

D. Grading tolerances of finished surface

1. Finish subgrade areas that are to receive topsoil. Finish elevations shall be within 0.10 foot of required subgrade elevations.

2. Shape subgrade under sidewalks to line, grade, and cross-section. Subgrade shall be brought to within 0.10 foot of required subgrade elevations.

3. Shape subgrade under pavement to line, grade, and cross-section. Bring to within 0.05 feet of required subgrade elevations.

3.21 FIELD QUALITY CONTROL

A. Compaction Tests

1. In the course of backfilling trenches and the preparation of subgrades, Owner may require compaction testing to verify that the backfilling and compaction of the trenches, pits, and excavations complies with the requirements of the Contract Documents. Contractor shall allow adequate time for testing.

2. A qualified geotechnical testing firm shall perform laboratory Standard Proctor Tests in accordance with ASTM D698/AASHTO T99 to establish a moisture-density relationship for materials being used as fill. The firm will perform field density determinations in accordance with one or more of the following as recommended by the firm:

a. ASTM D1556/AASHTO T191 (Density In-Place by the Sand Cone Method)

b. ASTM D2167/AASHTO T205 (Density In-Place by the Rubber-Balloon Method)

c. ASTM D2937/AASHTO T204 (Density In-Place by Drive Cylinder Method)

d. ASTM D6938 (Density In-Place by Nuclear Method)

3. The location of the compaction testing shall be determined by the Owner or Resident Project Representative.

4. The Resident Project Representative or the Owner will observe testing.

5. Test results and inspection reports will be submitted by the testing firm directly to the Owner and Engineer.

B. Non-Conforming Work

1. Where density testing indicates that compaction was not achieved in accordance with the Contract Documents, the material in that lift shall be removed, replaced, compacted, and re-tested, as directed by the Engineer, until the backfill meets or exceeds the minimum density requirements.

2. Payment for failed compaction test shall be made by the Contractor. When testing firm is employed by the Owner, the cost will be deducted from the payment due the Contractor on the next Pay Application.

3.22 RESTORATION OF SITE

A. Promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the property.

B. Upon completion of trenching and backfill operations, fine grade the site, removing all surplus excavated material, leaving the area free from surface irregularities.

END OF SECTION

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes

1. Erosion and sedimentation control measures

2. Stormwater General Permit NCG010000 and Self Inspection Requirements

B. The work shown on the Drawings and specified herein shall constitute the erosion control plan for this project in conformance with the Sedimentation Pollution Control Act of 1973, including subsequent amendments. The erosion control plan shown is based on the anticipated construction methods and sequence, and includes the permanent and temporary measures as required. The Contractor shall provide any other measures as may be required to prevent erosion as a result of construction activity at the site.

C. Temporary erosion control measures shall include, but not be limited to, check dams, diversion ditches, silt fences, rip rap, grass, mulches, mats, fabric, netting, construction entrances, or any other methods or devices that are necessary to control or restrict erosion. Temporary erosion control measures may include work outside the right-of-way or construction limits where such work is necessary as a result of construction such as borrow pit operations, haul roads, plant sites, equipment storage sites, and disposal of waste or debris.

D. Related Requirements

1. NCDEMLR Division of Land Resources Land Quality Section “Letter of Approval with Modifications and Performance Reservations” located in the appendices.

2. Construction Specification Section 32 90 00, Planting.

1.2 REFERENCES

A. Abbreviations and Acronyms

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

DWR	North Carolina Department of Environment and Natural Resources, Division of Water Resources
NCDEMLR	North Carolina Department of Environment and Natural Resources, Division of Energy, Mineral and Land Resources
EPA	United States Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
USACE	United States Army Corps of Engineers

B. Definitions: Not used.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. General Construction Sequence

1. Confirm locations of and construct or install gravel construction entrances, silt fences, silt fence stone filter outlets, diversion ditches, drop inlet protection, pipe inlet protection, and skimmer basins as indicated on the drawings. Install all other necessary erosion control measures whether or not indicated on the drawings in accordance with the specifications.

2. Where appropriate, clear, grub, and strip topsoil to limits required for construction. Legally dispose of waste materials.

3. Begin excavation and grading activities after all required erosion control measures have been installed.

4. Stockpiled fill material shall be protected from sedimentation and runoff.

5. Begin construction and installation of infrastructure and permanent erosion control protection.

6. Backfill and establish finish grades as quickly as possible after pipes have been installed.

7. Establish permanent soil vegetation after pipe installation.

8. All erosion and sedimentation control measures shall be inspected weekly and after each significant rainfall. Needed repairs shall be made immediately.

9. Ground cover shall be established on all slopes following completion of grading on each phase of the work. After ground cover is well established and the sites are stabilized, return to the site and remove all temporary measures including silt fences, diversion ditches, skimmer basins, and all other measures. Install permanent vegetation to all areas disturbed by the temporary measures.

   a. Within 14 days unless otherwise noted.

   b. Perimeter dikes, swales, ditches, slopes and high quality water (HQW) zones: within 7 days.

   c. Side slopes steeper than 3:1 (H:V): within 7 days unless 10 feet or shorter in length and not steeper than 2:1 side slopes, then within 14 days.

   d. Side slopes between 3:1 and 4:1 and greater than 50 feet in length: within 7 days.

10. Remove erosion control measures and restore areas affected by measures within 30 days after Engineer has determined that final site stabilization is acceptable.

1.4 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Comply with all codes, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work. The Contractor shall keep himself fully informed of all such regulations which in any way affect the conduct of the work and shall at all times observe and comply with all such regulations.

C. Erosion and sedimentation controls shall comply with the North Carolina Sedimentation Pollution Control Act of 1973 including subsequent amendments and NCAC Title 15A Environment and Natural Resources, Chapter 4 Sedimentation Control as adopted by the North Carolina Sedimentation Control Commission.

D. Comply with the North Carolina Department of Environment and Natural Resources, “Sediment Control Planning and Design Manual”.

E. Comply with NPDES Stormwater General Permit No. NCG010000.

F. Construction activities shall comply with NCDOT Standard Specifications for Roads and Structures.

G. In the event of conflict between the regulations listed above and the requirements of these Specifications, the more restrictive requirements shall apply.

H. Contractor shall be liable for damages to public or private property caused by silting or slides originating in areas used by Contractor.

I. Install and maintain erosion control devices as required to function properly and to satisfy the representatives of the North Carolina Land Quality Section, Division of Land Resources, Department of Environment, Health, and Natural Resources, and the Engineer.

J. Perform a complete site inspection of the erosion control measures every week and when rainfall occurs on site (within no more than 24 hours of the event). Note and implement corrective and maintenance measures immediately. Document inspections and provide documentation to Engineer’s Project Representative weekly.

K. Contractor will not receive time extensions on the contract resulting from time delays due to a shutdown by the N. C. Land Quality Section or due to unanticipated corrective work.

L. Maintain a rain gauge on site and record daily rainfall amounts.

M. Maintain the “DWQ-DEMLR Monitoring Form” attached to the end of this Section to document inspection and monitoring requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

PART 2– PRODUCTS

2.1 GEOTEXTILE FABRIC

A. Geotextile fabric shall be protected from mud, dirt, dust, sunlight, and debris during transport and storage. Material shall be inert to commonly encountered chemicals; resistant to mildew, rot, insects, and rodents; and biologically and thermally stable.

Geotextile fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours before or during installation.

B. Silt Fence Fabric: NCDOT Standard Specifications for Roadways and Structures Section 1056 – Geosynthetics, for Type 3 engineering fabric. Fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum construction life of six months.

C. Filter Fabric for Rip Rap: NCDOT Standard Specifications for Roadways and Structures Section 1056 – Geosynthetics, for Type 2 engineering fabric.

2.2 RIP RAP: NCDOT Standard Specifications Section 1042 – Rip Rap Materials, Class A, B, 1 or 2 as indicated on the Drawings.

2.3 CHECK DAM: NCDOT Standard Specifications Section 1633 – Temporary Rock Silt Checks.

2.4 SILT FENCE: NCDOT Standard Specifications Section 1605 – Temporary Rock Silt Fence.

2.5 STONE FOR SEDIMENT CONTROL: NCDOT Standard Specifications Section 1005 – General Requirements for Aggregate.

2.6 STONE FOR EROSION CONTROL: NCDOT Standard Specifications Section 1610 – Stone for Erosion Control.

2.7 EROSION CONTROL MATTING

A. Straw with Net Lining:

1. Straw fiber matrix sewn between two photo-degradable nets.

2. Wire staples machine made of No. 11 gage new steel wire formed into a “U” shape; not less than 6 inches long with not less than a 1 inch wide throat.

B. Curled Wood Mat:

1. Machine-produced mat of curled wood excelsior fibers, 80 percent of which are 6 inches or longer in length, evenly distributed over the entire area of the mat, with one side of the mat covered with a 1 inch by 1 inch photo-degradable extruded plastic mesh; mats minimum 47 inch width and weigh 0.975 pounds per square yard +/- percent.

2. Wire staples machine made of No. 11 gage new steel wire formed into a “U” shape; not less than 6 inches long with not less than a 1 inch wide throat.

C. Synthetic Mat:

1. Machine-produced mat of 100 percent UV stabilized polypropylene fibers. Top side of mat with netting of approximately 0.5 inch by 0.5 inch mesh size; bottom side of mat with netting of approximately 0.625 inch by 0.625 inch mesh size; mats sewn together with thread stitched on approximate 1.5 inch centers.

2. Wire staples machine made of No. 11 gage new steel wire formed into a U-shape; not less than 6 inches long with not less than a 1 inch wide throat.

2.8 WATTLE

A. Wattle shall meet the following specifications:

100% Curled Wood (Excelsior) Fibers

Minimum Diameter	12 in.
Minimum Density	2.5 lb/ft3 +/-10%
Net Material	Synthetic
Net Openings	1 in. x 1 in.
Net Configuration	Totally Encased
Minimum Weight	20 lb. +/-10% per 10 ft. length

B. Anchors: Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

C. Matting shall meet the requirements of section 1060-8 of the NCDOT Standard Specifications, or shall meet specifications provided elsewhere in this contract.

D. Provide staples made of 0.125" diameter new steel wire formed into a U shape not less than 12" in length with a throat of 1" in width.

2.9 COMPOST SOCK

A. Compost used for compost filter sock filler material (filter media) shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations including time and temperature data. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products will not be accepted. Test methods for the items below should follow US Composting Council Test Methods for the Examination of Composting and Compost guidelines for laboratory procedures:

B. pH – 5.0-8.0 in accordance with TMECC 04.11-A, “Electrometric pH Determinations for Compost”

C. Particle size – 99% passing a 2 inch (50mm) sieve and 30-50% passing a 3/8 inch (9.5mm) sieve, in accordance with TMECC 02.02-B, “Sample Sieving for Aggregate Size Classification.” (Note – In the field, product commonly is between 1/2 inch [12.5mm] and 2 inch [50mm] particle size).

D. Moisture content of less than 60% in accordance with standardized test methods for moisture determination.

E. Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.

F. A sample shall be submitted to the Engineer for approval prior to being used and must comply with all local, state, and federal regulations.

2.10 SILT SACK INLET FILTER PROTECTION:

A. Sack designed to keep silt, sediment, and construction debris out of the storm water system.

B. Sack shall fit the opening of the catch basin, drop inlet, or curb and gutter and hang beneath the grate in the catch basin.

C. Provide integral lifting straps to allow removal of the unit for emptying and manual inspection of the storm water system.

D. For curb inlets, provide a curb filter or deflector placed in front and extending beyond the inlet opening on both sides.

E. Constructed of sewn geotextile fabric meeting the following specifications:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	255 x 275
Grab Tensile Elongation	ASTM D 4632	%	20 x 15
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	420
Trapezoid Tear Strength	ASTM D 4533	lbs	40 x 50
Apparent Opening Size	ASTM D 4751	US Std Sieve	20
Permittivity	ASTM D 4491	sec^{1}	1.5
Ultraviolet Resistance	ASTM D 4355	%	70

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

3.2 PREPARATION

A. Implement the Erosion & Sedimentation Control Plan prior to land disturbance other than as necessary to install erosion and sedimentation control measures. A copy of the approved plan shall be maintained on the site at all times.

B. Permanent or temporary soil stabilization, which includes seeding, mulching, or ground cover sufficient to restrain erosion, must be applied to portions of the disturbed area in accordance with Construction Specification Section 32 90 00, Planting.

C. Immediately clean sediment transported onto public roads. Sediment shall be removed by shoveling or sweeping and be transported to a controlled disposal area.

D. Prior to suspension of operations on the project or any portion thereof, the Contractor shall take all necessary measures to protect the construction area, including but not limited to, borrow sources, soil type base course sources, and waste areas, from erosion during the period of suspension.

3.3 TEMPORARY EROSION CONTROL MEASURES

A. Install temporary and permanent erosion control measures in accordance with these Specifications and with the North Carolina Erosion & Sedimentation Control Planning & Design Manual.

B. Provide diversion ditches and berms as necessary to prevent concentrated flow of water across disturbed areas.

C. Stockpile excavated material on the opposite side of the utility trenches from the watercourses to the extent that is permissible.

D. In the event that stockpiles are placed on the watercourse side of the trench, provide silt fence or silt berms with stone filter outlets along the entire length of the stockpile that is on the watercourse side of the trench. The placement of these measures shall be at no additional cost to the Owner. Upon the completion of backfilling, the measures shall be removed and the site graded to its natural grade or as shown on plans.

E. Maintain natural buffer zones along all watercourses sufficient to retain all visible siltation within the first 25% of the buffer width.

F. Provide a settling basin with a gravel filter outlet for all water pumped from trenches or dewatering equipment. Pumping of that water directly into any stream, pond, or watercourse is prohibited.

G. Diversion Ditch:

1. Construct skimmer basins prior to construction of diversion ditches.

2. Strip topsoil and clear area.

3. Construct diversion ditch in locations and dimensions as shown on the Drawings.

4. Construct the ditch so that the top of the dike is not lower at any point than the design depth.

5. Vegetate the ridge immediately after construction unless it will remain in place less than 15 days.

H. Silt Fencing:

1. Provide silt fences where shown on the Drawings and as necessary to prevent erosion. Install silt fence as necessary at directional bore entry and exit points to assist with confinement of drilling fluid to the construction site.

2. Install in accordance with the details shown on the Drawings.

3. Repair when any fabric collapses, tears, decomposes, or becomes ineffective.

4. Remove sediment deposits when sediment depth behind fence reaches 6".

5. Posts: 1.33 lb/linear foot steel.

6. Install silt fence on low side of stockpiles and in locations shown on the Drawings. Extend fence around approximately 90% of the perimeter of the stockpile.

I. Check Dams and Silt Fence Stone Outlets:

1. Class B erosion control stone.

2. Place filter fabric between soil and rip rap and extend across ditch.

3. Rip rap shall not exceed 24 inches in height at center and slope shall be 2:1.

4. Place rip rap over the ditch banks to keep water from cutting around the dam.

5. Construct check dam to dimensions shown on the Drawings.

J. Temporary Seeding and Mulching: See Construction Specification Section 32 90 00, Planting.

K. Stream or Ditch Pipe Crossings:

1. Complete pipe crossing in one working day. Carefully stabilize disturbed slopes by tamping with equipment buckets and mechanical or hand tamping. Distribute topsoil evenly on slopes and tamp.

2. Where rip rap is required, carefully place as shown on the details.

3. Fertilize, seed, and mulch each crossing's slopes as soon as practicable after completing the crossing and in no case more than two weeks after disturbance of the slopes.

4. Install excelsior blankets where indicated and immediately after permanent seeding in accordance with manufacturer's recommendations. Blankets shall be installed with the netting on top and the fibers in contact with the soil over the entire area. When excelsior blankets are installed in ditches, they shall be applied in the direction of the flow of water. When installed on slopes, the blankets shall be applied either horizontally or vertically, and end and sides shall be butted snugly and stapled in accordance with manufacturer's recommendations.

5. Erosion control measures installed by the Contractor shall be acceptably maintained by the Contractor.

L. Hardware Cloth and Gravel Inlet Protection:

1. Space 1.25 lb/linear foot steel stakes, 5 foot minimum length, evenly around the perimeter of the inlet a maximum of four feet apart, and securely drive them into the ground a minimum of 24 inches deep.

2. Install 19-gauge hardware cloth with 1/4 inch mesh openings around stakes. Installed height shall be 2 feet with 2 feet laid under the gravel for anchoring.

3. Place Class 57 or 67 stone around cloth to a height of 16 inches with a 2:1 outside slope to grade.

4. Fasten cloth securely to the stakes.

M. Block and Gravel Inlet Protection:

1. Lay concrete blocks on firm, smooth foundation excavated 3” below storm drain top. Place blocks against drain inlet for lateral support. For inlet protection required on existing paved lot, lay concrete blocks on pavement 6” from storm drain outlet.

2. Place at least one concrete block on its side in each bottom row of blocks.

3. Place wire mesh with 1/2 inch openings over all block openings used for drainage.

N. Wire and Stone Inlet Protection:

1. Space steel posts evenly around the perimeter of the inlet a maximum of three feet apart. Securely drive the posts at least 18 inches into the ground.

2. Attach wire mesh with 1/4 inch openings as indicated on the drawings.

3. Place stone as indicated on the Drawings.

O. Rock Pipe Inlet Protection: Place rip rap and stone as indicated on the Drawings to prevent sediment migration into existing storm drains.

P. Slope matting:

1. Grade and smooth surface and remove rocks and sticks.

2. Assure placement of matting in close contact with soil as shown and staple in place.

3. Anchor top and bottom as shown.

Q. Wattle:

1. Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 inches with no more than 2 inches projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

2. Only install wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 inches.

3. Install matting in accordance with the detail provided in the Drawings, and in accordance with section 1631-3(B) of the NCDOT Standard Specifications, or in accordance with specifications provided elsewhere in this contract.

R. Compost Sock:

1. Compost filter socks should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second compost filter sock shall be installed at the top of the slope.

2. Stakes shall be installed through the middle of the compost filter sock on 10 foot centers, using 2 inch by 2 inch by 3 foot wooden stakes. In the event staking is not possible, i.e., when compost filter socks are used on pavement, heavy concrete blocks shall be used behind the compost filter socks to help stabilize during rainfall/runoff events.

3. Staking depth for sand and silt loam soils shall be 12 inches and 8 inches for clay soils.

4. Loose compost may be backfilled along the upslope side of the compost filter sock, filling the seam between the soil surface and the device, improving filtration and sediment retention.

5. If the compost filter sock is to be left as a permanent filter or part of the natural landscapes, it may be seeded at time of installation for establishment of permanent vegetation. The engineer will specify seed requirements.

6. Compost filter socks are not to be used in perennial, ephemeral, or intermittent streams.

S. Silt Sack Inlet Filter Protection: Install and maintain in accordance with manufacturer recommendations.

3.4 WATER AND AIR POLLUTION

A. Exercise every reasonable precaution to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces, or other property caused by construction operations.

B. Exercise every reasonable precaution to prevent pollution of rivers, streams, and water impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful waste shall not be discharged into or alongside of rivers, streams, or impoundments, or into natural or manmade channels leading thereto.

C. Comply with all state and local air pollution regulations.

D. Dust Control: Control dust within the project area and at other areas affected by the construction of the project, including, but not specifically limited to, unpaved secondary roads, haul roads, access roads, disposal sites, borrow and material sources, and production sites. Dust control shall not be considered effective where the amount of dust creates a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property.

E. Noise Control: Exercise every reasonable precaution to prevent excessive and unnecessary noise. The Contractor shall choose his methods so as to minimize the disturbance of area residents.

3.5 PERMANENT EROSION CONTROL MEASURES

A. Grass: See Construction Specification Section, 32 90 00, Planting.

3.6 MONITORING AND MAINTENANCE PLAN

A. All erosion control measures shall be inspected weekly and within 24 hours after each rainfall totaling 0.5 inches over any 24-hour period. All needed repairs shall be made immediately to prevent further damage and erosion. Utilize the inspection record form attached at the end of this Section to document monitoring activities and corrective actions taken. Provide records to the Owner and Engineer on a monthly basis. Structures and measures that shall be inspected include:

1. Seeding, Fertilizing, and Mulching: Seeded areas shall be inspected for failure and necessary repairs shall be made within the same season.

2. Gravel Construction Entrance: Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone.

3. Silt Fence: Fabric which collapses, tears, decomposes, or becomes ineffective will be replaced immediately. Remove sediment deposits behind fence when sediment accumulates to 6 inches.

4. Silt Fence Stone Filter Outlet and Rock Pipe Inlet Protection: Inspect for significant erosion around the edges and between dams. Install protective rip rap liners in portions of the channel where erosion occurs. Remove sediment

accumulated behind the dams as required to prevent damage to channel vegetation. Add stones to dams as required to maintain design height and cross section.

5. Skimmer Basin: Remove sediment and restore the basin to its original dimensions when sediment accumulates to one-half the height of the first baffle. Inspect the fabric lined spillway for damage and make any required repairs with fabric that spans the full width of the spillway. Check the embankment, spillways, and outlet for erosion damage and make all necessary repairs immediately. Clean the skimmer immediately if the skimmer, orifice, skimmer arm, or barrel pipe becomes clogged.

6. Porous Baffles: Remove sediment deposits when it reaches half full to provide adequate storage volume for the next rain event. Should the fabric of a baffle collapse, tear, decompose, or become ineffective, replace it promptly.

7. Stockpiles: Stockpiles shall be checked for sedimentation and stabilization.

8. Diversion Ditch: Inspect for any erosion on the ridge and in the flow areas. Remove sediment when sediment accumulates to 4 inches.

9. Inlet Protection: Hardware cloth which collapses, tears, or becomes ineffective shall be replaced immediately. Remove sediment deposits when sediment accumulates behind stone or cloth. Replenish stone as needed.

10. Rock Outlet Protection: Inspect weekly and after a 0.5-inch or greater rainfall to see if any erosion around below the rip rap has taken place or if stones have been dislodged. Repair immediately.

11. Erosion Control Matting: Monitor and repair matting as necessary until ground cover is established. Matting shall remain in close contact with ground.

12. Compost Sock: Inspect compost socks weekly and after each significant rainfall event (1/2 inch or greater). Remove accumulated sediment and any debris. The compost sock must be replaced if clogged or torn. If ponding becomes excessive, the sock may need to be replaced with a larger diameter or a different measure. The sock needs to be reinstalled if undermined or dislodged. The compost sock shall be inspected until land disturbance is complete and the area above the measure has been permanently stabilized.

13. Clean sediment transported onto public roads at the end of each day. Sediment shall be removed by shoveling or sweeping and be transported to a controlled disposal area. Street washing shall be allowed after sediment is removed in this manner.

END OF SECTION

INSPECTION AND MONITORING RECORDS FOR ACTIVITIES UNDER STORMWATER GENERAL PERMIT NCG010000 AND SELF-INSPECTION RECORDS FOR LAND DISTURBING ACTIVITIES PER G.S. 113A-54.1

Project Name		**Project #**	
Financially Responsible Party (Permittee)		**County**	
Name of Inspector		**Company**	
Address			
Phone Number		**Email Address**	

PART 1A: Rainfall Data.

Day / Date	Rain Amt (in)	Initials	Notes: Daily Rainfall Required. Except for Holidays or Weekends. If no rain, indicate with a "zero"
M			
T			
W			
Th			
F			
Sat (Optional)			
Sun (Optional)			

PART 1B: Current Phase of Project

Phase of Grading check the applicable box(es)	X	Comments
Installation of perimeter erosion and sediment control measures		
Clearing and grubbing of existing ground cover		
Completion of any phase of grading of slopes or fills - describe		
Installation of storm drainage facilities		
Completion of all land-disturbing activity, construction or development		
Permanent ground cover sufficient to restrain erosion has been established		

PART 1C: Signatures

By this signature, I certify in accordance with the NCG010000 permit & G.S. 113A-54.1 that this report is accurate and complete to the best of my knowledge.	
Landowner or Financially Responsible Party (Permittee) or Agent (Designee)	Date

GROUND STABILIZATION TIMEFRAMES		
Site Area Description	**Stabilization**	**Timeframe Exceptions**
Perimeter dikes, swales 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 4:1 or flatter	**14 Days**	**7 days for slopes greater than 50' in length**
All other areas with slopes flatter than 4:1	**14 Days**	**None, except for perimeters and HQW Zones**

PART 2A: EROSION AND SEDIMENTATION CONTROL MEASURES: Measures must be inspected at least ONCE PER 7 CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT GREATER THAN 0.5 INCH PER 24 HOUR PERIOD.

Erosion and Sedimentation Control Measures Inspected						Inspection Date	Describe Actions Needed Corrective actions should be performed as soon as possible and before the next storm event	Corrected Date
Name/Number/ Location of Measure (List all measures on Plan)	Operating Properly? (Y/N)	Any Repair or Maintenance Needed? (Y/N)	*New Measures Installed **					
			Proposed Dimensions (ft.)	*Actual Dimensions (ft.)*	*Significant Deviation from Plan? (Y/N)*			

*New erosion and sedimentation control measures installed since the last inspection should be documented here or by initialing and dating each measure or practice shown on a copy of the approved erosion and sedimentation control plan.

PART 2B: STORMWATER DISCHARGE OUTFALLS (SDOs): SDOs must be inspected at least ONCE PER 7 CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT GREATER THAN 0.5 INCH PER 24 HOUR PERIOD.

Stormwater Discharge Outfalls Inspected					Inspection Date	Report Visible Sedimentation to streams or wetlands to DWQ within 24 Hours http://portal.ncdenr.org/web/wq/ Describe Actions Needed Corrective actions should be performed as soon as possible and before the next storm event	Corrected Date
Stormwater Discharge Outfall ID or Location	Any Visible Sedimentation in Streams, Wetlands or Outside Site Limits? (Y/N)	Any Increase in Stream Turbidity from Discharge? (Y/N)	Any Visible Erosion below SDO? (Y/N)	Any visible oil sheen, floating or suspended solids or discoloration? (Y/N)			

PART 2C: GROUND STABILIZATION Must be recorded after each Phase of Grading

Area Where Temporary or Permanent Ground Cover is Required	Date Land-Disturbance Stopped or Completed	Time Limit for Ground Cover 7 days or 14 days	Is Ground Cover Sufficient to Restrain Erosion? (Y/N)	Inspection Date	Describe Actions Needed	Corrected Date

SECTION 32 11 00
BASE COURSES (NC)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aggregate Base Course.

2. Asphalt Concrete Base Course.

B. Related Requirements:

1. NCDOT Encroachment Agreement: Where the requirements of NCDOT Encroachment Agreement differ from this Section, the NCDOT Encroachment Agreement shall govern.

1.2 REFERENCES

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

ABC Aggregate Base Course

B. Definitions:

1. Roadway Owner: NCDOT, local municipality, or private entity as applicable.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate Work with roadway owner.

B. Pre-installation Meetings: Held with roadway owner, Owner, and Engineer prior to installation.

C. Coordinate sequencing and scheduling of Work with roadway owner, Owner, and Engineer.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that materials provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for base course and subgrade treatment materials.

D. Submit Job Mix Formula for each mixture to be supplied.

E. Additional as required by roadway owner.

1.5 CLOSEOUT SUBMITTALS

A. Record Documentation

1.6 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Perform Work in accordance with roadway owner requirements.

C. Aggregates: NCDOT Standard Specifications for Roads and Structures Section 1006, Aggregate Quality Control/Quality Assurance.

D. Asphalt Materials: NCDOT Standard Specifications for Roads and Structures Article 1020-6, Performance Graded Asphalt Binder and Asphalt Emulsion Quality Control/Quality Assurance.

E. Asphalt Concrete Base Course: NCDOT Standard Specifications for Roads and Structures Section 609, Quality Management System for Asphalt Pavements.

F. Qualifications:

1. Manufacturers: As accepted by NCDOT.

2. Applicators: As accepted by NCDOT.

3. Contractors: As accepted by NCDOT.

4. Testing Agencies: As accepted by NCDOT.

G. Supplier’s Certifications:

1. Asphalt Materials: NCDOT Standard Specifications for Roads and Structures Article 1020-1, Delivery and Acceptance of Asphalt Materials.

H. Delivery tickets for all products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

B. Aggregate Base Course: Comply with hauling, handling, and placement requirements of NCDOT Standard Specifications for Roads and Structures Section 520, Aggregate Base Course.

C. Asphalt Materials: Deliver in accordance with NCDOT Standard Specifications for Roads and Structures Article 1020-1, Delivery and Acceptance of Asphalt Materials.

D. Asphalt Concrete Base Course: Haul and deliver in accordance with NCDOT Standard Specifications for Roads and Structures Section 610, Asphalt Concrete Plant Mix Pavements.

1.8 FIELD CONDITIONS

A. Ambient Conditions:

1. Aggregate Base Course:

a. Do not place base material on frozen subgrade or base.

b. Base course that is in place on November 15 shall immediately be covered with a subsequent layer of pavement structure or with a sand seal. Base course that has been placed between November 16 and March 15 inclusive shall be covered within 7 calendar days with a subsequent layer of pavement structure or with a sand seal.

2. Asphalt Concrete Base Course:

a. Do not produce or place asphalt mixtures during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond.

b. Do not place asphalt material when the air temperature, measured in the shade away from artificial heat at the location of the paving operation and the road surface temperature in the shade, is less 32°F.

c. As an exception to the above, when in any day's operations, the placement of a layer of asphalt base course material or intermediate material 2" or greater in thickness has started, it may continue until the temperature drops to 32°F.

d. Do not place plant mix base course or intermediate course that will not be covered with surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February.

3. Tack Coat:

a. Do not apply tack coat when the weather is foggy or rainy.

b. Apply tack coat only when the surface to be treated is dry and when the atmospheric temperature in the shade away from artificial heat is 35°F or above.

PART 2– PRODUCTS

2.1 AGGREGATE BASE COURSE: NCDOT Standard Specifications for Roads and Structures Section 1010, Aggregate for Non-Asphaltic Type Bases, Article 1010-1, Aggregate Base Course.

2.2 ASPHALT TACK COAT: NCDOT Standard Specifications for Roads and Structures Section 1020, Asphalt Materials, Article 1020-2 Asphalt Binder Grade PG 64-22 or Article 1020-3 Emulsified Asphalt, Grade CRS-1, CRS-1H, CRS-2, HFMS-1, or RS-1H unless otherwise specified.

2.3 ASPHALT BINDER: NCDOT Standard Specifications for Roads and Structures Section 1020, Asphalt Materials, Article 1020-2 Asphalt Binder.

2.4 ASPHALT CONCRETE BASE COURSE: NCDOT Standard Specifications for Roads and Structures Section 610-3 Composition of Mixtures (Mix Design and Job Mix Formula). Provide mix type B25.0B or B25.0C as indicated on the Drawing or required by roadway owner.

PART 3– EXECUTION

3.1 EXAMINATION

A. Prior to mobilizing, confirm that existing conditions are as indicated on Drawings. Notify Engineer immediately if existing conditions have changed.

3.2 PREPARATION

A. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions and Section 31 10 00, Site Clearing.

B. Traffic Control:

1. Conduct operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

2. Do not close or obstruct streets or walks without permission from the roadway owner and Owner.

3. Comply with the Traffic Control requirements of Construction Specification Section 01 55 26, Temporary Traffic Control.

4. Maintain access to existing businesses, emergency facilities, and other properties requiring access.

C. Subgrade:

1. Prepare subgrade by grading, shaping, manipulating the moisture content, and compacting in accordance with NCDOT Standard Specifications for Roads and Structures Section 500, Fine Grading Subgrade, Shoulders, and Ditches before placement of the base material.

2. Prepare in accordance with the requirements of Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfilling.

3. The surface of the subgrade shall be dry and clean of all foreign substances. Ruts, soft yielding materials, and areas that do not meet compaction requirements shall be corrected by removing and replacing the material and properly compacting to the lines and grades shown on the Drawings.

4. Subgrade shall be approved by roadway owner prior to placement of base materials.

3.3 AGGREGATE BASE COURSE

A. Place, mix, compact, and shape in accordance with the lines, grades, depths, and typical sections shown in the Drawings.

B. Place, mix, compact, shape, and maintain in accordance with NCDOT Standard Specifications for Roads and Structures Section 520, Aggregate Base Course. Apply a sand seal when required by, and in accordance with, Article 520-5.

3.4 ASPHALT CONCRETE BASE COURSE

A. Construct one or more courses of asphalt concrete base mixture in conformity with the lines, grades, thickness, and typical sections shown on the Drawings.

B. Produce, weigh, transport, place, compact, and test in accordance with NCDOT Standard Specifications for Roads and Structures Section 610, Asphalt Concrete Plant Mix Pavements.

3.5 ASPHALT TACK COAT

A. Apply asphalt tack coat beneath each layer of asphalt plant mix to be placed in accordance with NCDOT Standard Specifications for Roads and Structures Section 605, Asphalt Tack Coat.

B. Where a prime coat, or a newly placed asphalt surface treatment mat coat has been applied, apply tack coat as directed by roadway owner.

3.6 FIELD QUALITY CONTROL

A. Field Tests and Inspections: As required by roadway owner.

B. Compaction Requirements: Per NCDOT Standard Specifications for Roads and Structures or NCDOT Encroachment Agreement.

C. Bituminous pavement coring sampling and density test reports shall be submitted at completion of project in accordance with the requirements of NCDOT Standard Specifications for Roads and Structures Section 609, Quality Management System for Asphalt Pavements.

D. Non-Conforming Work: Remove and replace materials that do not conform the requirements of this Section in a manner acceptable to the roadway owner and the Engineer.

3.7 PROTECTION

A. Protect bases from damage from construction activities.

3.8 MAINTENANCE

A. Aggregate Base Course:

1. Maintain the surface of the base weekly by watering, machining, rolling, or dragging when necessary to prevent damage to the base by weather or traffic.

2. Where the base or subgrade is damaged, repair the damaged area weekly. Reshape the base to required lines, grades, and typical sections and recompact to the required density at no cost to the Owner.

B. Asphalt Concrete Base Course:

1. Maintain asphalt concrete base course in an acceptable condition until final acceptance of the project. Immediately repair or replace damage or defects when directed by the roadway owner or Engineer in a manner acceptable to the roadway owner and Engineer.

END OF SECTION

SECTION 32 12 00
FLEXIBLE PAVING (NC)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphalt Concrete Intermediate Course.

2. Asphalt Concrete Surface Course.

3. Asphalt Driveways and Parking Areas.

B. Related Requirements:

1. NCDOT Encroachment Agreement: Where the requirements of NCDOT Encroachment Agreement differ from this Section, the NCDOT Encroachment Agreement shall govern.

1.2 REFERENCES

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

ABC Aggregate Base Course

B. Definitions:

1. Roadway Owner: NCDOT, local municipality, or private entity as applicable.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate Work with roadway owner.

B. Pre-installation Meetings: Held with roadway owner, Owner, and Engineer prior to installation.

C. Coordinate sequencing and scheduling of Work with roadway owner, Owner, and Engineer.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that materials provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for intermediate and surface courses.

D. Submit Job Mix Formula for each mixture to be supplied.

E. Additional as required by roadway owner.

1.5 CLOSEOUT SUBMITTALS

A. Record Documentation.

1.6 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Perform Work in accordance with roadway owner requirements.

C. Asphalt Materials: NCDOT Standard Specifications for Roads and Structures Article 1020-6, Performance Graded Asphalt Binder and Asphalt Emulsion Quality Control/Quality Assurance.

D. Asphalt Concrete Intermediate and Surface Course: NCDOT Standard Specifications for Roads and Structures Section 609, Quality Management System for Asphalt Pavements.

E. Qualifications:

1. Manufacturers: As accepted by NCDOT.

2. Applicators: As accepted by NCDOT.

3. Contractors: As accepted by NCDOT.

4. Testing Agencies: As accepted by NCDOT.

F. Supplier’s Certifications:

1. Asphalt Materials: NCDOT Standard Specifications for Roads and Structures Article 1020-1, Delivery and Acceptance of Asphalt Materials.

G. Delivery tickets for all products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

B. Asphalt Materials: Deliver in accordance with NCDOT Standard Specifications for Roads and Structures Article 1020-1, Delivery and Acceptance of Asphalt Materials.

C. Asphalt Concrete Intermediate and Surface Course: Haul and deliver in accordance with NCDOT Standard Specifications for Roads and Structures Section 610, Asphalt Concrete Plant Mix Pavements.

1.8 FIELD CONDITIONS

A. Ambient Conditions:

1. Prime Coat:

a. Do not apply prime coat on a frozen surface or when the weather is foggy or rainy.

b. Apply prime coat only when the surface to be treated is free of standing water, at proper moisture content, and the atmospheric temperature in the shade away from artificial heat is 40°F or above for plant mix and 50°F or above for asphalt surface treatment.

2. Tack Coat:

a. Do not apply tack coat when the weather is foggy or rainy.

b. Apply tack coat only when the surface to be treated is dry and when the atmospheric temperature in the shade away from artificial heat is 35°F or above.

3. Asphalt Concrete Intermediate Course:

a. Do not produce or place asphalt mixtures during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond.

b. Do not place asphalt material when the air temperature, measured in the shade away from artificial heat at the location of the paving operation and the road surface temperature in the shade is less 35°F.

c. As an exception to the above, when in any day's operations the placement of a layer of intermediate material 2 inches or greater in thickness has started, it may continue until the temperature drops to 32°F.

d. Do not place plant mix intermediate course that will not be covered with surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February.

4. Asphalt Concrete Surface Course:

a. Do not produce or place asphalt mixtures during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond.

b. Do not place asphalt material when the air temperature, measured in the shade away from artificial heat at the location of the paving operation and the road surface temperature in the shade is less than the temperature shown in NCDOT Standard Specifications for Roads and Structures Table 610-5.

PART 2– PRODUCTS

2.1 PRIME COAT: NCDOT Standard Specifications for Roads and Structures Section 1020, Asphalt Materials, Article 1020-5 Prime Coat Materials.

2.2 ASPHALT TACK COAT: NCDOT Standard Specifications for Roads and Structures Section 1020, Asphalt Materials, Article 1020-2 Asphalt Binder Grade PG 64-22 or Article 1020-3 Emulsified Asphalt, Grade CRS-1, CRS-1H, CRS-2, HFMS-1, or RS-1H unless otherwise specified.

2.3 ASPHALT BINDER: NCDOT Standard Specifications for Roads and Structures Section 1020, Asphalt Materials, Article 1020-2 Asphalt Binder.

2.4 ASPHALT CONCRETE INTERMEDIATE AND SURFACE COURSES: NCDOT Standard Specifications for Roads and Structures Section 610-3 Composition of Mixtures (Mix Design and Job Mix Formula). Provide mix type as indicated on the Drawings.

PART 3– EXECUTION

3.1 EXAMINATION

A. Prior to mobilizing, confirm that existing conditions are as indicated on Drawings. Notify Engineer immediately if existing conditions have changed.

3.2 PREPARATION

A. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions and Section 31 10 00, Site Clearing.

B. Traffic Control:

1. Conduct operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

2. Do not close or obstruct streets or walks without permission from the roadway owner and Owner.

3. Comply with the Traffic Control requirements of Construction Specification Section 01 55 26, Temporary Traffic Control.

4. Maintain access to existing businesses, emergency facilities, and other properties requiring access.

3.3 PRIME COAT

A. Treat all non-asphalt bases beneath an asphalt surface treatment with a prime coat in accordance with NCDOT Standard Specifications for Roads and Structures Section 600, Prime Coat.

B. Treat the existing non-asphalt base course with asphalt material by furnishing and applying the prime, furnishing and placing granular material to protect the prime, and maintaining the prime coat.

3.4 ASPHALT TACK COAT

A. Apply asphalt tack coat beneath each layer of asphalt plant mix to be placed in accordance with NCDOT Standard Specifications for Roads and Structures Section 605, Asphalt Tack Coat.

B. Where a newly placed asphalt surface treatment mat coat has been applied, apply tack coat as directed.

3.5 ASPHALT CONCRETE INTERMEDIATE AND SURFACE COURSES

A. Construct one or more courses of asphalt concrete intermediate or surface mixtures in conformity with the lines, grades, thickness, and typical sections shown on the Drawings.

B. Produce, weigh, transport, place, compact, and test in accordance with NCDOT Standard Specifications for Roads and Structures Section 610, Asphalt Concrete Plant Mix Pavements.

3.6 ASPHALT CONCRETE DRIVEWAYS AND PARKING AREAS

A. Commercial:

1. Base: NCDOT Asphalt Concrete Base Course, Type B-25.0B, match existing depth, minimum 6 inches.

2. Surface: NCDOT Asphalt Concrete Surface Course, Type S-9.5B, match existing depth, minimum 2 inches.

B. Residential:

1. Base: NCDOT Section 520 Aggregate Base Course, match existing depth, minimum 6 inches.

2. Surface: NCDOT Asphalt Concrete Surface Course, Type S-9.5B, match existing depth, minimum 2 inches.

3.7 FIELD QUALITY CONTROL

A. Field Tests and Inspections: As required by NCDOT or municipal owner.

B. Compaction Requirements: Per NCDOT Standard Specifications for Roads and Structures or NCDOT Encroachment Agreement.

C. Bituminous pavement coring sampling and density test reports shall be submitted at completion of project in accordance with the requirements of NCDOT Standard Specifications for Roads and Structures Section 609, Quality Management System for Asphalt Pavements.

D. Non-Conforming Work: Remove and replace materials that do not conform to the requirements of this Section in a manner acceptable to the roadway owner and the Engineer.

3.8 PROTECTION

A. Protect paving from damage from construction activities.

3.9 MAINTENANCE

A. Maintain asphalt concrete intermediate and surface courses in an acceptable condition until final acceptance of the project. Immediately repair or replace damage or defects when directed by the roadway owner or Engineer in a manner acceptable to the roadway owner and Engineer.

END OF SECTION

SECTION 32 16 00
CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS (NC)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete curbs.

2. Concrete gutters.

3. Concrete sidewalks.

4. Concrete driveways and parking areas.

5. Concrete curb ramps.

6. Concrete medians.

B. Related Requirements:

1. NCDOT Encroachment Agreement: Where the requirements of NCDOT Encroachment Agreement differ from this Section, the NCDOT Encroachment Agreement shall govern.

2. Construction Specification Section 32 11 00, Base Courses

3. Construction Specification Section 32 12 00, Flexible Paving

1.2 REFERENCES

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

WWR Welded Wire Reinforcement

B. Definitions:

1. Roadway Owner: NCDOT, local municipality, or private entity as applicable.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate Work with roadway owner.

B. Conduct pre-installation meetings with roadway owner, Owner, and Engineer prior to installation.

C. Coordinate sequencing and scheduling of Work with roadway owner, Owner, and Engineer.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that all materials and products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for cement, aggregates, admixtures, and appurtenances. Include manufacturer’s installation instructions.

D. Design Data: Concrete Mix Designs

E. Test and Evaluation Reports

F. Source Quality Control Submittals

G. Field Quality Control Submittals

H. Additional as required by roadway owner.

1.5 CLOSEOUT SUBMITTALS

A. Record Documentation

1.6 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Portland Cement Concrete: NCDOT Standard Specifications for Roads and Structures Section 1000, Portland Cement Concrete Production and Delivery.

C. Qualifications:

1. Manufacturers: As accepted by NCDOT.

2. Contractors: As accepted by NCDOT.

3. Testing Agencies: As accepted by NCDOT.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

B. Deliver in accordance with NCDOT Standard Specifications for Roads and Structures Section 1000, Portland Cement Concrete Production and Delivery.

1.8 FIELD CONDITIONS

A. Ambient Conditions:

1. Concrete:

a. Do not produce or place asphalt mixtures during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond.

b. Do not place asphalt material when the air temperature, measured in the shade away from artificial heat at the location of the paving operation and the road surface temperature in the shade is less 35 degrees.

PART 2– PRODUCTS

2.1 CONCRETE

A. Portland Cement Concrete, Class A in accordance with NCDOT Standard Specifications for Roads and Structures Article 1000-4, Portland Cement Concrete for Structures and Incidental Construction.

B. Design Strength: 3,000 psi at 28 days minimum unless otherwise shown on the Drawings.

2.2 REINFORCING STEEL

A. NCDOT Standard Specifications for Roads and Structures Section 1070, Reinforcing Steel.

2.3 JOINT MATERIALS

A. NCDOT Standard Specifications for Roads and Structures Section 1028, Joint Materials.

2.4 FORM MATERIALS

A. NCDOT Standard Specifications for Roads and Structures Article 825-2, Forms.

2.5 CURB AND GUTTER

A. NCDOT Standard Specifications for Roads and Structures Section 846, Concrete Curb, Curb and Gutter, Concrete Gutter, Shoulder Berm Gutter, Concrete Expressway Gutter, and Concrete Valley Gutter.

2.6 SIDEWALK

A. NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways, and Curb Ramps.

2.7 DRIVEWAYS AND PARKING AREAS

A. NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways, and Curb Ramps.

2.8 CURB RAMPS

A. NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways, and Curb Ramps.

2.9 TRAFFIC ISLANDS AND MEDIANS

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 852, Traffic Islands and Medians.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify existing conditions match conditions shown on the Drawings. Notify Engineer immediately if existing conditions have changed.

B. Verify suitability of grading, elevations, and existing conditions prior to installing formwork. Examine the areas and conditions under which concrete shall be cast-in-place and notify the Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 PREPARATION

A. Protect and maintain existing conditions in accordance with Construction Specification Section 02 01 00, Maintenance of Existing Conditions.

B. Subgrade:

1. Prepare subgrade by grading, shaping, manipulating the moisture content, and compacting in accordance with NCDOT Standard Specifications for Roads and Structures Section 500, Fine Grading Subgrade, Shoulders, and Ditches before placement of the base material.

2. Prepare in accordance with the requirements Construction Specification Section 31 23 00, Excavation and Fill and Section 31 23 33, Trenching and Backfilling.

3. The surface of the subgrade shall be dry and clean of all foreign substances. Ruts, soft yielding materials, and areas do not meet compaction requirements shall be corrected by removing and replacing the material and properly compacting to the lines and grades shown on the Drawings.

4. Subgrade shall be approved by Engineer prior to placement of concrete.

3.3 GENERAL

A. Construct in accordance with NCDOT Standard Specifications for Roads and Structures Section 825, Incidental Concrete Construction.

B. Fabricate and place reinforcement in accordance with NCDOT Standard Specifications for Roads and Structures Section 425, Fabricating and Placing Reinforcement.

3.4 CURB AND GUTTER

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 846, Concrete Curb, Curb and Gutter, Concrete Gutter, Shoulder Berm Gutter, Concrete Expressway Gutter, and Concrete Valley Gutter.

B. Provide in accordance with NCDOT Standard Detail 846.01, Concrete Curb, Gutter and Curb, and Gutter.

3.5 SIDEWALK

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways, and Curb Ramps.

B. Provide in accordance with NCDOT Standard Detail 848.01, Concrete Sidewalk.

C. Match existing thickness, minimum 4 inches except at driveways where it shall match the driveway thickness, minimum 6 inches.

D. Replace full sections between expansion joints.

E. Provide steel WWR where replacing sidewalk with WWR, minimum 6 x 6 x 8/8.

3.6 DRIVEWAYS AND PARKING AREAS

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways, and Curb Ramps.

B. Provide in accordance with NCDOT Standard Detail 848.02 and 848.03, Driveway Turnout.

C. Where there is less than 5 feet to the nearest contraction or control joint, remove and replace pavement to nearest joint.

D. Residential:

1. Match existing thickness, minimum 6 inches.

2. Provide steel WWR where replacing driveways and parking areas with WWR, minimum 6 x 6 x 8/8.

E. Commercial:

1. Match existing thickness, minimum 8 inches.

2. Match existing reinforcement, minimum 6 x 6 x 8/8 steel WWR.

F. When thickness is greater than 6 inches, furnish and install 5/8 inch hook bolts at 30 inches center-to-center where new abuts existing.

3.7 CURB RAMPS

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 848, Concrete Sidewalks, Driveways and Curb Ramps.

B. Provide in accordance with NCDOT Standard Detail 848.05 and 848.06, Curb Ramp.

C. Comply with American with Disabilities Act requirements.

3.8 TRAFFIC ISLANDS AND MEDIANS

A. Provide in accordance with NCDOT Standard Specifications for Roads and Structures Section 852, Traffic Islands and Medians.

B. Provide in accordance with NCDOT Standard Detail 852.01, Concrete Islands and Detail 852.02, Concrete Mountable Median.

3.9 FIELD QUALITY CONTROL

A. Field Tests and Inspections: As required by roadway owner.

B. Non-Conforming Work: Remove and replace materials that do not conform the requirements of this Section in a manner acceptable to the roadway owner and Engineer.

3.10 PROTECTION

A. Protect finished concrete from damage from construction activities. Repair or replace damaged concrete in a manner acceptable to roadway owner and Engineer.

END OF SECTION

SECTION 32 90 00
PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrade for planting.

2. Spreading topsoil.

3. Applying lime and fertilizer.

4. Seeding.

5. Sodding.

6. Planting (plants and trees).

B. Related Requirements

1.2 REFERENCES

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

PLS Pure Live Seed

B. Definitions:

1. Finish Grade: In terms of planting, the surface that has been established, graded, raked, and prepared to receive lime, fertilizer, seed, mulch, sod, and plantings. The finished surface of planting soil.

2. Sod: An existing established mat of grass that has been removed from one area by a mechanical harvester and transferred to a prepared subgrade at another location, used to render a finished appearance and/or provide immediate resistance to erosion.

3. Subgrade: Surface or elevation remaining after completing the excavation before placement of topsoil.

4. Topsoil: Native, imported, or modified soil which is friable in texture and primarily organic in nature, free of subsoil, clumps of clayey soils, rocks, stones, and other objects over 3/4 inch diameter, and without weeds, roots, gravel, and other objectionable material.

5. Weeds: Vegetative species other than specified species to be established in given area.

C. Reference Standards:

1. The following is a partial list of referenced standards used in this section. See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

AAN	American Association of Nurserymen
ANLA	American Nursery & Landscaping Association
NCSPA	North Carolina Sod Producers Association
TPI	Turfgrass Producers International

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data: Submit product data for seed mix, fertilizer, mulch, sod grass species, and other accessories. Include installation instructions.

D. Topsoil Analysis: Provide a topsoil analysis. Soil testing shall state percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil. The soils report shall state suitability of topsoil for lawn growth and recommend quantities of nitrogen, phosphorus, potash nutrients, and soil amendments to be added to produce satisfactory topsoil.

E. Seed certification: Seed shall be labeled to show it meets North Carolina Seed Law requirements. Seed must have been tested within 6 months of planting. A seed bag tag shall be submitted with final payment request from each type or mixture of seed used. Provide Vendor's statement for seed mixture stating botanical and common name, place of origin, strain, percentage of purity, percentage of germination, and amount of PLS per bag.

F. Sod: Every shipment of sod shall be accompanied by an invoice or sales slip indicating the variety, species, quality grade of the shipment, and date of harvest.

G. Type of herbicide to be used during first growing season to contain annual weeds and application rate.

1.5 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. A representative of the Owner must inspect, review, and approve materials to be used for planting prior to installation.

C. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging. Remove from the site seed which has become wet, moldy, or otherwise damaged in transit.

D. Furnish topsoil, seed, fertilizer, lime, sod, and other materials from a single source throughout the Work.

E. Perform work in the NCDOT right-of-way in accordance with NCDOT requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Store and protect fertilizer in a location where it will remain dry until application.

C. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

D. Follow the nursery's directions for delivery and storage of seed, sod, and plant materials.

E. Deliver sod on pallets or in rolls. Protect exposed roots from dehydration. Do not deliver more sod than can be installed within 24 hours.

F. See PART 3 - EXECUTION of this Section for requirements for delivery, storage, and handling of sod materials.

1.7 PROJECT CONDITIONS

A. Temporary Seeding:

1. Denuded areas to be graded during the construction phases that are not to be brought to final grade within 30 days shall receive temporary seeding within 15 days of completing initial earthwork. Note that the time for establishment of permanent ground cover is 15 working days or 30 calendar days, whichever is shorter. Temporary seeding shall also be used to stabilize finished grade areas if the time of year is outside the specified permanent seeding periods.

2. Seed mixture shall be chosen to ensure the development of plants during the season of planting, and to ensure future growth and permanence.

B. Environmental:

1. Wetlands: Before crossing or entering jurisdictional wetlands, verify that a wetlands permit has been obtained for the encroachment and review special restrictions imposed on the project. Take care to not disrupt drainage, alter, or destroy wetlands unless a permit has been obtained, in which case, the conditions of the permit must be strictly followed. Restore areas noted on the Drawings, the Contract Documents, and/or in the permit. Encroachments shall be subject to USACOE and NCDEQ Division of Water Resources approval and permitting conditions.

1.8 WARRANTY

A. The warranty period for plantings shall be 12 months from the date of substantial completion if not designated as temporary cover.

PART 2– PRODUCTS

2.1 TOPSOIL

A. Comply with ASTM D 5268, pH range of 5.5 to 7, a minimum of 4% organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

B. On-site Topsoil Source: Reuse surface soil stockpiled on site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth. Provide erosion control measures to prevent erosion and off-site deposition of topsoil. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches in depth. Do not obtain from swamps or marshes.

C. Off-site Topsoil Source: Contractor may supplement on-site source with imported or manufactured topsoil when quantities are insufficient. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4 inches in depth. Do not obtain from swamps or marshes.

2.2 FERTILIZER

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

C. Cyanic compound or hydrated lime not permitted in mixed fertilizers.

D. Application Rate:

1. For permanent seeding and sod: 600 lb/ac of 10-20-20 or according to soil tests.

2. For temporary seeding: 600 lb/ac of 10-20-20 or according to soil tests.

2.3 LIME

A. Lime shall be in accordance with ASTM C 602, “Standard Specification for Agricultural Liming Materials,” agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, Class O, with a minimum 95 percent passing through No. 8 sieve and a minimum 55 percent passing through No. 60 sieve.

B. Provide a pelleted form of limestone with a water-soluble binder to speed breakdown of limestone where significant pH adjustment is necessary to establish plantings.

C. Application Rate: 4,000 lb/ac or according to soil tests.

2.4 SEED

A. Seed shall be entirely free from bublets or seed of Bermudagrass (except where specifically called for in the seed mixture), Johnson Grass, Nutgrass, Sanbur, Wild Onion, Wild Garlic, Witchweed, and Crotalaria.

B. Seed shall not contain more than 2%, singly or collectively, of crop seed other than the kind or kinds of seed specified.

C. Provide the following seed mixture according to region, application, and planting date:

Seeding Region & Application	Planting Period	Seed Mixture	Rate (lb/ac)
Mountain or Piedmont, low maintenance areas	Feb. 15 – Apr. 30 or Sep. 1 – Oct. 31	Tall fescue Pensacola Bahiagrass Kobe lespedeza	80 50 40
Mountain or Piedmont, high maintenance areas (i.e. lawns)	Feb. 15 – Apr. 30 or Sep. 1 – Oct. 31	Tall fescue blend (2 or 3 improved varieties) Rye (grain)	200 25
Mountain or Piedmont, grass lined swale	Feb. 15 – Apr. 30 or Sep. 1 – Oct. 31	Tall fescue	200
Coastal Plain, low maintenance	Apr. 1 – Jul. 15	Pensacola Bahiagrass Common Bermudagrass(*) German millet ** or Bermudagrass at 5 lb/ac*	50 10 10
Coastal Plain, high maintenance (i.e. lawns)	Mar. 1 – Jun. 30	Centipedegrass	15
Coastal Plain, high maintenance (i.e. lawns)	Apr. 1 – July 31	Common Bermudagrass	60
Coastal Plain, grass lined swale	Apr.1 – July 31	Common Bermudagrass	80

D. Provide the following temporary seed mixture according to planting date:

Planting Period	Seed Mixture	% by Weight	Rate (lb/ac)
Jan. 1 – May 1	Rye (grain)	100	120
May 1 – Aug. 15	German Millet	100	40
Aug. 15 – Dec. 30	Rye (grain)	100	120

2.5 MULCH

A. For seeded areas: Clean, seed-free, threshed straw of oats, wheat, barley, rye, beans, peanuts, or other locally available mulch material which does not contain an excessive quantity of matured seeds of noxious weeds or other species that will grow or be detrimental to seeding, or provide a menace to surrounding land. Do not use material which is fresh or excessively brittle, or which is decomposed and will smother or retard growth of grass.

B. Around trees and shrubs: Hardwood chips, shredded bark, or other material as approved by the Engineer.

2.6 SOD

A. Sod shall be “Nursery Turfgrass Sod” as defined by TPI, planted on cultivated agricultural land and grown specifically for turfgrass sod purposes. It shall have been mowed regularly and carefully and otherwise maintained from planting to harvest to assure reasonable quality and uniformity. Only sod secured from approved sources shall be used.

B. Sod shall have a strong fibrous root system and be free of stones, burned, or bare spots.

C. Sod shall be Standard Grade Turfgrass Sod, defined as being visibly consistent, with no obvious patches of foreign grasses or visible broadleaf weeds when viewed from a standing position. In no case may the total amount of foreign grasses or weeds exceed two percent of the total canopy. The turfgrass sod shall be neatly mowed and be mature enough that when grasped at one end it can be picked up and handled without damage.

2.7 PLANTS AND TREES

A. Provide trees, plants, and ground cover of species and size identified in the plant schedule, grown in climatic conditions similar to those in locality of the Work.

B. Provide species in accordance with Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.

C. Label individual plants or each bundle of plants when tied in bundles.

D. Provide nursery grown stock, freshly dug. No heeled-in, cold storage, or collected stock will be accepted.

E. Provide plants that are No. 1 Grade conforming to “American Standard for Nursery Stock” of AAN. Plants shall be sound, healthy, and well-branched, with symmetrical, vigorous, and balanced root and top growth; free from disease, injurious insects, mechanical wounds, broken branches, decay, and other defects.

F. Furnish trees with reasonably straight trunks, well balanced tops, and single leader.

G. Furnish deciduous plants in dormant state, except those specified as container grown.

H. Balled and burlapped plants shall have firm, natural balls of soil.

I. Container-grown plants shall have roots well established in soil, grown in container for at least one growing season.

J. Bare root plants shall have an intact root system, cleaned of earth, wrapped immediately in wet straw, moss, or other suitable material.

2.8 WATER

A. Water shall be clean, fresh, and free of substances or matter capable of harming or inhibiting vigorous growth of grass, sod, trees, plants and groundcover.

B. Provide water from an approved source. Approval shall be received prior to use.

2.9 ACCESSORIES

A. Tree Stakes: As detailed or in accordance with State Specifications.

B. Staking Wire: Minimum 12 GA galvanized wire.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify that fills and trench backfilling have been inspected and accepted by the Owner.

B. Verify that subgrades have been contoured and compacted and are ready to receive the Work of this section.

C. Examine the areas and conditions under which planting is to be performed and notify the Engineer, in writing, immediately of conditions which differ from the Drawings or which are detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

D. Examine subgrade to receive sodding and associated work and conditions under which work will be installed. Do not proceed until unsatisfactory conditions have been corrected in a manner complying with the Contract Documents and are acceptable to the installer. Starting of work within a particular area will be construed as installer's acceptance of surface conditions.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, along with lawns and existing exterior plants from damage caused by planting operations.

B. Protect undisturbed lawns, shrubs, and trees and promptly repair damages caused by seeding, sodding, and groundcover operation.

C. Protect landscaping and other features remaining as final Work.

D. Proceed with planting only when existing and forecasted weather conditions permit.

3.3 PREPARATION OF SUBGRADE

A. General:

1. Excavate, grade, and prepare subgrade for seeding and sodding in accordance with Construction Specification Section 31 23 00, Excavation and Fill; Section 31 23 33, Trenching and Backfill; and Section 31 22 00, Grading.

2. Prepare sub-soil to eliminate uneven areas and low spots. Correct any surface irregularities to prevent pocket or low areas which will allow water to stand. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas. The subgrade upon which this work is to be placed shall be smoothly shaped and compacted to a firm, even surface conforming to the elevations shown on the Drawings.

3. When establishing finish grades, remove and dispose of clods, hard lumps, rocks, roots, litter, and other foreign matter not passing through the teeth of a hand iron rake. Tractor drawn raking equipment that compacts lawn areas will not be allowed. Fine grade the site to ensure that the finished grade conforms to

the proposed finished grades as shown on the plans and the applicable standard details.

4. Dense or compacted soil areas and cut grade soil areas shall be ripped at greater than 6 inches of depth with a spring toothed ripper or similar equipment after finish grade but before tillage. Severely compacted surfaces shall be ripped to at least 12 inches of depth. No compaction soils shall be covered with soil fill until ripped.

5. Remove debris, roots, branches, and stones in excess of one inch. Remove foreign materials, weeds, and undesirable plants and their roots. Remove contaminated subsoil. Remove soft, mucky, frozen, and unsuitable material and replace with approved material.

6. Finished lawn areas shall be sufficiently high to meet paved areas and catch basins after settlement.

B. Placing Topsoil

1. Where seeding, sodding, and/or planting are required, strip topsoil to a nominal depth of 4 inches, and stockpile. After compaction of backfill, replace topsoil during dry weather.

2. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

3. Remove roots, weeds, rocks over 1 inch in any dimension, sticks, rubbish and extraneous matter, and foreign material while spreading.

4. Manually spread topsoil close to buildings, structures, trees, landscaping, ornamental structures, and other existing items to prevent damage.

5. Lightly compact placed topsoil.

6. Remove surplus subsoil and topsoil from site.

7. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.4 APPLICATION OF FERTILIZER AND LIME

A. Prior to applying lime and fertilizer, loosen areas with a double disc or other suitable device if the soil has become hard or compacted. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil. Finish grades on slopes shall be roughened parallel to contours to maximize surface storage and minimize runoff.

B. Distribute lime and fertilizer uniformly over areas to be seeded.

C. Thoroughly incorporate lime and fertilizer into soil to a depth of at least 2” by disking, harrowing, or other approved methods. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.

D. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture. Roll and rake, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted soon after preparation.

E. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.5 RESTORATION OF VEGETATION - GENERAL

A. The work to be done to acquire the necessary vegetative cover shall include but is not limited to preparation of the subgrade, application of lime and fertilizer, seeding, mulching to hold the seed and soil in place until germination and growth occur, and sodding.

B. Restore vegetation as the work progresses. Areas to be protected by vegetative cover include areas disturbed during construction that are not otherwise stabilized by gravel, concrete, asphaltic paving, or other impervious built-upon surface.

C. All disturbed surfaces shall be vegetated, non-erosive, and stable within 15 working days of completion of the land disturbing activity. In areas where construction will resume later than 15 days, provide temporary seeding to restore vegetation until construction resumes.

D. Permanently restore disturbed areas as soon as practical after completion of construction in an area but in no less than 15 working days.

E. Maintained vegetated areas to prevent erosion throughout the life of the project.

F. Restore disturbed areas as specified but in no case less than the original vegetative condition.

G. When established residential or commercial lawns are disturbed, permanent grass seeding shall match existing grass type. When unmaintained areas are disturbed, permanent grass seeding shall be appropriate for the region and conditions. Unless noted otherwise, Piedmont and Mountain region projects shall use a Tall Fescue blend and coastal region projects shall use Centipedegrass or common Bermudagrass.

H. Portions of the project area are in developed areas with established lawns which extend from the property line to the pavement edge. In some situations, the Owner may direct the Contractor to provide sodding for specific lawns. In these situations, provide sodding that matches the existing type of grass. This could include the following types of sod: Bermuda, Carpet, Centipede, St. Augustine, and Zoysia.

I. In general, where streets have roadside ditches, the area from the edge of pavement to the centerline of the ditch will be seeded or sodded, depending on the existing condition of the grass. The Owner or Engineer will determine which areas will be sodded.

J. Areas disturbed the construction limits and without Owner authorization shall be restored by the Contractor to the requirements of this Section at his own expense.

K. Apply water to seeded, sodded, and planted areas as necessary to provide vigorous growth.

L. Alternative methods such as hydro-seeding or hydro-mulching may be considered on an individual basis.

3.6 PERMANENT AND TEMPORARY SEEDING

A. Seed NCDOT rights-of-way in accordance with NCDOT specifications and the requirements of the approved encroachment agreement.

B. Apply the proper seed mixture at the specified rate for the proper growing period.

C. Where utilities are installed through a manicured lawn, the seeding shall be modified to restore ground cover to match the existing lawn.

D. Do not use seed which is wet, moldy, or otherwise damaged.

E. Employ satisfactory methods of sowing using mechanical power-driven drills or seeders, mechanical hand seeders, or other approved equipment.

F. Distribute seed evenly over entire area, 50 percent sown in one direction, remainder at right angles to first sowing.

G. Do not sow immediately following heavy rain or when winds are over 12 mph.

H. Lightly rake seed into soil followed by light rolling or cultipacking.

I. Do not seed areas in excess of that which can be mulched on same day.

J. Provide the proper care of the seeded area during the period that vegetation is being established. In the event of an erosive rain before an adequate stand of vegetation has been established, damaged areas shall be re-graded, re-limed, re-fertilized, reseeded, and re-mulched at the Contractor's expense.

K. A stand of grass shall be considered acceptable when area cover is at least 95%. Overseed and otherwise maintain the grassed areas until the stand of grass has reached a uniform height of 3 to 4 inches and a state of uniform species maturity. Annual weed grasses and grain weeds shall not be considered part of the area cover, and seeding stands shall not be considered acceptable until the stand reaches a state of uniform post-seeding maturity for the specified species.

L. If straw mulching results in competing stands of grain, maintenance shall include mowing of the grain weed stand to a height of 4 inches prior to reaching a height of 10 inches. Grain weed stands shall not be considered part of the minimum 95% area cover. Unacceptable grass stands shall be aerated and overseeded at half the original rate, as many times as necessary to establish an acceptable stand.

3.7 MULCHING

A. Immediately protect seeded areas against erosion by mulching. Spread mulch in continuous blanket using 2 tons per acre to a depth of 4 or 5 straws. Apply asphaltic tack at 0.10 gallons per square yard or as otherwise recommended by manufacturer.

3.8 EROSION FABRIC

A. Cover seeded slopes where grade is 3:1 or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

B. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.

C. Secure outside edges and overlaps at 36 inch intervals with stakes.

D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.9 SODDING

A. Existing sod stands may be carefully taken up, protected, and replaced to their original condition, or the Contractor may elect to install new sod of the same grass type.

B. After inspection and approval of the source of sod by the Owner, the sod shall be cut with approved sod cutters to such a thickness that after it has been compacted, it shall have a uniform thickness of not less than 2 inches. Sod sections or strips shall be cut in uniform widths, not less than 10 inches, and in lengths of not less than 18 inches, but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

C. The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stored in an unrolled condition, irrigated, and protected from exposure to air drafts and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, permission to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

D. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted during periods of drought with the approval of the Owner, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches immediately prior to laying the sod.

E. The sod shall be moist and shall be placed on a moist earth bed. Do not handle sod with pitchforks. Do not dump sod from vehicles. Carefully place sod by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. Immediately press sod firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and ensure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, when replacing it, the workmen shall work from ladders or treated planks to prevent further displacement. Screened soil of good quality shall be used to fill cracks between sod sections. The quantity of the fill soil shall not cause smothering of the grass.

F. When laid on surfaces of slopes which may cause sod to slide due to the height and slope of the surface or due to the nature of the soil, sod shall be stabilized by a method acceptable to the Owner to ensure proper binding and to prevent slippage. Anchoring is best achieved by using wooden pegs 6 to 10 inches long to anchor the sod to the slope. To avoid interference with the future mowing operations, pegs shall be driven beneath the mower cutting height. Curvilinear shapes and forms shall be cut and trimmed with a sharp cutting tool to assure proper shapes and forms.

G. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately 1 inch below the pavement edge. Where the flow will be over the sodded areas and onto the paved surface around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

H. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. Water sodded areas a minimum of 1 inch of water, twice per week until re-established and at least once per week thereafter until work is accepted. Watering shall be done in a manner, which will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

3.10 PLANTING

A. General:

1. Place and orient plants and trees for best appearance.

2. Set plants and trees vertically.

3. Remove non-biodegradable root containers.

4. Set plants and trees in pits or beds, partly filled with prepared plant mix, at minimum depth as indicated on Drawings under each plant. Remove or loosen burlap, ropes, and wires from top half of root ball.

5. Place bare root plant and tree materials so roots lie in natural position. Backfill soil mixture in 6-inch layers. Maintain plant and tree materials in vertical position.

6. Saturate soil with water when pit or bed is half full of topsoil and again when full.

B. Plant Relocation and Re-planting:

1. Relocate plants as indicated on the Drawings.

2. Ball or pot removed plants when temporary relocation is required.

3. Replant plants in pits or beds, partly filled with prepared topsoil mixture, at minimum depth as indicated on Drawings under each plant. Remove or loosen burlap, ropes, and wires from top half of root ball.

4. Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6-inch layers. Maintain plant materials in vertical position.

5. Saturate soil with water when pit or bed is half full of topsoil and again when full.

C. Installation of Accessories:

1. Place mulch beds around plants where indicated on Drawings.

2. Wrap deciduous shade and flowering tree trunks and place tree protectors.

3. Brace plants vertically with plant-protector-wrapped guy wires and stakes to the following:

Tree Caliper	Tree Support Method
1 inch	1 stake with one tie
1 - 2 inches	2 stakes with two ties
2 - 4 inches	3 guy wires [with eye bolts and turn buckles]
Over 4 inches	4 guy wires [with eye bolts and turn buckles]

D. Field Quality Control:

Plants and trees will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.11 MAINTENANCE

A. Begin maintenance of planted areas immediately after each portion is planted and continue until final acceptance.

B. Provide general care for the restored areas as soon as the areas have been seeded and mulched, sod has been laid, and plantings have been installed. Such care shall continue until grass is well established and exhibits vigorous growing condition and through final inspection and acceptance of the work. Restored areas shall be protected against traffic or other use by warning signs or barricades as approved by the Owner.

C. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, uniform lawn, free of weeds and eroded or bare areas.

D. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

E. Provide and maintain temporary piping, hoses, and watering equipment as required to convey water from water sources and to keep planted areas uniformly moist as required for proper growth. Provide a suitable backflow prevention device for filling of water tank trucks or trailers. Lay out temporary lawn watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch. Water sodded, seeded, and planted areas as necessary for providing for vigorous growth of sod, seed, and plants.

F. Mow the sodded and seeded areas with approved mowing equipment as soon as there is enough top growth to cut with mower set at recommended height for principal species planted. Repeat mowing as required to maintain height. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowings as required to maintain a height of 2 to 3 inches. Do not mow lower than 2 inches.

G. In the event that weeds or other undesirable vegetation are permitted to grow to such an extent that, either cut or uncut, they threaten to smother the species, they shall be mowed and the clippings raked and removed from the area.

H. Maintenance of sodded lawn areas, shall include watering until a depth of 4 inches is wet, spot weeding, mowing, application of herbicides, fungicides, insecticides and re-sodding until a full, uniform stand of grass, free of weeds, undesirable grass species, disease and insects is achieved and accepted. Water sod thoroughly as required to establish proper rooting.

I. Re-mulch with new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.

J. Unacceptable plantings are those areas that do not meet the quality of the specified material, produce the specified results, or were not installed to the specified methods.

3.12 CLEANUP

A. Remove surplus soil and waste material, unsuitable soil, trash, and debris and legally dispose of off-site.

3.13 PROTECTION

A. After seeding and mulching, care shall be taken to prevent runoff and destruction of seeded areas.

3.14 FINAL ACCEPTANCE

A. Lawns will be acceptable when requirements, including maintenance, have been met, and a healthy, uniform, close stand of specified grass is established, free of weeds, bare or dead spots, and surface irregularities.

END OF SECTION

SECTION 33 01 10.58
DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Disinfection of new water mains.

2. Disinfection of repaired water mains.

B. Related Requirements: City of Hickory Engineering MOP Water Specifications

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions: Not Used.

C. Reference Standards:

1. The following is a partial list of referenced standards used in this section. See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

AWWA B300 Hypochlorites

AWWA B301 Liquid Chlorine

AWWA C651 Disinfecting Water Mains

AWWA Manual M12, Simplified Procedures for Water Examination

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with Owner for interruption of service, operation of valves, line cut-ins, or placement of a tapping sleeve and valve in accordance with Construction Specification Section 33 14 13, Water Utility Distribution Piping.

B. Coordinate and schedule disinfection of water mains with Owner at least one week in advance. Owner shall be present during disinfection operations.

C. Notify residents in writing at least 48 hours prior to interruption and then again 24 hours prior to interruption.

D. Pre-disinfection Meeting: Conduct a pre-disinfection meeting with Owner and RPR a minimum of 24 hours before disinfection to review the process and procedure required by Owner. Comply with Owner requirements.

E. Sequencing: See City of Hickory Engineering MOP Water Specifications.

F. Scheduling: See City of Hickory Engineering MOP Water Specifications.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that materials and products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for materials and products.

D. Bacteriological Test Reports.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Testing Agencies: Company specializing in testing potable water systems, certified or approved, as required by local or state authorities.

PART 2– PRODUCTS

2.1 FORMS OF CHLORINE:

A. Liquid Chlorine

B. Sodium Hypochlorite Solution

C. Calcium Hypochlorite Granules or Tablets

PART 3– EXECUTION

3.1 GENERAL

A. Basic Disinfection Procedure (AWWA C651-05):

1. Inspect materials to be used to ensure their integrity.

2. Prevent contaminating materials from entering the water main during storage, construction, or repair. Note potential contamination at the construction site.

3. Remove, by flushing or other means, those materials that may have entered the water main.

4. Chlorinate any residual contamination that may remain, and flush the chlorinated water from the main.

5. Protect the existing distribution system from backflow caused by hydrostatic pressure test and disinfection procedures.

6. Document that an adequate level of chlorine contacted each pipe to provide disinfection.

7. Determine the bacteriological quality by laboratory test after disinfection.

8. Final connection of the approved new water main to the active distribution system.

3.2 PREPARATION

A. Comply with guidelines in AWWA C651 for preventive and corrective measures during construction.

3.3 METHODS OF CHLORINATION FOR NEW MAINS

A. Comply with one of the three methods of chlorination in AWWA C651 required by Owner:

1. Tablet Method

2. Continuous Feed Method

3. Slug Method

3.4 FINAL FLUSHING

A. Provide final flushing in accordance with AWWA C651.

B. Clear the main of heavily chlorinated water.

C. Where there is any possibility that the chlorinated discharge will cause damage to the environment, apply a neutralizing chemical to the water to thoroughly neutralize the residual chlorine.

3.5 FINAL CONNECTIONS TO EXISTING MAINS

A. Follow sanitary construction practices during installation of the final connection so that there is no contamination of the new or the existing water main.

B. Comply with AWWA C651 for connections.

3.6 DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING EXISTING MAINS

A. Comply with the following procedures in AWWA C651 when existing mains are wholly or partially dewatered:

1. Provide trench treatment.

2. Swab or spray (with a 1% hypochlorite solution) the interior of pipe and fittings used in making the repairs before they are installed.

3. Flush toward the work area from both directions if possible.

4. Where practical, in addition to the procedures above, the section of the main in which the break is located shall be isolated, service connections shut off, and the section flushed and chlorinated as described in AWWA C651 Section 4.4.4.

5. Take bacteriological samples following the procedures in AWWA C651 Section 5.1.3.

B. AWWA C651 indicates that the existing main may be returned to service prior to the completion of bacteriological testing after the appropriate procedures have been completed, in order to minimize the time customers are without water. The Owner will determine when the main can be placed back into service.

3.7 SPECIAL PROCEDURE FOR CAULKED TAPPING SLEEVES

A. In accordance with AWWA C651, before a tapping sleeve is installed, thoroughly clean the exterior of the main to be tapped and the interior surface of the sleeve by lightly dusting with calcium hypochlorite powder.

3.8 BACTERIOLOGICAL TESTS

A. Comply with AWWA C651 for performing bacteriological tests.

B. If the initial disinfection fails to produce satisfactory bacteriological results or if the other water quality is affected, re-disinfect the mains in accordance with AWWA C651. Complete the bacteriological tests again and repeat the disinfection and testing cycle until acceptable results are obtained.

END OF SECTION

SECTION 33 05 23.16
UTILITY BORED CROSSING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation of a Steel Casing Pipe by Bore and Jack Method.

B. All Work under this Section shall be for a guaranteed crossing. In the event that the first bore attempt is not successful, the Contractor shall relocate the bore and jack to a location, approved by the Owner and NCDOT or right-of-way owner, and attempt the bore and jack again at no additional cost to the Owner. The Contractor shall continue this process until a successful bored crossing is completed. No additional payment will be made for multiple bore attempts or for additional materials and labor required for revising the bore location or the pipeline alignment to accommodate a relocated bored crossing.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements, for abbreviations and acronyms used throughout the Contract Documents.

B. Definitions:

1. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

2. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements, for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate bored utility crossings with pipe installed by direct-bury.

2. Highway crossings shall comply with standards set forth in the "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" from the N.C. Department of Transportation, Division of Highways and the "Standard Specifications for Highway Bridges" from AASHTO.

3. Railroad crossings shall comply with standards set forth in the "Specifications for Pipelines Conveying Non-Flammable Substances" from the American Railway Engineering and Maintenance-of-Way Association.

4. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before digging for locates of existing utilities. Confirm utilities have been located prior to excavating.

B. Pre-installation Meetings:

1. Conduct a Pre-installation Meeting in accordance with Construction Specification Section 01 31 00, Project Management and Coordination, Article 1.5, Pre-installation Meetings.

2. In addition to the requirements of Construction Specification Section 01 31 00, Article1.5, review the following:

a. Identify the Installation Specialist.

b. Bored Installation Plan.

c. Method of Monitoring and Controlling Line and Grade.

d. Shoring Plan.

e. Method of Dewatering.

f. Survey Methodology to Monitor Settlement of the Roadway or Railroad.

g. Work Schedule.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Material Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that pipe, and other products provided have been manufactured and tested in accordance with the requirements of the applicable referenced standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for steel casing pipe, carrier pipe, spiders, end seals, and appurtenances. Shop Drawings shall also include complete installation and adjustment instructions and recommendations.

D. Contractor Qualifications: Submit a list of ten projects completed in the last two years by both the Contractor and Installation Specialist with pipe of an equal or greater length and diameter than that required by this project. The submittal shall include owner name, address, telephone number, and contact person; prime contractor name, address, telephone number, and contact person; design engineer name, address, telephone number, and contact person; date and duration of work, and location.

E. NCDOT and Railroad Submittals:

1. Boring Installation Plan: Proposed method of installation, equipment to be used, detailed layout information, methods to be implemented if adverse soil conditions (i.e.: running sand, water, etc.) are encountered during installation, and design certifications, all sealed and signed by a Professional Engineer licensed in the State of North Carolina shall be submitted to the N.C. Department of Transportation, Design Services Unit and/or railroad company for approval by these entities prior to starting work.

2. Shoring Plan: Plans, specifications, details, and design computations for pit shoring, for the protection of the roadway or railway, signed and sealed by a Professional Engineer licensed in the State of North Carolina, shall be submitted to the N.C. Department of Transportation, Design Services Unit, or railroad company for approval when requested by these entities. Excavation of pits shall

not proceed until the shoring plans have been approved and made a permanent part of the NCDOT encroachment agreement or railroad occupancy agreement.

3. Survey methodology to monitor settlement of the roadway or railroad.

4. All submittals shall be revised and resubmitted as directed by the NCDOT and railroad company.

5. All submittals shall be copied to the Engineer and Owner.

F. Owner or local municipality may require submittals for bored crossings of municipal streets in accordance with the requirements established for NCDOT/railroad submittals.

G. Provide a detailed installation schedule that includes each step of the process.

H. Record Drawings: Maintain a clean, undamaged set of contract drawings and shop drawings to be marked up for submittal as record drawings. The set shall be marked in red to show the actual installation where the installation varies from the Work as originally shown. Mark the drawing most capable of accurately showing the constructed conditions. Where shop drawings are used, record a cross-reference at the corresponding location on the contract record drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Drawings shall be signed and dated by Contractor's construction project manager.

I. No work shall proceed until all submittals have been approved.

J. Submittals, including those sealed by a Professional Engineer, shall be provided at no additional cost to the Owner.

K. Allow sufficient time for review of submittals by the NCDOT, the railroad company, or the municipality in the project schedule. Provide NCDOT, railroad, and municipal submittals to each respective entity within 30 days of Notice to Proceed to allow sufficient time for review and not delay the project. The Owner shall not be responsible for delays resulting from insufficient or unapproved submittals.

1.5 QUALITY ASSURANCE

A. Contractor Qualification Requirements:

1. Provide the full-time services of a competent Installation Specialist during the bore and jack process to oversee the installation and assist with technical matters. He shall advise the Contractor on matters including boring and jacking, quality assurance of the Work, safety, and other items as necessary.

2. The Contractor and Installation Specialist shall both have a minimum of 5 years' experience in the technique of boring and jacking. Both shall have performed at least 10 bore and jacks in the last 2 years with pipe of an equal or greater length and diameter than that required by this project.

B. Bore and Jack Equipment Manufacturer Requirements:

1. Bore and jack equipment shall be manufactured by companies currently supporting the equipment with technical staff and resources that can supplement the Contractor's knowledge and experience and provide additional technical expertise. Bore and jack equipment no longer supported by the manufacturer will not be accepted.

2. Bore and jack equipment manufacturer technical staff shall visit the project site in the event that forward progress of the pipe stops and when requested by the Engineer to confirm proper operation of the bore and jack equipment, evaluate and assist with resolving problems, and provide additional technical assistance to the Contractor. This assistance shall be at no additional cost to the Owner.

C. NCDOT roadway crossings shall comply with the requirements of the NCDOT "Policies and Procedures for Accommodating Utilities on Highway Rights of Way" and the requirements stipulated in the NCDOT encroachment agreement.

D. Railroad crossings shall comply with the standards set forth in the "Standard Specifications for Pipelines Conveying Flammable and Non-Flammable Substances" by the American Railway Engineering and Maintenance-of-Way Association, the design and construction guidelines of the railroad company, and the requirements in the railroad pipeline occupancy agreement.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements, for transporting, handling, storing, and protecting products.

B. Inspect each truckload of materials thoroughly upon arrival at the site. Examine materials for damage and verify conformance with approved submittals.

C. Transport, receive, store, and handle pipe and appurtenances in accordance with manufacturer recommendations.

D. Exercise special care in handling pipe during transportation, delivery, storage, and distribution to avoid damage and unnecessary stress. Adequately supported pipe to prevent sagging or bending. Damaged pipe will be rejected and shall be replaced at the Contractor’s expense.

E. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

F. Block individual and stockpiled pipe to prevent unintentional movement.

G. Pipe shall be protected during handling against impact shocks and free fall. Care shall be taken when unloading pipe to avoid damaging the pipe lining.

H. Protect pipe coating during handling using methods recommended by the manufacturer. The use of bare cables, chains, hooks, metal bars or narrow skids in contact with coated pipe is not permitted.

I. Each section of the pipe shall be carefully examined for damage and conformity with approved submittals and these specifications before installation.

J. Pipe that has been damaged either in transit or during unloading shall be plainly marked and immediately removed from the project site.

1.7 SITE CONDITIONS

A. See Construction Specification Section 02 32 00, Geotechnical Investigations, for subsurface data available through Owner.

PART 2– PRODUCTS

2.1 STEEL CASING PIPE

A. Steel casing pipe shall be smooth wall or spiral welded steel pipe with a minimum yield strength of 35,000 psi. All joints shall be butt welded with a full depth, single "V" groove weld. The casing pipe shall conform to ASTM A 139, Grade B (without hydro-test), ASTM A53, Grade B (without hydro-test), or ASTM A252, Grade 2**.**

B. Provide structural design of the casing pipe. Materials and installations shall be designed and manufactured to withstand the maximum stresses occurring during fabrication, installation, and service. If requested by the Owner, submit a certification that the casing pipe has been designed to resist all loads implied and reasonably anticipated and in strict conformance with Section 16 of the Standard Specifications for Highway Bridges adopted by AASHTO. The certification shall also state that the design of the casing pipe has been performed by a Professional Engineer licensed in the State of North Carolina.

C. Casing pipe shall be a minimum of 6 inches larger in diameter than the outside diameter of the carrier pipe bell. The minimum pipe size and wall thickness shall be as indicated in the following table.

Carrier Pipe Size	Casing Pipe ID	Minimum Wall Thickness	
		AREMA-not coated	NCDOT
6 inches and less	12 ¾ inches	0.188 inches	0.188 inches
8 inches	16 inches	0.281 inches	0.250 inches
	18 inches	0.312 inches	0.250 inches
	20 & 22 inches	0.344 inches	0.250 inches
12 inches	24 inches	0.375 inches	0.250 inches
14 inches	26 inches	0.406 inches	0.312 inches
16 inches	28 inches	0.438 inches	0.312 inches
18 inches	30 inches	0.469 inches	0.312 inches
20 inches	32 inches	0.500 inches	0.375 inches
24 inches	34 & 36 inches	0.531 inches	0.375 inches
30 inches	42 inches	0.625 inches	0.500 inches
36 inches	48 inches	0.688 inches	0.500 inches
42 inches	54 inches	0.781 inches	
48 inches	66 inches	0.938 inches	
54 inches	72 inches	1.000 inches	

2.2 CARRIER PIPE

A. Carrier pipe shall be restrained joint ductile iron pipe, minimum 18-foot lengths, of the class indicated on the drawings and in accordance with the following:

Conveyance Pipeline	Specification Section
Water Main	Section 33 14 13 – Public Water Utility Distribution Piping

2.3 SPIDERS

A. Band shall be a minimum 14-gauge, T 304 stainless steel, a minimum of 12 inches wide.

B. Liner shall be PVC a minimum of 0.09 inches thick with a hardness-durameter 85-90 and electrical properties of 1380 V/min.

C. Risers shall be a minimum 10-gauge, T 304 stainless steel, reinforced over 6 inches height, MIG welded to band.

D. For bolted connections, bolts shall be minimum 5/16-inch, T 304 stainless steel.

E. Runners shall be glass reinforced plastic or nylon or ultra-high molecular weight polymer with a minimum width of 2 inches.

F. Spiders shall be stainless steel as manufactured by ITT Grinnell, Charlotte, NC; Spider Manufacturing, Durham, NC; Advanced Products & Systems (APS) model SSI with EPDM skids, Lafayette, LA, or approved equal. See standard detail in Drawings

2.4 END SEALS

A. Construct end seals from brick, block, and mortar as indicated on detail in Drawings.

2.5 GROUT

A. Grout for filling voids outside of the proposed casing shall meet the requirements of Article 1040-9 of the NCDOT Standard Specifications.

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify that existing utility main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

A. Verify that water main, sanitary sewer, or force main elevations are as indicated on the Drawings prior to excavation and installation of casing pipe.

B. Excavations and pits shall be well sheeted and braced as necessary for safe and adequate access for workmen, inspections, and materials and shall be of a size suitable for equipment and material handling requirements. Comply with OSHA requirements. Shoring and sheeting shall not remain as a permanent installation and must be removed upon completion of the Work.

C. Excavations and pits located within the NCDOT right-of-way shall be a minimum of 5 feet from the toe of the roadway embankment of ditch bottom and shall be completely isolated from the roadway traffic with precast concrete barriers installed in accordance with the NCDOT Roadway Standard Drawings, Standard No. 150.02.

3.3 INSTALLATION

A. General:

1. The Contractor shall be responsible for the design, adequacy, and methodology of the bored and jacked casing pipe installation.

2. Install the steel casing pipe and carrier pipe in conformance with the lines, grades, and details shown on the Drawings.

3. Construction shall be performed in such a manner as to prevent settlement of the ground or road surface or railroad above the pipeline. The Contractor shall be responsible for rectifying and bearing costs associated with rectifying settlement and heaving related issues to the satisfaction of the Owner, NCDOT, local municipality, or the railroad company.

B. Casing Pipe Installation:

1. Bored and jacked installations shall be jacked through dry bores slightly larger than the pipe bored progressively ahead of the leading edge of the advancing pipe as spoil is mucked by the auger back through the pipe. As the dry boring operation progresses, each new section of the casing pipe shall be 360-degree butt welded, using a full depth, single "V" groove weld, to the next section previously jacked into place. Field welded joints shall be performed by AWS D.1.1 certified welders.

2. The boring equipment to be used for installing the jacked casing shall be of such size and capacity to allow the boring to proceed in a safe and expeditious manner. The installation of the casing and boring of the hole shall be done as rapidly as possible and shall be done simultaneously to avoid voids, cave-ins, or settlement.

3. Jacks shall have sufficient capacity to complete the work without interruption, except for adding pipe lengths. Intermediate jacks may be used. Intermediate jacking pits will not be permitted.

4. When augers and cutting head or similar devices are used for casing pipe advance, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. Over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than 1/2 inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

5. If voids are encountered or occur outside the casing pipe, grout holes shall be installed in the top section of the casing pipe at 10-foot (maximum) centers and the voids filled with grout with sufficient water added to produce a flowable mixture and at sufficient pressure to prevent settlement.

6. The Contractor shall be prepared to bore through weathered or partially weathered rock, if encountered, with a specialized bit. Costs associated with this provision shall be deemed as included in the Unit Price Bid for each location and no additional payment will be made.

7. In the event an obstruction is encountered during the boring and jacking operation, and the casing pipe is at least 30 inches in diameter, the auger shall be withdrawn and the obstruction removed. If a boulder is encountered and is removed by blasting or other approved method, the void shall be filled with grout, as previously specified. No blasting shall be permitted until a detailed blasting plan is submitted to and approved by the NCDOT, the railroad company, or the local municipality and the Owner.

C. Carrier Pipe Installation:

1. Install the carrier pipe with adequately designed and spaced pipe alignment guides or "spiders" secured as shown on the Drawings. Place spiders at the bell of each carrier pipe with two equally spaced spiders in between and as necessary to ensure the proper line and grade without any sags or high spots.

2. The proposed procedure to install the carrier pipe is to "bell up" the pipe outside the casing and push the carrier pipe through the casing.

3. Exercise care to protect the interior of the casing and to maintain tight, full-seated joints in the carrier pipe.

D. End Seals

1. All exposed metal shall be coated with epoxy or asphaltic material.

2. Install concrete brick and mortar bulkheads with a vent at the terminal ends of the casing as shown in the detail on the Drawings.

3.4 FIELD QUALITY CONTROL

A. Prior to beginning excavation, a survey methodology to monitor settlement of the roadway or railroad shall be established to the satisfaction of NCDOT, the railroad company, or the local municipality (for a municipal street). Settlement shall be monitored and elevations shall be recorded daily until the casing installation is complete.

B. Contractor shall check the vertical and horizontal alignment of the casing periodically during installation at intervals as required by the NCDOT, the railroad company, or the local municipality (for a municipal street).

3.5 NCDOT SPECIAL REQUIREMENTS

A. Furnish to the North Carolina Department of Transportation to the attention of the State Design Services Engineer, North Carolina Department of Transportation, Division of Highways, Raleigh, North Carolina 27611, for his approval, a certificate of insurance, in an original and one copy, in the minimum amounts of $500,000 Bodily Injury and $250,000/$500,000 Property Damage as evidence of proper coverage before beginning any work at the site. The Certificate shall indicate that explosion, collapse, and underground insurance coverage is provided and shall make reference to the project, county, and the Design Services Unit's file number. The Certificate shall be countersigned by an authorized North Carolina Resident Agent with the name and address of the agent denoted thereon.

B. Furnish and keep in force the insurance requirements for a period of one (1) year after completion and acceptance of the Work by the Owner and the Department of Transportation.

3.6 RAILROAD SPECIAL REQUIREMENTS

A. Furnish to the railroad company insurance as required by the railroad. Keep the insurance requirements in force for a period of one (1) year after completion and acceptance of the Work by Owner and railroad company.

B. Pay costs for flagmen required by the railroad company for the duration of the work within the railroad rights-of-way.

3.7 PROTECTION

A. Protect installation from damage until accepted into service by the Owner.

END OF SECTION

SECTION 33 05 97
IDENTIFICATION AND SIGNAGE FOR UTILITIES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Detectable Marking Tape.

2. Non-Detectable Marking Tape.

3. Tracer Wire.

4. Electronic Marker Balls.

5. Valve Markers.

6. Fire Hydrant Markers.

1.2 REFERENCE STANDARDS

A. Abbreviations and Acronyms:

1. The following is a partial list of typical abbreviations and acronyms used in this section. See Construction Specification Section 01 40 00, Quality Requirements, for additional abbreviations and acronyms used throughout the Contract Documents.

APWA American Public Works Association

B. Definitions: Not used

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for marking tape, tracer wire, markers, and accessories. Submit dimensional drawings for markers.

D. Samples of marking tape.

1.4 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Perform Work in accordance with Owner standards, specifications, and details.

C. Materials used for the construction of water and sewer components and appurtenances shall be new and free of defects. Materials and appurtenances shall be clearly, legibly, and appropriately marked for identification purposes.

D. The Owner or RPR must inspect, review, and approve materials to be used for water and sewer components and appurtenances prior to installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements, for transporting, handling, storing, and protecting products.

B. Inspect products thoroughly upon arrival for damage. Remove damaged or rejected materials from the site immediately.

PART 2– PRODUCTS

2.1 DETECTABLE MARKING TAPE

A. Provide 0.8 Mil clear film, reverse printed and laminated to aluminum foil laminated to 3.75 Mil clear film, making the film permanently printed. Provide a minimum overall thickness of 5.0 Mil, manufactured for direct burial service for prolonged use underground. Tape shall meet or exceed industry standards, including the APWA color code. Minimum width shall be 3 inches. The text shall include the wording “CAUTION WATER LINE BELOW” (replace “WATER” with “SEWER” as applicable) in bold lettering repeated along the length of the tape.

TEST DATA	METHOD	VALUE
Thickness	ASTM D2103	5.0 Mil
Tensile Strength	ASTM D882	15,000 PSI
Elongation	ASTM D882-75B	80%

2.2 NON-DETECTABLE MARKING TAPE – NOT USED

2.3 TRACER WIRE

A. Open-cut Excavation Installations:

1. 10 gauge THHN or better single strand copper wire.

2. Heavy-duty stainless steel clamps when DIP and PVC are included in the same run of pipe.

B. Horizontal Directional Drill Installations:

1. 10 gauge or better single strand stainless steel wire.

2.4 ELECTRONIC MARKER BALLS:

A. 4-inch diameter EMS (Electronic Marker System) passive underground marker with an antenna encased in a water resistant polyethylene shell that does not react with chemicals or minerals. Operates without an external power source.

B. Locatable using a 3M™ Dynatel™ Locator. The locator transmits a signal to the buried marker. The electronic marker ball shall return the signal to the locator, indicating the marker’s exact position via a visual reading and an audible tone.

C. Self-leveling design to ensure the marker is always in an accurate, horizontal position regardless of how it is placed into the ground.

D. Temperature range: -4 to 122 °F

E. Color coded in accordance with the American Public Works Association's Uniform Color Code for marking underground facilities and its Underground Utility Location and Coordination Council standards.

1. For water mains provide blue electronic marker balls specifically designed for water installations.

2.5 VALVE MARKERS:

A. Reinforced concrete as shown on the plans. 3,000 psi compressive strength at 28 days.

B. Marked with recessed letters including MV (meter valve), AV (air valve), or BO (blow-off) as appropriate. Install facing item being located.

PART 3– EXECUTION

3.1 INSTALLATION

A. Detectable Marking Tape:

1. Place 9 to 12 inches below finished grade (for 3-inch wide tape) directly above non-metallic pipes with printed side up during backfill procedure. Tape shall not be pulled, distorted, or otherwise misplaced during completion of the trench backfill.

B. Tracer Wire:

1. Install continuously along the top of non-metallic pipe and attach securely every 10 feet with electrical tape or zip ties.

2. Where both PVC and DIP are used in the same run of pipe, bond wire conductor to metal with heavy-duty stainless steel clamps.

3. Make splices in the wire only by use of an underground-rated, watertight, and approved splice connector. Do not twist wire ends. Do not wrap tracer wire around the pipe, flanges, bells, valves, or other appurtenances. Tracer wire shall be accessible above ground at least every 1,000 feet. Access points shall be protected by a cast iron box with cover marked "water" or "sewer," as appropriate, with a concrete collar. Electrical conductivity along the pipe shall be continuous and uninterrupted between valve boxes.

4. Where a valve box for an active valve is utilized as an access point, install the tracer wire and stow the excess in a manner that does not interfere with valve wrench insertion or valve operation.

C. Electronic Marker Balls:

1. Before placing the marker ball over the key point of the facility, decide if a tie down procedure is necessary to keep it in place. If so, secure the marker by inserting a cable tie through one, or both, tie down tabs on the Marker and the key point.

2. Install while pipe laying is in progress approximately 6 inches directly over the pipe or point to be located with a minimum depth of 18 inches and a maximum depth of 24 inches.

3. Install a minimum of 6” from any metal objects.

4. Hand backfill markers to 12 inches above marker to prevent movement or damage during backfill.

5. Install at the following locations:

   a. 22.5 degree bends and larger.

   b. Reducers and capped or plugged ends.

   c. Tees over main line.

   d. A minimum spacing of 100 linear feet.

D. Valve Markers:

1. Install for each valve and blow-off. Set plumb with the letters facing the valve or blow-off.

E. Fire Hydrant Markers:

1. Fire hydrant pavement markers shall be placed at the centerline of the road directly in front of the fire hydrant. The reflective faces shall be oriented toward traffic.

2. Prior to placing the pavement reflector, grind off the existing paint to permit bonding of epoxy to pavement.

3. The pavement temperature shall be a minimum of 50ºF.

3.2 FIELD QUALITY CONTROL

A. TRACER WIRE TESTING

1. Test after installation in the presence of the Owner and RPR to verify that electrical conductivity is continuous and uninterrupted between valve boxes.

B. ELECTRONIC MARKER BALLS

1. Test after installation in the presence of the Owner and RPR to verify that marker balls can be detected. If marker balls cannot be located, remove and reinstall until all function properly.

END OF SECTION

SECTION 33 14 13
WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water main.

2. Related appurtenances.

B. Related Requirements: City of Hickory Engineering MOP Water Specifications

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for abbreviations and acronyms used throughout the Contract Documents.

B. Definitions:

1. Sewers: Sanitary sewer and wastewater force mains.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Maintain service continuously to customers except for the minimum amount of time required to make connections.

2. Contact Owner to obtain approval for and coordinate of interruption of service, operation of valves, line cut-ins, or placement of a tapping sleeve and valve. Arrange interruptions to cause the least disruption and minimize loss of service. Schedule interruptions at least one week in advance with Owner. Owner shall be present during interruption operations. Provide temporary service when required by Owner.

3. Except as needed for fire suppression purposes, the City of Hickory will be the sole operator of all valves and hydrants. Only in case of an emergency may a Contractor operate a valve. Keep records of any valves closed during an emergency and notify the Owner/City of Hickory of the specific valves closed at the earliest reasonable time following such valve closure.

4. Make every effort to avoid causing unplanned service outages. Service outages resulting from the Contractor’s operations will be investigated by the Owner. If the investigation determines that the Contractor could have avoided the service outage, Contractor shall reimburse Owner for any damages, operational costs, fines, and other costs incurred by Owner, its customers, and owners of the easement, right-of-way, or property.

5. Notify residents in writing at least 48 hours prior to interruption and then again 24 hours prior to interruption.

6. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before digging for locates of existing utilities. Confirm utilities have been located prior to excavating.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that all pipe, fittings, and other products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for pipe, fittings, couplings, adapter pieces, restraints, bolts, gaskets, supports, and appurtenances. Submit dimensional drawings for piping. Submit dimensional drawings and weights for all fittings. Include manufacturer’s installation instructions.

1.5 QUALITY ASSURANCE

A. Comply with Construction Specification Section 01 40 00, Quality Requirements.

B. Perform Work in accordance with City of Hickory Engineering MOP Water Specifications, specifications, standards, and details.

C. Comply with North Carolina Department of Environment and Natural Resources Rules Governing Public Water Systems (NCAC Title 15A Subchapter 18C, Water Supplies).

D. Relation of Water Mains to Sewers:

1. Lateral Separation of Sewers and Water Mains:

a. Water mains shall be laid at least 10 feet laterally from existing or proposed sewers, unless local conditions or barriers prevent a 10-foot lateral separation – in which case:

i. The water main is laid in a separate trench, with the elevation of the bottom of the water main at least 18 inches above the top of the sewer; or

ii. The water main is laid in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.

2. Crossing a Water Main Over a Sewer:

a. Whenever it is necessary for a water main to cross over a sewer, the water main shall be laid at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer, unless local conditions or barriers prevent an 18-inch vertical separation; in which case, both the water main and sewer shall be constructed of ferrous materials and with joints that are equivalent to water main standards for 10 feet on each side of the point of crossing.

3. Crossing a Water Main Under a Sewer:

a. Whenever it is necessary for a water main to cross under a sewer, both the water main and the sewer shall be constructed of ferrous materials and with joints equivalent to water main standards for 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

E. Comply with NSF/ANSI Standard 61: “Drinking Water System Components – Health Effects” for materials for water main and service piping and specialties for domestic water.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements for transporting, handling, storing, and protecting products.

B. Transport, receive, store, and handle pipe, fittings, and appurtenances in accordance with manufacturer recommendations and the following:

1. PVC pipe: AWWA M23 PVC Pipe – Design and Installation.

2. DI pipe: AWWA M41 Ductile Iron Pipe and Fittings.

3. PE pipe: AWWA M55 PE Pipe – Design and Installation.

C. Exercise special care in handling pipe during transportation, delivery, storage, and distribution to avoid damage and unnecessary stress. Support pipe to prevent sagging or bending. Damaged pipe will be rejected and shall be replaced at the Contractor’s expense.

D. Inspect each truckload of materials thoroughly upon arrival at the site. Examine materials for damage and verify conformance with approved submittals. Protect pipe during handling against impact shocks and free fall. Take care when unloading pipe to avoid damaging the pipe lining. Pipe that has been damaged either in transit or during unloading shall be plainly marked and immediately removed from the project site.

E. Protect pipe coating during handling using methods recommended by the manufacturer. The use of bare cables, chains, hooks, metal bars, or narrow skids in contact with coated pipe is not permitted.

F. Store PE and PVC materials out of sunlight.

G. Block individual and stockpiled pipe to prevent unintentional movement.

H. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

I. Keep pipe, fittings, and appurtenances clean at all times. Store to prevent entry of water, dirt, and foreign matter into pipe, bells, and fitting flanges. If pipe is provided with end protectors, do not remove until ready for inspection or installation. Replace protectors after inspection.

PART 2– PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. Pipe:

1. Designed in accordance with ANSI/AWWA C150/A21.50. Minimum pressure class shall be 350 psi through 12-inch diameter and 250 psi above 12-inch diameter unless noted otherwise on the Drawings.

2. Manufactured in accordance with ANSI/AWWA C151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.

3. Provide in minimum nominal 18 or 20-foot laying lengths.

4. Cement-mortar lining on the interior in accordance with ANSI/AWWA C104/A21.4. Pipe shall have standard 1–mil asphaltic coating on the exterior in accordance with ANSI/AWWA C151/A21.51.

5. Each length of pipe shall be cast or stamped with the class or nominal thickness, net weight without lining, casting period, the manufacturer's mark, country where cast, year in which the pipe was produced, and the letters "DI" or "Ductile."

B. Joints:

1. Push-on Type Joints:

a. Rubber gasket push-on type joints in accordance with ANSI/AWWA C111/A21.11, such as Tyton® or Fastite® except at specific locations indicated on the drawings or as approved by the Owner. Furnish complete with accessories.

2. Mechanical Joint Pipe:

a. ANSI/AWWA C111/A21.11 and FS WW-P-421. Installed only at the specific locations indicated on the drawings or as approved by the Owner. Furnished complete with accessories.

b. Glands, gaskets, and bolts shall conform to ANSI/AWWA C111/A21.11. Bolt length shall be sufficient for all threads of the nut to be engaged.

3. Restrained Joint Pipe:

a. Boltless push-on type as follows or equal:

Table 331100.1

Restrained Joint Pipe Approved Products

Manufacturer	Product
United States Pipe and Foundry Co.	TR Flex or Tyton Field Lok 350
American Cast Iron Pipe Company	Flex-Ring or Lok-Ring or Fast-Grip Gasket with Fastite® Joint Pipe

4. Mechanical Joint Restraint:

a. Ductile iron conforming to ASTM A536, working pressure rating equal to the pipe on which it is used, and designed with a factor of safety of 2.

b. Subject to hydrostatic pressure testing in accordance with AWWA C600 or ASTM D2774.

c. Joint restraint system as follows:

Table 331100.2	
Mechanical Joint Restraint Approved Products	
Manufacturer	Restraint Make/Model
EBAA Iron Sales, Inc.	Megalug Series 1100
Ford	Wedge action restrainer gland/UFR Series 1400
Sigma Corporation	

d. Restraints which employ wedge action retainers shall have wedge-activating bolt. Bolt heads shall be designed to be “auto-torque” twist off.

2. Flanged Joint:

a. ANSI/AWWA C115/A21.15 with facing and drilling identical to ASME/ANSI B16.1, class 125 flanges.

b. Firmly bolted with machine bolts; however, where valves or special fittings are attached to a flange pipe, stud or tap bolts may be used, providing the number used and diameter for each joint is the same for each respective size of pipe or special, or valve, as recommended by the AWWA Standard for flanged drilling. Bolts shall be in accordance with ANSI B18.2.1. Nuts shall be in accordance with ANSI B18.2.2. Bolts and nuts shall be cold-worked 304 stainless steel meeting ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs for sizes up to 1.5 inches. Stainless steel bolts and nuts shall have a minimum yield strength of 45,000 psi. Bolts shall be of sufficient length to pass through two flanges and the nut threads shall be accurately cut, close fitting, and the prevailing standard. Bolt heads shall be cut square and nuts hexagon in shape, both the heads and nuts being chamfered. Gaskets to be of 1/8-inch thick plain rubber (Styrene Butadiene [SBR]) per AWWA C110/ANSI A21.11 or equal as approved by the Public Services Director.

C. Fittings:

1. Ductile iron conforming to either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53. Mechanical Type Joints in accordance with ANSI/AWWA C111/A21.11.

2. Minimum working pressure rating of 250 psi.

3. Cement-mortar interior lining in accordance with ANSI/AWWA C104/A21.4, 1–mil asphaltic exterior coating in accordance with ANSI/AWWA C151/A21.51.

4. Glands, gaskets and bolts shall conform to ANSI/AWWA C111/A21.11. Bolt length shall be sufficient for all threads of the nut to be engaged.

5. Acceptable manufacturers are American Cast Iron Pipe Company, United States Pipe and Foundry Company, Sigma Corporation, Star Pipe Products, Napac, Union Foundry, or equal.

6. Mechanical joint restraints shall be in accordance with Paragraph 2.1B.4.

2.2 POLYVINYL CHLORIDE (PVC) PIPE

A. Designed in accordance with AWWA M23 PVC Pipe – Design and Installation.

B. 2-inch PVC: ASTM D2241, “Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR PR Series).” Minimum SDR 21 with a pressure rating of 200 psi. Comply with ASTM D1784, D3139, F477, D2122, D1599 and D2152. PVC-glued, threaded, or galvanized fittings are not allowed.

C. 4-inch through 12-inch PVC: AWWA C900, “Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. for Water Distribution.” Minimum of DR 18 with a pressure rating of 235 psi.

D. 14-inch through 48-inch PVC: AWWA C905, “Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 48 in., for Water Distribution.” Minimum DR 18 with a pressure rating of 235 psi.

E. Pipe joints shall be gasket, push-on type. Elastomeric gaskets shall be part of a complete pipe section and purchased as such. Lubricant shall be as recommended by the pipe or fitting manufacturer and shall not adversely affect the potable qualities of the water to be transported. The gasketed joint shall meet the laboratory performance requirements specified in ASTM D3139.

F. Certified to NSF International Standard No. 61.

G. Standard laying length shall be 20-feet.

H. Ductile iron fittings shall be installed on all PVC pipe.

I. Joint Restraint:

1. Ductile iron conforming to ASTM A536, working pressure rating equal to the pipe on which it is used, and designed with a factor of safety of 2.

2. Subject to hydrostatic pressure testing in accordance with AWWA C600 or ASTM D2774 and shall meet the requirements of ASTM F1674.

3. Joint restraints shall be as follows or equal:

Table 331113.3	
PVC Joint Restraint Approved Products	
Pipe - Type	Restraint Make/Model
C900/C905 PVC - MJ restraint	EBAA Iron Sales, Inc./Megalug Series 2000/2200 Romac Industries, Inc./PVC RomaGrip Ford Series 1500 Stargrip® (acceptable only where pressure rating equals the pipe)
C900 PVC - MJ Split Restraint	EBAA Iron Sales, Inc./Megalug series 19MJ00
C900 PVC - Bell Restraint	EBAA Iron Sales, Inc./Series 1900 Romac 600 Series Ford Series 1390 Star Pipe Series 1100
C905 PVC - Bell Restraint	EBAA Iron Sales, Inc./Series 2800 (acceptable only where pressure rating equals the pipe) Romac 600 Series Ford Series 1390 Star Pipe Series 1100

2.3 COUPLINGS

A. ANSI/AWWA C-219, ANSI/NSF Standard 61 Certified, ASTM A-536, grade 65-45-12 ductile iron. Minimum working pressure equal to pipe pressure rating. Gaskets shall be specially compounded new rubber polymer suitable for use on water and sewage designed for a temperature range of -40ºF to 150º F. Bolts are to be Type 304 stainless steel. Coating shall be fusion bonded powder epoxy coating per ANSI/AWWA C-213.

B. Accommodate IPS PVC, C-900/905 PVC, Ductile Iron Pipe, Cast Iron, and Asbestos Cement Classes 100/150/200.

2.4 BLOW OFFS

A. Sized to provide 2 to 4 fps flushing velocity in the main to which the blow-off is attached.

B. Blow-Off Assembly for Future Extension: Consist of two standard slip type valve boxes, one for a curb valve and one for a brass pipe riser, a thrust collar, a plug tapped for 2 inches or 4 inches (determined by main size), a 2-inch or 4-inch brass pipe riser with a 2-inch or 4-inch threaded male plug. A gate valve shall be placed at the upstream end of the last joint of DIP with thrust collar to permit both extending and testing of the section to be extended. In unpaved areas, concrete collars may be used for valve boxes or 4-inch thick by 2-foot square concrete pads placed over each valve box.

C. Permanent Blow-Off Assembly: Consists of a standard valve box with a concrete stabilizing pad (in unpaved areas only), an NRS gate valve or curb valve as applicable, a mechanical joint reducer as applicable, thrust collar, a riser with elbow and blocking, and, if applicable, a flanged 90-degree elbow placed above grade.

2.5 TIE RODS

A. Tie rods shall be stainless steel or cold-dipped galvanized. Cold-dipped galvanized tie rods shall be coated with coal tar epoxy or other rust inhibitor approved by the Engineer.

2.6 METERS – NOT USED

2.7 CROSS-CONNECTION CONTROL

A. Refer to the Owners Water System Cross-Connection Control Ordinance for hazard classification and type backflow device requirements.

2.8 ACCESSORIES – NOT USED

PART 3– EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Verify that existing utility water main size, location, and invert are as indicated on Drawings.

B. Evaluation and Assessment:

1. Prior to installing pipe, carefully examine each section of the pipe for damage and conformity with approved submittals and these specifications. Pipes in which spigots and bells cannot fit together properly, or pipes that have chipped bells or spigots will be rejected. Pipes damaged or deemed not to conform to these specifications shall be plainly marked and immediately removed from the project site.

2. The faces of all spigot ends and all shoulders on the bells must be true, without lumps or rough edges, and be brought in fair contact. Examine bell and spigot for uniformity and smoothness of liner and barrel.

3.2 PREPARATION

A. String pipe sections along the route of the mains so as to interfere least with pedestrian and vehicular traffic and to protect the pipe. String pipe along the road shoulder and not in ditches. String out no more pipe than can be installed in one day.

B. Excavate trench in accordance with Construction Specification Section 31 23 33, Trenching and Backfilling.

C. Verify that polyethylene encasement is in place, where required, before placing bedding.

D. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws is not permitted. Grind edges smooth with beveled end for push-on connections.

E. Remove scale and dirt on inside and outside before assembly.

F. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION – BURIED PIPE AND FITTINGS

A. GENERAL

1. Carefully lower pipe, fittings, valves, and appurtenances into the trench using a backhoe, crane, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to water main materials and protective coating and linings. Under no circumstances shall water main pipe, fittings, valves, and materials be

dropped or dumped into the trench or be allowed to drop against the pipe or fitting already in the trench. Take great care to prevent the pipe and coating from being damaged. Do not install any damaged pipe.

2. Except as otherwise permitted or ordered by Engineer, install pipe in locations and at the alignment and grades shown or specified to avoid existing or proposed utility lines or other obstructions encountered; to secure a more readily accessible position for trenching; or to facilitate the location of various pipe appurtenances.

3. When temporary supports are used, ensure that sufficient rigidity is provided to prevent shifting or distortion of pipe.

4. Lay pipe with bell ends upgrade and facing the direction of laying. Lay pipe by installing the spigot plain end of the pipe into the previously laid socket.

5. Do not expose gaskets to oil, grease, ozone, extensive heat, sunlight, or other elements that would degrade the gasket. Store gaskets in a cool, dark place until installation.

6. Provide a minimum of 3 feet of cover. Measure depth of cover from final surface grade to top of pipe. If site conditions prevent adherence to minimum cover requirements, approval of an alternate design by the Engineer is required.

7. Do not install pipe with high and low points in the main other than those specifically shown. If unforeseen field conditions arise that necessitate high points, notify Engineer before proceeding with installation. Install additional air release valves as directed by Engineer.

8. Holes for pipe bells shall be excavated into the trench bottom at each joint and shall be no larger than necessary for joint assembly and assurance that the pipe barrel will lie flat on the trench bottom. Bell-hole depressions for push-on type joints shall only be large enough to ensure that the pipe is not resting on the bells and is supported by the full length of the pipe barrel.

9. Install pipe to allow for expansion and contraction without stressing pipe or joints.

10. Deflect pipe joints in strict accordance with pipe manufacturer’s instructions.

11. Locate pipe to maintain a minimum clearance of 18 inches in all directions, with respect to other utilities, to allow for taps to be inserted.

12. Flanged joints shall not be used in underground installations except within structures.

13. To prevent gasket displacement and leaking joints, remove all sand, dirt, grit, excess coating, ice, and other foreign material from the plain end and the gasket recesses of the bell.

14. Before any length of pipe is lowered into the trench, inspect it for damage and ensure the inside is free of loose dirt and foreign objects such as tools, clothing, etc. If mud and trench water have been permitted to stand or flow through the pipe, scrub the inside with a strong chlorine solution and wash or flush the pipe out. No debris, tools, clothing, or other materials shall be placed in the pipe at any time.

15. Prevent foreign material from entering the pipe during placement. Keep pipes clean during and after laying, and seal the pipe end with a water-tight plug at the end of the day's work and when pipe laying is stopped for any reason. Do not use the pipe as a means of draining groundwater from the area.

16. Excavate and backfill the trench in accordance with Construction Specification Section 31 23 33, Trenching and Backfilling.

17. Install pipe identification in accordance with Construction Specification Section 33 05 95 Identification and Signage for Utilities.

18. Provide access fittings to permit testing, air release, and disinfection.

B. Surface Water Crossings:

1. Surface water crossings shall be perpendicular to the channel and either buried below the invert of the channel or aerial above the high water mark of the channel. Surface water crossings shall be designed and installed in accordance with all federal, state, and local regulations.

2. For buried surface water crossings other than horizontal directional drills, the pipe shall be either encased in concrete or placed in a steel casing. Concrete encasement and steel casings shall extend horizontally from top of stream bank to top of stream bank.

3. For aerial surface water crossings, the pipe shall be supported on piers or steel girders, which shall adequately support surface water crossings. Kraft paper shall be placed between pipe and all points of contact with concrete and stainless steel straps.

4. Disturbed banks shall be stabilized with rip rap placed over a non-woven fabric.

C. DUCTILE IRON PIPE

1. Pipe, fittings, and accessories shall be installed and tested in accordance with ANSI/AWWA C600: Installation of Ductile Iron Water Mains and Their Appurtenances.

2. The trench laying condition shall be as designed in accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C600 and as specified on the Drawings. See Construction Specification Section 31 23 33, Trenching and Backfilling for laying condition requirements. The maximum depth of cover shall be as follows:

Table 331113.4							
Ductile Iron Pipe Trench Laying Condition							
Size (in.)	Pressure Class (psi) (100 psi surge, FS 2)	Nominal Thickness (in.)	Laying Condition (min. depth of cover 2.5 ft.)				
			Type 1 Trench	Type 2 Trench	Type 3 Trench	Type 4 Trench	Type 5 Trench
			Maximum Depth of Cover (ft.) (Single H-20 truck with 1.5 impact factor.)				
3	350	0.25	78	88	99	100+	100+
4	350	0.25	53	61	69	85	100+
6	350	0.25	26	31	37	47	65
8	350	0.25	16	20	25	34	50
10	350	0.26	11*	15	19	28	45
12	350	0.28	10*	15	19	28	44

* minimum depth of cover = 3 feet

3. Verify that polyethylene encasement is in place, where required, before placing bedding.

4. Push-On Joint Assembly:

   a. Thoroughly clean the groove and the bell socket of the pipe or fitting; also clean the plain end of the mating pipe or fitting. Using a gasket of the proper design for the joint to be assembled, make a small loop in the gasket and insert it in the socket. For pipe sizes larger than 20 inches, it may be necessary to make two loops in the gasket (6 and 12 o'clock). Make sure the gasket faces the correct direction and that it is properly seated. In cold weather, it may be necessary to warm the gasket to facilitate insertion.

   b. Apply lubricant to the exposed surface of the gasket and plain end of the pipe or fitting in accordance with the pipe manufacturer's recommendations. Do not apply lubricant to the bell socket or the surface of the gasket in contact with the bell socket. Lubricant is furnished in sterile containers and every effort shall be made to keep it sterile. For underwater or very wet joint assemblies, use relatively insoluble underwater joint lubricant that is manufactured for that application.

   c. Bevel the plain end per the manufacturer's recommendations; square or sharp edges may damage or dislodge the gasket and cause a leak. When pipe is cut in the field, bevel the plain end with a heavy file or grinder to remove all sharp edges. Refer to a shop-manufactured bevel as a guide for proper shape.

   d. Push the plain end into the bell socket of the mating pipe or fitting, keeping the joint straight while pushing. Make deflection after the joint is assembled.

   e. Small pipe can be pushed into the bell socket with a long bar. A jack, lever puller, or backhoe shall be used for larger pipe. Use a timber header between the pipe and the jack or backhoe bucket to avoid damage to the pipe.

f. Maximum horizontal deflections for push-on ductile iron pipe shall meet AWWA C600 as follows:

Table 331100.5			
Ductile Iron Pipe Allowable Joint Deflection			
Size (inches)	Nominal Laying Length (feet)	Maximum Allowable Deflection	
		Offset per Length (inches)	Deflection Angle (degrees/radius, ft.)
3	18	19	5°/205
4	18	19	5°/205
6	18	19	5°/205
8	18	19	5°/205
10	18	19	5°/205
12	18	19	5°/205
14	18	11	3°/340
16	18	11	3°/340
18	18	11	3°/340
20	18	11	3°/340
24	18	11	3°/340
30	18	11	3°/340
36	18	11	3°/340
42	18	11	3°/340
48	20	12	3°/380

5. Mechanical Joint Assembly:

a. Wipe clean the socket and the plain end. Brush both the gasket and plain end with soapy water or an approved push-on joint lubricant meeting the requirements of ANSI/AWWA C111/A21.11 immediately before slipping the gasket onto the plain end for joint assembly. Lubrication is required for assembly of all mechanical joints.

b. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end. In cold weather, it is preferable to warm the gasket to facilitate assembly of the joint.

c. Insert the plain end into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during assembly.

d. Push the gland toward the socket and center it around the plain end with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening bolts.

e. Tighten the bolts to the normal range of bolt torque (as indicated in the table below) while constantly maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This consistency can be accomplished by partially tightening the bottom bolt first, then the top bolt, then the bolts at either

side, and finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque.

(excerpt from AWWA C600-99 Table 2):

Table 331100.6		
Ductile Iron Pipe MJ Bolt Torque Requirements		
Joint Size (in.)	Bolt Size (In.)	Torque (ft. – lbs.)
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120
42-48	1 1/4	120-150

Tighten nuts on alternate sides of the gland until pressure on the gland is equally distributed.

f. Permissible deflection in mechanical joint pipe shall not be greater than listed in Table 4 of AWWA C600-99 as follows:

Table 331100.7			
Allowable Joint Deflection			
Size (inches)	Nominal Laying Length (feet)	Maximum Allowable Deflection	
		Offset per Length (inches)	Deflection Angle (degrees/radius, ft.)
3	18	31	8°-18’/125
4	18	31	8°-18’/125
6	18	27	7°-07’/145
8	18	20	5°-21’/195
10	18	20	5°-21’/195
12	18	20	5°-21’/195
14	18	13.5	3°-35’/285
16	18	13.5	3°-35’/285
18	18	11	3°-00’/340
20	18	11	3°-00’/340
24	18	9	2°-23’/450

6. Cutting Ductile Iron Pipe:

a. Cut ductile iron pipe using an abrasive cut-off saw, a rotary wheel cutter, a guillotine pipe saw, or a milling wheel saw. No welding, flame cutting, or flame tapping will be allowed.

b. The ANSI/AWWA standards for ductile iron pipe require factory gauging of the spigot end. Accordingly, pipe selected for cutting shall be field-gauged. A mechanical joint gland inserted over the barrel of the pipe might serve as a convenient indicator for field gauging. When glands are not available, pipe can be selected by measuring with a tape in

accordance with the manufacturer's recommendation. Some pipes, especially in the larger diameters, may be out-of-round to the degree that they will need to be rounded after cutting by jacking or other methods to facilitate making the joint. When rounding the pipe by jacking, be careful not to over jack the pipe. Instructions for rounding pipe products can be obtained from the pipe manufacturer.

c. Grind all cut ends and rough edges smooth and, for push-on type connections, bevel the cut end slightly in accordance with the manufacturer's recommendations.

D. POLYVINYL CHLORIDE (PVC) PIPE

1. PVC pipe shall be installed in accordance with the following:

a. AWWA C605: Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.

b. AWWA M23: PVC Pipe – Design and Installation.

c. Unibell Handbook of PVC Pipe Design and Construction by the PVC Pipe Association.

2. Embedment Type:

a. The embedment requirements for PVC water pipe shall be in accordance with AWWA Standard C605 for "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water."

b. The embedment type shall be as specified on the Drawings. See Construction Specification Section 31 23 33, Trenching and Backfill for embedment type requirements.

3. Field cuts:

a. Cut pipe only as recommended by the manufacturer. Cuts shall be at a right angle to the longitudinal axis of the pipe. Debur and bevel the pipe spigot to provide a smooth end and re-mark with insertion line. Field bevels shall match factory bevels.

4. Push-on Joint Assembly:

a. Assemble joints in accordance with manufacturer's recommendations.

b. Do not lubricate the gasket or the gasket groove in the bell because the lubrication could cause gasket displacement.

c. Push the spigot until the reference mark on the spigot end is flush with the end of the bell. If undue resistance to insertion of the spigot is encountered or the reference mark does not reach the flush position, disassemble the joint and check the position of the rubber gasket.

d. Do not "over-bell" the pipe by inserting the pipe past the manufacturer's recommend mark.

5. Longitudinal Bending:

    a. Do not bend pipe longitudinally without approval of the Engineer.

    b. Pipes larger than 12 inches in diameter shall not be bent.

    c. Embedment types 1 and 2 shall not be permitted for longitudinally-bent pipe segments.

    d. Block and brace pipe joints to ensure that bending does not result in axial deflection that exceeds the manufacturer's recommendations in the gasketed or mechanical joints.

    e. The longitudinal bending in the PVC pipe barrel must meet 125% of the minimum bending radius requirements at every point.

    f. Construction machinery shall not be used to bend PVC pipe.

6. All service line connections to PVC water pipe shall be made in accordance with the recommendations of AWWA C605.

E. THRUST RESTRAINTS

1. Thrust blocking or a restraint system shall be provided to prevent movement of pipe or appurtenances in response to thrust. Provide concrete thrust blocking unless restrained joints are specifically called for on the drawings.

2. Provide thrust blocking or restraint system at:

    a. Changes in direction (bends, tees, etc.).

    b. Changes in size (reducers, change in pipe diameter, etc.).

    c. Dead ends (caps, plugs, etc.).

    d. Valves and hydrants.

3. Do not encase pipe and fitting joints to flanges. Ensure that pipe and fitting joints will be accessible for repair.

4. Pour concrete thrust blocks against undisturbed earth.

5. Install tie rods, clamps, setscrew retainer glands, or restrained joints.

6. Protect metal-restrained joint components against corrosion by applying a bituminous coating or encasing metal area using concrete mortar.

7. Thrust Blocking:

    a. Thrust blocks shall be constructed from 3,000 psi concrete (at 28 days). Concrete thrust blocking shall be constructed in accordance with standard detail 15-33. Concrete anchors may be unformed, but minimum dimensions must be maintained. All fittings and pipe shall be wrapped in plastic prior to installation of concrete to ensure that bolts and nuts are free of concrete and debris to allow accessibility for future repairs. When soft, mucky, unsuitable, or unstable soils are encountered, thrust shall be resisted by running tie rods to solid foundations by removing the soft

materials and replacing it with ballast of sufficient size and weight to resist thrust.

b. Follow pipe manufacturer's installation manuals for the anchoring of valves and fittings unless superseded by the requirements of these specifications.

c. Concrete thrust blocking is not allowed where the blocking may bear on other utilities or where the area behind the block may be excavated in the future.

d. The RPR or Owner inspector must inspect all blocking and anchoring prior to backfilling.

8. Rodding:

a. 4-inch and larger valves and assemblies of fittings shall be secured to a blocked fitting by threaded rods with eyebolts. Refer to standard details 15-30,15-31, and 15-32 for the minimum size and number of rods needed for 200 psi test pressure. No more than one coupling shall be allowed between rods. Rodding length between fittings shall not exceed 20 feet. When the length between fittings exceeds 20 feet, place a thrust collar on the line and rod to the thrust collar.

b. All eyebolts and plain or galvanized-threaded steel rods shall be coated with a minimum of 12 mils of a 2-component coal tar epoxy meeting ASTM D3359. Coal tar epoxy coating shall meet or exceed Benjamin Moore M47/M48, Epoxy Systems Product #216, or equal. Rods are to be thoroughly clean and dry before coating.

c. A restraint flange system may be used in lieu of rodding.

9. Thrust Collars:

a. The thrust collar shall consist of a wedge-action restrainer gland placed around a joint of ductile iron pipe encased in a reinforced 3000 psi concrete block. Where the blocking provides thrust resistance for fittings, threaded rods shall be connected to the restraint flange fitting secured to a full joint of ductile iron pipe. On dead end lines, the thrust collars must be placed on a full joint of ductile iron pipe just after the terminal end line valve.

b. Vertical upward thrust at fittings or vertically deflected joints shall be resisted with thrust collars of adequate size and weight to resist thrust.

F. COUPLINGS

Install couplings in accordance with manufacturer recommendations.

G. WATER SERVICES

1. Location of water service connections indicated on the plans are approximate. Final locations shall be established during construction by RPR or Owner.

2. Install water service connections in accordance with Construction Specification Section 33 14 17, Water Utility Service Connections.

3. Replace and/or abandon water service connections in accordance with Construction Specification Section 33 14 17, Water Utility Service Connections.

H. BLOW-OFF, SAMPLING, AND FLUSHING ASSEMBLIES

1. Install assemblies as shown and specified. Comply with component manufacturer's instructions.

2. Set valves plumb and on solid bearing; center and plumb valve box over valve; set box cover flush with finished grade; provide expansion joint material around portion of box in concrete pavement or sidewalks.

3. Place stone fill under blow-off assemblies.

4. Provide drain hole where indicated for blow-off assembly.

5. Remove bacteria sampling and flushing assemblies after notice from the Owner that mains have passed all tests and have been placed in service.

I. CONNECTION TO AND INSERTIONS INTO EXISTING MAINS

1. Furnish all materials for connection to existing water mains. The Owner shall be the sole operator of all valves and fire hydrants. See Article 1.3A, Coordination, for limitations on valve operation and system shut down.

2. Set valves as shown on the plans.

3. If the connection to the existing mains requires a wet tap, the tap shall be completed by a company that is licensed by the State of North Carolina for utility work, and who is experienced and equipped to do this type of work. All materials and labor shall be provided by Contractor to include, but not necessarily be limited to the sleeve, valve, tapping machine, accessories, installation, and testing of such materials to complete the work. The Owner shall have the right to approve or reject the company or crew that is proposed to perform the work based on the Owner’s assessment of the qualifications of the company or crew.

4. Work shall be scheduled at least 48 hours in advance through the Owner’s Inspector, who shall be present during the operation. After installation of the tapping sleeve and valve and prior to performing the tap, the assembly shall be hydrostatically tested at a pressure of 80 psi. Pressure shall be maintained with no loss for a minimum time of 15 minutes. Tapping sleeves shall not be air tested. Connect new mains to existing mains using approved fittings and in a manner acceptable to the Owner.

5. Expose existing mains at connection points 10 days prior to making connections to determine elevation, verify type of pipe, confirm outside diameter of pipe, and identify type of existing restraints.

6. Keep shutoff time to a minimum and perform work at off-peak hours.

7. Take extreme care in making connections to prevent contamination of existing mains.

8. Before making cut-ins or connections to existing mains, wash all fittings, valves, and pipe with clean water, and then disinfect by washing with a chlorine solution having a residual chlorine strength of not less than 50 ppm.

9. Plugs removed from existing mains that are not damaged may be reused within the Project, and those remaining after completion of construction shall remain the property of the Owner.

10. Connections to AC pipe shall be made with appropriate fittings specifically designed for AC pipe connections, and shall be acceptable to Owner. Connections to AC pipe shall be via pad adapters. AC pipe must not be cut with a saw. Cuts shall be accomplished by snap cut.

3.4 PREPARATION FOR USE

A. Prior to filling, flushing and testing, confirm all thrust restraints are properly installed and that concrete thrust blocks/collars have been allowed sufficient time to develop the required strength. As a minimum, all concrete thrust blocks/collars shall have set for 7 days for standard concrete and 3 days for high early strength concrete (min 4,500 psi). Temporary bracing will not be allowed.

B. All trenches shall be backfilled. All construction activities which require excavation in proximity to water mains shall be complete.

C. Pressure test prior to installation or restoration of pavement.

D. Hydrants shall be properly located, operable, and plumb at the correct elevation.

E. Valves shall be properly located, operable, and at the correct elevation.

F. When existing water mains are used to supply test water, provide cross-connection control between the test and supply mains in accordance with Owner requirements. Remove connections to existing mains to isolate the mains to be tested.

G. Water mains shall be disinfected prior to pressure testing where testing against an existing valve that is known to be leaking.

H. Initial Cleaning:

Prior to testing and disinfection, clean the water mains in accordance with ANSI/AWWA C651.

I. Filling and Flushing:

1. Water mains shall be filled slowly with potable water at a rate that allows air to exit the line at the same rate as the water entering the line with a maximum velocity of 1 ft./s.

2. Air shall be vented from the water main to prevent entrapment. If permanent air vents are not located at all high points, corporation cocks shall be installed at these points to expel the air at these locations. Corporation cocks shall be removed and plugged or left in place per Owner requirements.

3. Thoroughly clean all new pipe by flushing with water to remove all dirt, stones, etc. Pipelines shall be flushed until no evidence of debris remains. Sediment-laden water shall not be allowed to enter the sanitary sewer system or storm drainage system.

4. Where deemed necessary by the Owner, pig the main to the satisfaction of the Owner and then re-flush the main.

5. Flush water mains at a minimum velocity of 3 ft./s. in accordance with ANSI/AWWA C605. Flush water mains until the discharge appears clean with a minimum duration that will provide three changes of pipeline volume.

6. Make provisions to discharge flushing water in a manner which prevents erosion, damage to property, or interruption of traffic including proper dechlorination and disposal of chlorinated water.

J. Hydrostatic Testing:

1. Subject all mains to hydrostatic testing before connecting to existing mains.

2. Testing shall be performed in the presence of the RPR or Owner. Schedule Owner and Engineer a minimum of 48 hours in advance. Do not proceed until granted approval by the Owner.

3. Test each valve-to-valve section separately. If Contractor elects to test more than one valve-to-valve section, the allowable leakage for the test will be based upon the shortest valve-to-valve section in the test.

4. Perform in accordance with AWWA C600 and C605 and the following:

a. Isolate main from adjacent existing main, and apply pressure by pumping clean water into the main via 1-inch corporation stops.

b. Ensure that the pipe is full of water and that the air has been removed before testing. Confirm all air is vented from high points.

c. Fill each pipeline section with water and pressurize to the test pressure for a period of no less than 24 hours prior to the pretest.

d. Test pressure shall be at least 1.5 times the working pressure at the point of testing with a minimum of 150 psi. Test pressure shall not be less than 1.25 times the working pressure at the highest point along the test section. Test pressure shall not exceed the pipe or thrust restraint design pressure. Test pressure shall not vary by more than +/- 5 psi for the duration of the test.

e. Test pressure shall not exceed the rated pressure of the valves.

f. Test pressure shall be 150 psi, unless testing against valves on existing mains, in which case test pressure may be 100 psi if Owner determines that the older existing valves may not seal properly; and shall not vary by more than +5 psi.

g. Pretest all mains for a period of 2 hours before notifying the Owner that the main is ready for a final hydrostatic test. No final hydrostatic test will begin after 2:00 pm.

h. During the test period, pump water from a container into the main as required to maintain a pressure within 5 psi of the required hydrostatic test pressure and measure the volume of water used.

i. The quantity of makeup water shall not exceed that as determined by the following formula:

$$Q = \frac{LD\sqrt{P}}{148{,}000}$$

in which Q is the quantity of makeup water in gallons per hour; L is the length of pipe section being tested in feet; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the hydrostatic test in pounds per square inch gage.

j. When testing against closed metal-seated valves, allow an additional leakage per closed valve of 0.0078 gallons/hour/inch of nominal valve size.

k. When hydrants are in test section, perform test with closed hydrant valves.

l. Test at each side of intermediate valves at this time by shutting each valve, exhausting the pressure on one side, and applying the test pressure to the main on the opposite side of the valve for approximately 10 minutes as determined by Engineer. Repeat this procedure for each intermediate valve.

5. If main and valves do not pass the hydrostatic test, locate and repair the leak or leaks and repeat testing procedure until successful. Repair visible leaks regardless of the amount of leakage.

6. Provide all materials, labor, and equipment required for hydrostatic testing and pay for the total volume of water used.

7. Install air release valves upon completion of pressure testing.

K. Disinfection:

1. Newly installed water mains shall be disinfected in accordance with ANSI/AWWA C651 prior to placing in service.

2. Disinfect water mains and appurtenances in accordance with Construction Specification Section 33 01 10.58, Disinfection of Water Utility Piping Systems.

3.5 ABANDONING OF EXISTING WATER MAINS

A. When an existing water main is replaced with a new water main, abandonment of the existing line is required once it is no longer in service. All mains are to be abandoned at the source, the valve removed, and the “tee” or tapping sleeve plugged with a mechanical plug. The line shall be filled with flowable fill or approved equal when required by the Owner.

3.6 PROTECTION

A. Protect distribution piping and appurtenances from damage until accepted into service by Owner.

3.7 FINAL ACCEPTANCE

A. Upon completion of water main installations and prior to final acceptance, provide adequate and competent personnel to conduct, in conjunction with the Owner or RPR, an inspection of each valve and hydrant on the newly completed main. The purpose of this inspection shall be to ensure the operability and location of each valve and to further ensure that all valves are left in the open position.

3.8 ACTIVATION OF WATER MAINS

A. Upon receipt of Final Approval from the State, the main valve serving the new section of main(s) shall be opened and placed into service by the Owner.

B. No further Work on the main, valves, hydrants, and appurtenances will be permitted without full knowledge of the Owner and Engineer.

END OF SECTION

SECTION 33 14 19
VALVES AND HYDRANTS FOR WATER UTILITY SERVICE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Valves.

2. Hydrants.

3. Related Appurtenances.

B. Related Requirements: City of Hickory Engineering MOP Water Specifications.

1.2 REFERENCES

A. Abbreviations and Acronyms: See Construction Specification Section 01 40 00, Quality Requirements for additional abbreviations and acronyms used throughout the Contract Documents.

B. Definitions: Not used.

C. Reference Standards: See Construction Specification Section 01 40 00, Quality Requirements, for a list of reference standards used throughout the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Service shall be continuously maintained to customers except for the minimum amount of time required to make connections.

2. Contact Owner to obtain approval for, and to coordinate, interruption of service, operation of valves, line cut-ins, or placement of a tapping sleeve and valve. Arrange interruptions to cause the least disruption and minimize loss of service. Schedule interruptions at least one week in advance with Owner. Owner shall be present during interruption operations. Provide temporary service when required by Owner.

3. Except as needed for fire suppression purposes, Owner will be the sole operator of valves and hydrants. Only in case of an emergency may a Contractor operate a valve. Records shall be kept of any valves closed during an emergency and the Owner shall be notified of the specific valves closed at the earliest reasonable time following such valve closure.

4. Make every effort to avoid causing unplanned service outages. Contractor-caused service outages will be investigated by the Owner. If the investigation determines that Contractor could have avoided the service outage, Contractor shall reimburse Owner for any damages, operational costs, fines, and other costs incurred by Owner, its customers, and owners of the easement, right-of-way, or property.

5. Notify residents in writing at least 48 hours prior to interruption and then again 24 hours prior to interruption.

6. Contact North Carolina 811 by calling 811 or 1-800-632-4949 two business days before digging for locates of existing utilities. Confirm that utilities have been located prior to excavating.

1.4 SUBMITTALS

A. Provide submittals in accordance with Construction Specification Section 01 33 00, Submittal Procedures.

B. Manufacturer's Affidavits: Manufacturers shall furnish a performance affidavit stating that valves, hydrants, valve boxes, tapping sleeves and valves, pipe, fittings, couplings, appurtenances, and other products provided have been manufactured and tested in accordance with the requirements of the applicable referenced Standards.

C. Product Data/Shop Drawings: Submit product data/shop drawings for valves, hydrants, adapter pieces, restraints, bolts, rods, supports, pipe, fittings, couplings, adapter pieces, gaskets, and appurtenances. Submit dimensional drawings and weights for valves and hydrants. Include manufacturer’s installation instructions.

D. Field Quality Control:

1. Pressure Test Reports:

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Manuals: Submit operation and maintenance manuals in accordance with Construction Specification Section 01 78 00, Closeout Submittals.

B. Warranty Documentation:

C. Record Documentation:

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts:

B. Tools:

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with Owner’s standards, specifications, and details.

B. Comply with North Carolina Department of Environment and Natural Resources Rules Governing Public Water Systems (NCAC Title 15A, Subchapter 18C, Water Supplies).

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with Construction Specification Section 01 60 00, Product Requirements, for transporting, handling, storing, and protecting products.

B. Transport, receive, store, and handle valves, hydrants and appurtenances in accordance with manufacturer recommendations.

C. Exercise special care in handling valves and hydrants during transportation, delivery, storage, and distribution to avoid damage.

D. Inspect valves, hydrants, and appurtenances thoroughly upon arrival for damage. Remove damaged or rejected materials from the site immediately.

E. Valves, hydrants, and appurtenances shall be kept clean. Valves and hydrants shall be stored to prevent entry of water, dirt, and foreign matter into valves. Seal valve and ends to prevent entry of foreign matter.

1.9 SITE CONDITIONS

A. Existing Conditions:

PART 2 – PRODUCTS

2.1 GATE VALVES

A. 2-inch through 12-inch:

1. Gate valves shall be iron body and bonnet with resilient-seat gate in full compliance with AWWA C509. Gate valves shall be UL listed and FM approved with a working pressure of 200 psi and a hydrostatic test pressure of 400 psi.

2. The gate shall be cast iron with a resilient seat permanently bonded to the gate with a rubber-tearing bond meeting ASTM D429 and AWWA C550. There shall be no metal to metal contact when in the fully closed position.

3. Valve shall have a smooth, unobstructed waterway in the fully opened position with a diameter equal to or larger than the full nominal diameter of the valve.

4. Non-Rising Stems (NRS) shall be cast bronze with integral collars in compliance with AWWA. The NRS stuffing box shall have two O-ring seals designed to remain water tight. O-rings shall be field replaceable without removing the valve from service.

5. Internal parts shall be accessible without removing the body from the main.

6. Gate valves 4 inches through 12 inches shall have mechanical-joint ends for buried service or flanged ends for exposed service. 2-inch gate valves shall have iron pipe threads.

7. All bolts and nuts shall be Type 304 stainless steel.

8. Valves shall open counter-clockwise (left) and shall be equipped with a 2-inch square AWWA operating nut.

9. The interior and exterior of the valve body and bonnet shall be coated with fusion bonded thermosetting plastic or epoxy. Internal coating shall conform to AWWA 550.

10. Acceptable gate valves, sizes 4-inch through 12-inch, shall be:

Manufacturer	Model
American Flow Control	Series 2500SS
Clow (M&H)	F-6100
Mueller	A-2360-20
Kennedy	Kenseal II

B. 14-inch and Larger:

1. Gate valves shall be ductile iron body and bonnet with resilient-seat gate in full compliance with AWWA C515. Gate valves shall be UL listed and FM approved with a working pressure of 250 psi and a hydrostatic test pressure of 500 psi.

2. The gate shall be ductile iron with a resilient seat permanently bonded to the gate with a rubber-tearing bond meeting ASTM D429 and AWWA C550. There shall be no metal to metal contact when in the fully closed position.

3. Valve shall have a smooth unobstructed waterway in the fully opened position with a diameter equal to or larger than the full nominal diameter of the valve.

4. Non-Rising Stems (NRS) shall be bronze with integral collars in compliance with AWWA. Stem and stem nut shall be high-strength bronze. Stem shall be sealed by three O-rings. The NRS stuffing box shall have two O-ring seals designed to remain water tight. O-rings shall be field replaceable with valve fully open under full rated pressure. O-rings set in a cartridge shall not be allowed. A thrust washer shall be located above and below the thrust collar.

5. Internal parts shall be accessible without removing the body from the main.

6. Gate valves shall have mechanical-joint ends for buried service or flanged ends for exposed service.

7. All bolts and nuts shall be Type 304 stainless steel.

8. Valves shall open counter-clockwise (left) and shall be equipped with a 2-inch square AWWA operating nut.

9. Non-buried valves shall have all interior and exterior surfaces of the valve body and bonnet coated with fusion bonded thermosetting plastic or epoxy in conformance with AWWA 550 applied electrostatically prior to assembly.

10. Acceptable gate valves, sizes 14-inch and larger, shall be:

Manufacturer	Model
American Flow Control	Series 2500SS
Clow (M&H)	67-01
Mueller	A-2361

C. All gate valves furnished for a project shall be from the same manufacturer.

D. Insert Valves:

1. Insert valves shall meet the requirements of gate valves for the valve mechanism and AWWA C110/ANSI A21.10 for the sleeve. Pressure rating shall be as indicated on the Drawings.

E. Brass Plumbing Gate Valve:

1. Brass plumbing gate valves used for air relief valves shall be non-rising stem with an ASTM B584 cast brass body, threaded ends, integral seat, ASTM B584 cast brass threaded bonnet, adjustable packing nut, ASTM B584 cast brass solid wedge disc, and ASTM A48 Class 35 cast iron handwheel. Valve shall be non-shock cold water rated for 200 psi. Acceptable brass gate valves are the Hammond Valve model IB 646 or equal.

2.2 AIR RELEASE VALVES (COMBINATION VALVES)

A. Pressure air release valves shall have cast iron bodies, type 302 stainless steel floats, bronze trim, and Buna-N seats and be in accordance with ASTM C512. All working parts shall be bronze, brass, stainless steel, or other corrosion resistant material.

B. Size and location of air release valves shall be as indicated on the Drawings. Valves shall be rated for working and corresponding test pressure as indicated on the Drawings with a minimum 200 psi working pressure.

C. Valves shall relieve large volumes of air as the lines are filled and release small quantities of entrained air automatically while the main is in service and under pressure.

D. All internal and external ferrous components and surfaces of the valves, with the exception of stainless steel and finished or bearing surfaces, shall be shop painted with two coats (10 mils min. dry film thickness) of premium epoxy for corrosion resistance. Damaged surfaces shall be repaired in accordance with the manufacturer's recommendations.

E. Acceptable Manufacturers are listed below:

Size	Manufacturer	Model
1-inch	Crispin	Type “N” PL10
2-inch	Crispin	Type “N” PL20
1-inch	G. A. Industries	Fig. 910
2-inch	G. A. Industries	Fig. 920
1-inch	Val-Matic	Models 15 or 22
2-inch	Val-Matic	Model 38

F. Air release valves shall be installed per standard detail.

2.3 BUTTERFLY VALVES

A. Butterfly valves are not permitted unless approved by the Owner.

2.4 CHECK VALVES

A. Swing check valves used for pressure zone separation shall be in accordance with ASTM A126 Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings and ANSI/AWWA C-508. Valves shall be certified to NSF 61.

B. Check valves shall be iron body, bronze-mounted, with either mechanical joint or flanged ends as indicated on the Drawings. Mechanical joint ends shall be furnished with bolts, glands, and rubber gaskets and in accordance with ANSI/AWWA C111/A21.11. Flanged ends shall meet the dimensional requirement of ANSI B16.1, Class 125, and shall be provided with bolts and gaskets.

C. Check valves shall be non-slamming (shock absorber) type. Check valves shall be equipped with an outside lever and weight with an external adjustable pneumatic cylinder to control opening and closing speed of clapper. Valves up to 12 inches shall have a minimum operating pressure of 175 psi. Valves 16-inch to 24-inch shall have a minimum non-shock cold-water pressure rating of 250 psi.

D. The disk seat bolt shall be 304 stainless steel and the body seat ring shall be bronze with an easily replaceable resilient disc seat. The valve shall be tight seating.

E. Check valves shall have an epoxy coated interior and exterior for corrosion resistance.

F. Check valves shall have an O-ring sealed stuffing box.

G. When check valves are used in vault applications, a ball drip valve is to be provided.

H. Check valves shall be furnished with an arrow cast into the body indicating the direction of flow during system operation.

I. Acceptable Manufacturers are listed below:

Manufacturer	Model
G. A. Industries	350-W
Clow (M&H)	1106LW or 1106SL
Mueller	A-2606-6-01 or A-2606-6-02

2.5 TAPPING SLEEVES AND VALVES

A. The tapping sleeve and valve shall be suitable for wet installation without interrupting water service.

B. Tapping sleeve body, flange, bolts, nuts, test plug, and other structural components shall be constructed of Type 304 stainless steel. The sleeve and gasket shall provide full wrap-around (360-degree) pipe coverage. Sleeve shall be provided with a full gasket of girded virgin SBR compounded for water service per ASTM D2000. Acceptable manufacturers are Ford, Romac, or Mueller “Stainless Steel Tapping Sleeve,” or equal.

C. Tapping valves shall be resilient seat and epoxy coated (minimum 10 mil thickness) and shall otherwise meet the requirements of gate valves except that the seat openings shall be larger than nominal size with a raised alignment ring on the flange. Valve ends shall be mechanical joint by flange. Valves shall open counter-clockwise (left) and shall have a 2-inch operator nut. Tapping valves shall be O-ring type mechanical joint end conforming to AWWA NRS construction. Inlet flange end shall be Class 125 (ANSI B16.1). Bolts and nuts are to be Type 304 stainless steel. Acceptable resilient seat tapping valves are listed below:

Manufacturer	Model
American Flow Control	Series 2500 TM
Clow (M&H)	F-6114
Mueller	T-2360
Kennedy	Kenseal II

2.6 VALVE BOXES

A. Adjustable two-piece valve boxes shall be US-made, gray cast iron. Lids shall be heavy-duty traffic weight with the word “water” cast into the lid. Provide cast-iron telescoping slip type top section of length required for depth of burial of valve and bottom section with base of size to fit over valve. Valve boxes shall be coated inside and out with asphalt.

Acceptable valve boxes are: Sigma Corporation Model V-8459, Capitol Foundry of Virginia, Inc. Model VB-FCWA-#3435, or equal.

2.7 FIRE HYDRANTS

A. Fire hydrants shall be dry-barrel, cast iron body, compression, breakaway type in accordance with ANSI/AWWA C502, Dry-Barrel Fire Hydrants, with interior coating in accordance with AWWA C550, Protective Interior Coatings for Valves and Hydrants.

B. Fire hydrants shall comply with UL 246: Hydrants for Fire Protection Service and FM1510: Fire Hydrant (Dry Barrel Type) for Private Fire Service.

C. Hydrants shall be hub end, triple nozzle, with two 2½-inch fire hose nozzles and one 4½-inch pumper nozzle (with a screw-on 5-inch Storz adaptor with locking cap) with American National Standard hose threads. Nozzles shall be provided with caps and chains.

D. Minimum working pressure shall be 150 psi for standard pressure zones and 250 psi for high-pressure zones.

E. Hydrant shall be dry top with lubrication reservoir.

F. The hydrant valve opening shall be 5¼ inches. The main valve shall be of synthetic rubber reinforced with steel. The seat shall be of a bronze ring threaded to a bronze insert in the hydrant shoe, with O-Rings to seal the drain way and barrel from leakage of water in the shoe.

G. All hydrants must include cast or ductile epoxy-lined shoe (minimum 4 mils), rubber drain seals, and positive protective valve stop device.

H. Hydrants shall have a 6-inch hub-end or mechanical joint elbow.

I. The hydrant barrel shall be of sufficient length to provide a minimum bury of 3 feet.

J. Hydrant cap and stuffing box shall be of unitized, one-piece design creating a watertight cavity without the use of gaskets. The combination of O-Rings to a crimped brass ferrule around the stem shall seal the cavity from contact with water. Hydrant caps shall have a means for providing periodic lubrication of the operating threads.

K. The hydrant drain hole shall momentarily force flush with each operation.

L. All hydrant extension kits, flange kits, stems, couplings and other repair parts must be from the original hydrant manufacturer. Only one 24-inch extension kit is allowed.

M. Hydrants are to be painted with two coats of approved paint in accordance with standard details. Barrels are to be painted federal safety red with the caps. Owner will paint bonnets in colors coordinated with operating pressure.

N. Hydrants shall open counter-clockwise (left) and shall have a National Standard pentagon-type operating nut (1½-inch point to flat). The operating nut shall be of one-piece bronze construction. A thrust washer shall be supplied between the operating nut and stem lock nut. The valve stem shall have a safety flange and a safety coupling.

O. Approved fire hydrants, including model and manufacturer, are listed below:

Manufacturer	Model	Suitable for High Pressure Applications
Mueller	A-423 Super Centurion 250	Yes
American Cast Irion Pipe Company	Mark-73 Traffic Model	Yes

P. All hydrants furnished for a project shall be from the same manufacturer.

Q. See standard details for additional requirements.

2.8 ACCESSORIES

PART 3– EXECUTION

3.1 EXAMINATION

A. Verify that water main size, location, and elevation are as indicated on the Drawings prior to excavation and installation of valves and hydrants.

3.2 PREPARATION

A. Confirm exact location of valves, hydrants, tapping sleeves, and services with Owner prior to installation.

B. Prior to making the tap:

1. Confirm materials for a complete installation are at the site.

2. Cut pipe ends square, ream pipe ends to full pipe diameter, remove burrs.

3. Remove scale and dirt on inside and outside before assembly.

4. Prepare pipe connections to equipment with flanges or mechanical joints, as indicated on the Drawings.

3.3 INSTALLATION

A. General:

1. Install valves at the locations indicated on the Drawings in accordance with manufacturer’s recommendations.

2. Set valves and hydrants and other items plumb.

B. Gate Valves:

1. Valves shall be installed with stems in a vertical plane through the pipe axis and perpendicular to the pipe axis. Contractor shall clean the valves before installation and check for satisfactory operation.

2. All valves adjacent to and within 20 feet of tees or bends and at intersections shall be restrained to the fitting with either mechanical joint restraints or threaded tie rods in accordance with Construction Specification Section 33 14 13, Water Utility Distribution Piping. See standard detail for number and diameter of tie rods.

3. Nipples for 4-inch through 12-inch valves shall be cut so that the valves are installed no more than four feet from the fitting (centerline to centerline). 2-inch valves shall be installed with a 4-inch long brass nipple.

4. Valve nut extensions shall not be installed unless approved by the Owner.

C. Insertion Valves:

1. Prior to ordering insertion valve and sleeve assembly, expose existing main at point of installation and verify circumference, actual caliper diameter, and roundness of existing pipe. In addition, identify the exterior condition of the pipe with respect to pitting, scaling, electrolysis, or other defects that would affect manufacturing dimensions or exact location of the insertion. This information shall be provided to the Owner and to the valve manufacturer.

D. Air Release Valves:

1. Pressure air release valves shall be located as shown on the Drawings and as otherwise directed by the Owner. The valve shall be housed in a precast concrete eccentric manhole and shall be installed in accordance with standard detail. Pipe and fittings used to attach the valve to the main shall be brass.

E. Check Valves:

1. Install check valves as detailed on the Drawings and in accordance with manufacturer’s recommendations.

F. Tapping Sleeves and Valves:

1. Prior to ordering the tapping sleeve assembly, Contractor shall excavate and expose the existing main and obtain the circumference of the existing pipe to ensure the sleeve will fit the pipe. This information shall be provided to the Owner on the as-built drawings.

2. Tapping sleeves and valves shall be installed in accordance with the manufacturer's recommendations at locations shown on the Drawings. Contractor shall make connection to existing water mains in the manner shown on the Drawings or otherwise in a manner that is satisfactory to the Owner.

3. Install tapping sleeves and valves in accordance with standard detail.

G. Valve Boxes:

1. All underground valves without gearing or operators shall be equipped with a valve box with lid per standard detail. Valve boxes shall be centered and plumb over the operating nut of the valve. Valve boxes shall be fitted together securely and set so that the cover is flush with the finished grade of the adjacent surface. Contractor shall adjust valve boxes to final grade at the time designated by the Owner.

2. Valve boxes shall be installed so as not to transmit shock or stress to the valve and shall be centered. The ground in the trench upon which the valve boxes rest shall be thoroughly compacted to prevent settlement.

3. A 4-inch thick, 2-foot x 2-foot concrete stabilizing pad shall be installed around the valve box in unpaved areas and set flush with grade and valve box.

4. When valve box tops project more than 1 inch above the unfinished road surface, install a temporary layer of asphaltic concrete around the valve box. The asphaltic concrete shall be feathered to provide a smooth transition from the unfinished road surface to a level no more than 1 inch below the edge of the rim and cover. The exposed sides of the valve box shall be painted bright orange.

5. Valve boxes in easements shall be provided with a valve box marker post as manufactured by Pipeline Supply, Sanford, NC, or equal.

H. Fire Hydrants:

1. Fire hydrants shall be installed where shown on the Drawings or as directed by the Fire Marshall of the governing municipal jurisdiction in accordance with Owner standard details.

2. Hydrants shall be located at a distance from the curb or edge of pavement that provides ready access and minimizes the possibility of damage from vehicles. They shall be set to the height prescribed by standard details with the pumper nozzle facing or pointing toward the street or fire access lane. Where hydrants are set behind guardrails, the pumper nozzle shall be set with its centerline a minimum of 12 inches and a maximum of 18 inches above the top of the guardrail. Determine the required barrel length and order to meet site conditions.

3. A resilient seat gate valve shall be installed at the main line tee and rodded or restrained to the tee and the hydrant as indicated in details. The hydrant shall be installed a minimum of 4 feet from the gate valve. When the valve is placed outside the pavement, a concrete stabilizing pad shall be provided in accordance with standard detail.

4. Set hydrants with the stem vertical/plumb and the flange above grade.

5. Take care to keep concrete away from bolts and weep holes.

6. Install a minimum of 3 CF of loose #57 stone around the hydrant elbow.

7. Restrain hydrants to the valve, and from the valve to the main, with 3/4-inch diameter threaded rods. Where hydrant branches exceed 20 feet, attach rods to the hydrant and to a thrust anchor behind the first full joint of pipe on the hydrant branch between the hydrant and the leg valve. If test pressures are expected to exceed 200 psi, rod with a minimum of 4 rods, see standard detail for rod diameters. Rods are not required if a joint restraint system is used.

8. All threaded rods are to be Type 304 stainless steel or cold-dipped galvanized ASTM 307 steel. Cold dipped-galvanized rods are to be coated liberally with coal tar epoxy or other rust inhibitor approved by the Owner to protect the steel from corrosion. Joint restraint systems are preferred over tie rods.

9. If the water main will be pressurized within seven days of setting the hydrant, then utilize 4,000 psi high early strength concrete for thrust blocking.

10. Owner’s representative must inspect fire hydrants and restraint systems prior to backfilling.

11. Install fire hydrant markers in pavements in accordance with Construction Specification Section 33 05 97, Identification and Signage for Utilities.

3.4 FIELD QUALITY CONTROL

A. Pressure test valves and hydrants with the water main in accordance with Construction Specification Section 33 14 13, Water Utility Distribution Piping.

B. Flush hydrants after hydrostatic testing. Check for proper drainage.

3.5 PROTECTION

A. Protect valves, fire hydrants, and other installed components and appurtenances from damage until accepted into service by Owner.

B. Keep valve boxes clean and free of any foreign matter until acceptance of the project.

C. Hydrant bagging will be performed by Owner.

3.6 FINAL ACCEPTANCE

A. Upon completion of water main installations and prior to acceptance, provide adequate and competent personnel to conduct, in conjunction with Owner, an inspection of each valve and hydrant on the new water main. The purpose of this inspection shall be to ensure the operability and location of each valve and hydrant and to further ensure that valves are left in the open position. Upon receipt of State Final Approval, the main valve serving the new section of main(s) shall be opened and placed into service by the Owner.

END OF SECTION

Engineering Department
Manual Of
Practice



Life. Well Crafted.

Water Specifications

SECTION 022000 - EARTHWORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Installation, protection and/or modification of utilities during site work construction, including any necessary staging of work.

B. Scarifying, compaction and testing of previously graded sites to ensure proper preparation and acceptability.

C. Excavation and embankment placement to required lines, dimensions, and subgrade elevations.

D. Preparation of existing low areas for placing of fill, including disposal of muck, topsoil, silt and wet or unsuitable materials.

E. SUB-SURFACE DATA:

1. Investigation: Sub-surface investigations tilted Geotechnical Investigation proposed Hickory Center, Hickory, NC Project No. 90G-010100.6, dated September 18, 1990 have been made. A copy of this report can be found at the back of this specification. The report is furnished as a mater of convenience and courtesy and there is no implied or expressed warranty as to the correctness of the report as to the existing condition. However, where a treatment is not covered in the specification, the recommendations made in the report shall be considered binding.

2. Site Visit: Data shown is for general information for bidders. Contractors are expected to examine the site, make investigations and decide for themselves the character of the materials to be encountered.

3. Responsibility: The owner will not assume responsibility for variations of sub-soil quality or condition.

1.02 REFERENCE STANDARDS

The following most current publications form part of this specification to the extent indicated by references thereto and shall be followed for all construction testing.

American Society for Testing and Materials (ASTM):

D 422	Method for Partial Size Analysis of Soils
D 698	Test for Moisture-Density Relations of Soils using 5.5 lb. (2.5 kg) Rammer and 12-inch (304.8mm) Drop (Standard Proctor)
D 1556	Test for Density of Soil in Place by Sand Cone Method
D 1557	Test for Moisture-Density Relations Using 10-lb (4.5 kg) Rammer and 18-inch (457mm) Drop (Modified Proctor)
D 1559	Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
D 2167	Test for Density of Soil in Place by the Rubber Balloon Method
D 2216	Laboratory Determination of Moisture Content of Soil
D 2487	Classification of Soils for Engineering Purposes
D 2922	Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D 3017	Test for Moisture Content of Soil and Soil-Aggregates by Nuclear Methods (Shallow Depth)
D 4318	Test for Plastic Limit, Liquid Limit & Plasticity Index of Soils
C 25	Chemical Analysis of Limestone, Quicklime and Hydrated Lime
C 110	Physical Testing of Quicklime and Hydrated Lime, Wet Sieve Method
C 618	Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland cement Concrete
C 977	Quicklime and Hydrated Lime for Soil Stabilization

American Association of State Highway and Transportation Officials (AASHTO)

T 88	Mechanical Analysis of Soils

PART 2 PRODUCTS

2.01 MATERIALS

A. Acceptable Stabilization Fabrics and Geogride:
   1. Mirafi 500X or 600X
   2. Phillips 66 Supac 6WS
   3. Dupont Typar 3401 and 3601
   4. Trevira S1114 and S1120
   5. Tensar SS-1 and SS-2
   6. Exxon GTF-200 or 350

B. Filter/Drainage Fabrics:
   1. Mirafi 140NS
   2. Phillips 66 Supac 4NP
   3. Dupont Typar 3341

C. Silt Fencing Fabrics:
   1. Phillips 66 Supac 5 NP (UV)
   2. Mirafi 100X

D. Material for filling and backfilling shall be clean subsoil free from debris, roots, topsoil, frozen material and rock larger than ½ cu. ft. Fill materials shall be tested and approved by the laboratory for the degree of compaction required by its intended use.

E. Unsuitable fill material shall be defined as that which fails to conform to requirements of paragraph 2.01 above.

PART 3 EXECUTION

3.01 PREPATATION

A. Remove excess or unsuitable materials from the site at no additional cost to Owner. All excess and/or unsuitable material shall be wasted off site at allocation approved by the North Carolina Department of Natural Resources and Community Development (Erosion Control). Backfill areas with layers of material and compact as specified.

B. Prior to placing fill in low areas, such as previously existing creeks, ponds or lakes perform following procedures:

   1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch, use adequate pump to obtain same results.

   2. After drainage of low area is complete, remove muck, mud, debris, and other unsuitable material by using acceptable equipment and methods that will keep natural underlying low areas dry and undisturbed.

   3. If proposed for fill, all muck, mud and other materials removed from above in low areas shall be dried on-site by spreading in thin layers for observation by Owner's representative. Material shall be inspected and, if found to be suitable for use as fill material shall be incorporated into lowest elevation of site filling operation, but not under or within 10'-0" of perimeter of building pad or paving subgrade. If, after observation by Owner's representative, material if found to be unsuitable material shall be removed from site at no additional cost to Owner.

4. Provide additional materials at no additional cost to Owner where existing materials are insufficient or unsuitable for their intended use. Borrow pits shall be approved by Owner's representative and the North Carolina Department of Natural Resources and Community Development (Erosion Control).

3.02 EXCAVATION FOR FILLING AND GRADING

A. Classification of Excavation: Contractor by submitting bid acknowledges that he has investigated site to determine type, quality, quality and character of excavation work to be performed. All excavation shall be considered unclassified excavation.

B. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and governing agencies.

C. When performing grading operations during periods of wet weather, provide adequate drainage and ground water management to control moisture of soils. Site dewatering is Earthwork Contractors responsibility at no additional cost to Owner.

D. Shore, base and drain excavations as necessary to maintain safe, secure and free of water at all times.

E. Perform rock excavation in a manner that will produce material of such size as to permit it being placed in embankments. Remove loose or shattered rock, overhanging ledges and boulders, which might dislodge.

F. Use suitable material to replace rock overblast in building area and in expansion area to facilitate placement of utilities and future footings.

G. Break or crush rock obtained from blasting to allow use for fill in parking area as follows:

1. Rock 6" or greater in largest dimension is unacceptable as fill within proposed building and paving area.

2. Rock less than 6" in largest dimension is acceptable as fill to within 24" of surface of proposed subgrade when mixed with suitable material.

3. Rock fragments less than 2" in largest dimension and mixed with suitable material is acceptable as fill within the upper two feet (2') of proposed subgrade.

3.03 USE OF EXPLOSIVES

A. Comply with all laws, rules and regulations of federal, state and local authorities and insure which govern storage, use, manufacture, sale, handling, transportation, licensing, or other disposition of explosives. Take special precautions for proper use of explosives to prevent harm to human life and damage to surface structures, all utility lines or other subsurface structures. Do not conduct blasting operations until persons in vicinity have had ample notice and have reached positions of safety.

B. Contractor shall save harmless Owner, Architect and Owner's representative from any claim growing out of use of such explosives. Removal of materials of any nature by blasting shall be done in such manner and such time as to avoid damage affecting integrity of design and to avoid damage to any new or existing structure included in or adjacent to work. It shall be Contractors' responsibility to determine method of operation to ensure desired results and integrity of completed work.

3.04 FILLING AND SUBGRADE PREPARATION

A. BUILDING SUBGRADE AREAS:

1. Building subgrade pad shall be that portion of site directly beneath and ten feet (10') beyond the building and appurtenance limits.

2. The building subgrade pad shall be prepared in strict accordance with the "foundation subsurface preparation", to be provided by Owner.

3. Unless specifically indicated otherwise on the drawings, areas exposed by excavation or stripping and on which building subgrade preparations are to be performed shall be scarified to a minimum depth of 12" and compacted to a minimum of 98% of the optimum density, in accordance with ASTM D 698, at a moisture content of not less than 1% below and not more than 3% above the optimum moisture content.

These areas shall then be proof rolled to detect any areas of insufficient compaction. Proof rolling shall be accomplished by making a minimum of two (2) complete passes with a fully-loaded tandem-axle dump truck or approved equivalent, in each of the two perpendicular directions under the supervision and direction of a field geotechnical engineer. Areas of failure shall be excavated and replaced with suitable fill material per these specifications.

4. Unless specifically indicated otherwise on the drawing, fill materials used in preparation of building subgrade shall be placed in lifts or layers not to exceed 8" loose measure and compacted to a minimum density of 98% of optimum density, in accordance with ASTM D 698, at a moisture content of not less than 1% below and not more than 3% above the optimum moisture content. Unless specifically stated otherwise in the "foundation subsurface preparation" on the drawing.
5. The top 18" of building and parking subgrade shall be compacted to 100% Standard Proctor.

The following table stipulated maximum allowable values for Plasticity Index (PI) and Liquid Limit (LL) of suitable materials to be used as fill in the specified areas.

Location:	PI	LL
Building area, below upper four feet	20	50
Building area, upper four feet	12	40

B. SETTLEMENT MONITORING OF BUILDING SUBGRADE AREAS:

1. Settlement hubs are to be installed in the building areas in locations shown on the plans by the site grading contractor.

2. Settlement hubs shall be 8" in diameter and embedded a minimum of 30" into the subgrade at the building pad "blue top" elevation as detailed on the plans.

3. Settlement hub monitoring shall begin as soon as the building subgrade is reached. Monitoring shall be performed daily the first week of installation and weekly thereafter. Accuracy of monitoring is to be to 1/100 of a foot.

4. The on-site soils engineer shall monitor the settlement hubs. The site contractor shall insure that a stable bench mark is maintained at all times during monitoring and site work.

5. Reports of settlement monitoring and progress shall be submitted to the architect, and the general contractor.

6. Refer to soils report for further information.

7. After on-site soils engineer has determined when settlement has reached the acceptance limit, the site grading contractor is responsible for providing building pad elevations as shown on the grading plans.

C. AREAS OF CONSTRUCTION EXCLUSIVE OF THE BUILDING SUBGRADE:

1. Unless specifically stated otherwise on the drawing, areas exposed by excavation or stripping and on which subgrade preparations are to be performed shall be scarified to minimum depth of 8" and compacted to minimum of 98% of optimum density, in accordance with ASTM D 698, at a moisture content of not less than 1% below and not more than 3% above the optimum moisture content. These areas shall then be proof rolled to detect any areas of insufficient compaction. Proof rolling shall be accomplished by making a minimum of two (2) complete passes with a fully-loaded tandem-axle dump truck or approved equivalent, in each of the two perpendicular directions under the supervision and direction of a field geotechnical engineer. Areas of failure shall be excavated and replaced with suitable material per these specifications.

2. Unless specifically stated otherwise on the drawings, fill materials used in preparation of subgrade shall be placed in lifts or layers not to exceed 8" loose measure and compacted to a minimum density of 98% of optimum density, in accordance with ASTM D 698, at a moisture content of not less than 1% below and not more than 3% above the optimum moisture content.

3. The following table stipulates maximum allowable values for Plasticity Index (PI) and Liquid Limit (LL) of suitable fill materials to be used in the specified areas, unless specifically stated otherwise on the drawings.

Location*	PI	LL
Area below upper tow feet, exclusive of building area	20	50
Upper two feet, exclusive of building area	15	40

*References to depth are to proposed subgrade elevations.

4. Material imported from off-site shall be CBR (California Bearing Ratio) value equal to or above the pavement design subgrade CBR value indicated on the drawings.

5. The site grading contractor shall provide and install all topsoil as indicated on the drawings and in conformance with landscaping plans and specifications.

3.05 MAINTENANCE OF SUBGRADE

A. Finish subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

B. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

C. Remove areas of finished subgrade found to be insufficient for any reason to depth necessary and replace in a manner that will comply with compaction requirements per these specifications. Surface of subgrade after compaction shall be hard, uniform, smooth, stable and true to grade and cross-section.

D. Grading of paving areas shall be within a tolerance of up to 0.10 feet as so long as it does not adversely affect drainage and other conditions. Contractor to provide engineering and field staking necessary for verification of lines, grades and elevations.

E. Maintain subgrade for area to be paved. Make adjustments that may be required in accordance with specifications at no additional expense to Owner.

3.06 RIP-RAP

A. Rip-rap shall be constructed as shown on the drawings.

3.07 FINISH GRADING

A. Grade all areas where finish grade elevations or contours are indicated on drawings, other than paved areas, including excavated areas, filling transition areas and landscaped areas. Grading areas shall be uniform and smooth, free from rock, debris or irregular surface changes. Finished subgrade surface shall not be more than 0.10 feet above or below established finished subgrade elevation and all ground surfaces shall vary uniformly below indicated elevations. Finish ditches shall be graded to allow for proper drainage without ponding and in a manner than will minimize erosion potential. For topsoil application, refer to Section 02900 (LANDSCAPING, SEEDING AND SODDING).

B. Correct all settlement and eroded areas within one year after date of substantial completion of all work at no additional expense to Owner. Bring grades to proper elevation.

3.08 FIELD QUALITY CONTROL

A. Independent Testing Laboratory selected and paid by Owner, shall be retained to perform construction testing and act as the Owner's representative on site based on the following:

1. Building Subgrade Areas, including 10'-0" Outside Exterior Building Lines: In cut areas, not less than one compaction test for every 2,500 square feet. In fill areas, same rate of testing for each lift (measured loose).
2. Areas of construction exclusive of Building Subgrade: In cut areas, not less than one compaction test for every 10,000 square feet. In fill areas, same rate of testing for each lift (measured loose).

B. In compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to Owner.

C. In all areas to receive pavement, a CBR (or LBR) test shall be performed for each type of material imported from off-site.

D. The following rest shall be performed on each type of on-site or imported soil materials used as compacted fill as part of construction testing requirements.

1. Moisture and Density Relationship: ASTM D 698 or ASTM D 1557.
2. Mechanical Analysis: AASHTO T-88
3. Plasticity Index: ASTM D 4318

E. Field density tests for in-place materials shall be performed according to one of the following standards as part of construction testing requirements:

1. Sand-Cone Method: ASTM D 1556
2. Balloon Method: ASTM D 2167
3. Nuclear Method: ASTM D 2922
   (Method B-Direct Transmission)

F. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data and test results. The architect and Contractor shall be provided with copies of reports within 96 hours of time test was performed. In event that any test performed fails to meet these specifications, Independent Testing Laboratory shall notify the General Contractor immediately.

The Contractor at no additional expense shall pay for all costs related to retesting due to failures to Owner. We reserve the right to employ an Independent Testing Laboratory and to direct any testing that is deemed necessary. Contractor shall provide free access to site for testing activities.

END OF SECTION

SECTION 02222 - EXCAVATION, BACKFILLING AND COMPACTING FOR UTILITIES

PART 1 – GENERAL

1.01 SUMMARY

This section includes the excavation, bedding and backfilling of utilities necessary to perform work indicated on drawings and contract documents.

1.02 RELATED REQUIREMENTS

Construction drawings
Specs. Section 02110 SITE PREPARATION
Specs. Section 02200 EARTHWORK

1.03 SUBMITTALS

A. Shop drawings or details pertaining to site utilities are not required unless use of materials, methods, equipment or procedures contrary to drawings or these specifications are proposed. Do not perform work until required shop drawings have been accepted by Owner.

B. The Contractor shall contact all utility companies and determine if additional easements will be required to complete the project. Contractor shall provide written confirmation of the status of ALL easements to the owner's Construction Manager at the time of the preconstruction conference or no later than 90 days prior to the project possession date.

PART 2 – PRODUCTS

A. Bedding Material: Processed sand and gravel free from clay lumps, organic or other deleterious material and complying with following gradation requirements:

U.S. Sieve Size	Percent Passing (by weight)
1 inch	100
¾ inch	90-100
3/8 inch	20-55
No. 4	0-10
No.8	0-5

B. Steel Casing Pipe: Comply with AWWA C-201 or C-202, minimum grade B, size and wall thickness as indicated on drawings.

PART 3 – EXECUTION

3.01 SUMMARY

A. Set all lines, elevations and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments or other reference points.

B. Maintain in operating condition existing utilities, active utilities and drainage systems encountered in utility installation. Repair any surface or subsurface improvement shown on drawings.

C. Verify location, size, elevation and other pertinent data required to make connections to existing utilities and drainage systems as indicated on drawings. Contractor shall comply with local codes and regulations.

3.02 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform excavation as indicated for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides or cave-ins.

B. Remove excavated materials not required or not suitable for backfilling or embankments and waste off-site. Any structures discovered during excavation(s) shall be disposed of as specified.

C. Prevent surface water from flowing into trenches or other excavations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods.

D. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to owner.

~~E. All excavation shall be unclassified.~~

3.03 TRENCH EXCAVATION

A. The local utility companies shall be contacted before excavation shall begin. Dig trench at proper width and depth for laying pipe, conduit or cable. Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point-bearing. Overexcavate rock, wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform bedding as directed by soils engineer.

B. All trench excavation side walls greater than 5 feet in depth shall be sloped, shoring, sheeted, braced or other wise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or deeper.

C. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joint, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer or wider than needed to make joint connection properly.

D. Trench width requirements below the top of the pipe shall not be less than 12” not more than 18” wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit or cable shall be at least practical width that will allow for proper compaction of trench backfill.

E. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances.

1. WATER MAINS: 36” to top of pipe barrel
2. SANITARY SEWER: Elevations and grades as indicated on drawings.
3. STORM SEWER: Depths, elevations and grades as shown on drawings.
4. ELECTRICAL CONDUITS: 24” minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes or the local utility company requirements, whichever is deeper.
5. TV CONDUITS: 18” minimum to top of conduit or as required by the local utility company, whichever is deeper.
6. TELEPHONE CONDUITS: 18” minimum to top of conduit, or as required by the local utility company, whichever is deeper.
7. GAS MAINS AND SERVICE: 30” minimum to top of pipe, or as required by the local utility company, whichever is deeper.

3.04 SHEETING AND BRACING

Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.

3.05 PIPE BEDDING

Accurately cut trenches for pipe or conduit that is installed to designed elevations and grades to line and grade from 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to confirm to lower portion of pipe barrel. After pipe installation, place select backfill as determined in Section 02200, and compact in maximum 8" layers measured loose to the top of the trench.

3.06 TRENCH BACKFILLING

A. Criteria: Trenches shall not be backfilled until required test are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfilling trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.

B. Backfilling: After pipe or conduit has been installed, bedded and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts. Compact to minimum density of 98% of optimum density in accordance with ASTM D 698.

C. Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.

D. Compaction Testing: If determined by the owner and at the owner's expense an independent testing laboratory shall perform test at intervals not exceeding 200'-0" or trench for the first and every other eight-inch (8") lift of compacted trench backfill and furnish copies of test results as specified.

END OF SECTION

SECTION 02227 - BORING AND ENCASEMENT

PART 1 – GENERAL

1.1 GENERAL DESCRIPTION: This section covers the furnishing of all supervision, labor, equipment and materials required for the complete installation of encasement pipe and carrier pipes under highways and railroads by boring and jacking as shown on the drawings and specified herein.

1.2 GENERAL INTENTION: This section shall include construction methods for pipe lines installed by boring and jacking in the locations as shown on the contract drawings. The contractor shall inspect the locations at the proposed crossings and shall familiarize himself with the conditions under which the work will be performed, and with all necessary details and the suitability of his equipment and methods for the work required. All work in railroads shall comply with all current requirements of governing highways and railroad agencies. The Contractor shall be familiar with these requirements.

PART 2 – MATERIALS

2.1 The encasement pipe shall be of the size as shown on the contract drawings. All encasement pipe shall be smooth wall welded steel conforming to ASTM Designation A139, Grade B. The outside of the pipe shall be coated in accordance with AWWA Standard C203. Minimum pipe wall thickness shall be as follows:

Pipe-Nominal Diameter Inches	Wall Thickness Inches
16	.250
20	.250
24	.250
30	.312
36	.500

2.2 Steel spiders shall be galvanized.

PART 3 – EXECUTION

3.1 Encasements shall be installed by boring and jacking unless field conditions require otherwise. It shall be the Contractor's responsibility to notify the Engineer immediately if conditions do not permit a jack and bore installation.

3.2 Installation of encasement pipe shall include all related work and services such as mobilization of equipment, construction and maintaining working pits, right-of-way maintenance and restoration, traffic maintenance, mining, excavations, dewatering, sheeting, shoring and bracing for embankments, operating pits, and as elsewhere required shall be placed and maintained in order that work may proceed safely and expeditiously.

3.3 The encasement pipe shall be of the diameter indicated for the carrier pipe as shown on the drawings.

3.4 Boring Machine Alignment: The boring machine shall be accurately aligned before the boring is commenced and the Contractor shall take such necessary steps as are required to accurately place the encasement with respect to line and grade. Payment will not be made for a bore and encasement that is not accurate as to line and grade as determined by the Engineer.

3.5 Extension of Encasement Pipe: As the boring operation progresses, each new section of the encasement pipe shall be butt welded to the section previously jacked into place. The boring auger shall not be of a greater diameter than the outside diameter of encasement. The leading edge of the steel casing shall be kept as close to the auger head as possible and shall be advanced at the same rate of speed as the earth auger in order to minimize any unsupported holes in the earth. Any voids that occur are to be filled with 3:1 ratio sand to cement grout at 50 psi pressure, sand or pea gravel, as directed by the Engineer to insure that there will be no settlement. The Engineer will direct that this space be filled if the space is large enough to cause any earth settling. There will be no payment for grout work.

3.6 Before the pipe is installed in the casing, bolt-on meter skids painted with bitumastic paint shall be rigidly fastened to the barrel of the pipe. After completion of the casing, the Contractor shall insert the pipeline in the pre-jointed segments. No contact will be permitted between the casing and the carrier pipeline.

3.7 Obstructions: In the event that an obstruction is encountered during the boring operation which cannot be penetrated as determined by the Engineer, the auger is to be withdrawn and the steel pipe encasement is to be cut off, capped and completely filled with 3:1 ratio sand to cement grout at 50 psi pressure before moving to a new site. Payment will be made by the Owner on completed before the boring operation was stopped plus the additional linear footage at the new site. There will be no payment for the grout work.

SEE SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

End Section

SECTION 2400 – THRUST BLOCKING

1.1 INTRODUCTION

Thrust Blocks are to be installed at all fittings which change a direction of the pipeline centerline, either in part or whole including but not solely, bends and tees, at dead end situations of the pipeline or as directed by the Engineer/Owner.

1.2 MATERIALS

Concrete used for construction of Thrust Blocking shall be a minimum of 3000-psi compressive strength determined in accordance with ASTM C39 or C42 with a maximum of 5" slump delivered from the factory. The only water to be added in the field is that which the factory held back from achieving the 5" slump at the point of mixing. Reinforcing steel shall be of grade and installed as shown on the plan details in such cases, as it is required. Sakrete or any like material shall not be permitted under any circumstance.

1.3 THRUST BLOCKING CONSTRUCTION

Thrust Blocking shall be constructed to the minimum dimensions shown on the drawings or as field directed by the Engineer. All faces shall rest against undisturbed earth with the exception of the face to which the load is to be applied. Care must be exercised so that concrete is not allowed to drop more that 4' free undisturbed fall so that separation of aggregates is avoided and maximum benefit is achieved. All joints and faces of the appurtenances to be restrained shall be wrapped continuous with a 4 mil plastic such that the concrete does not come into direct contact with bolts, joints, flanges, gaskets etc. Diligence must be exercised so that pipe joints are not encased with concrete intended to provide thrust blocking except as specified or directed by the Engineer.

END OF SECTION

SECTION 2401 – WATER VALVES, VALVE BOXES, AIR RELIEF VALVES AND TAPPING SLEEVE & VALVES

1.1 INTRODUCTION

This section covers the requirements for furnishing and installing the above-mentioned items and their respective appurtenances as detailed on the plans. This shall include all labor, equipment, materials and incidentals that are necessary to complete installation of subject items in accordance with the plans and specifications. All supplied materials shall be of a type and class as specified herein

This section will specify storage and handling, excavation, bedding, laying and coupling of joints and backfilling. All construction shall be as specified as herein, unless written deviation is received from the Engineer.

Work under this section shall be measured by the actual number of components and paid for at unit prices established in the Contract.

1.2 CATALOG CUT SUBMITTALS

Contractor shall submit 4 copies of catalog cuts to Engineer for review for all materials that are required to complete the work as described in the associated plans. Engineer will retain two sets of original submittals and return two sets to the Contractor with the appropriate response annotated.

1.3 STORAGE AND HANDLING

The Contractor shall inspect the materials upon receipt for visible defects prior to off loading. The Contractor shall unload all valves and appurtenances as so to avoid any deformation or other injury. The Contractor shall implement appropriate measures during storage such that no storm water may pass through or encumber the materials. All materials shall be stored in such a manner that they will drain and so protect them from contamination or freezing.

If any material is found to be defective during installation, then same material shall be removed and replaced with appropriate quality and type at the Contractors expense.

1.4 MATERIALS

A. <u>Gate Valves:</u>

All Gate Valves shall as a minimum reflect a rating of 200 psi, contain clearway equal to the full nominal diameter of the adjoining pipe, be open left operation (counterclockwise), reflect the name and date of manufacture, be of non-rising stem type, contain a directional arrow for operation cast into the body, have a 2” operating nut for control and contain Mechanical Joint connections. All requirements shall be met unless specified on the plans or directed by the Engineer in writing.

All materials shall withstand a hydraulic test pressure of equal to twice the rated pressure and Contractor shall provide written proof of test from manufacturer upon request.

A.1 Resilient Seated Wedge Valve:

Gate Valves 2" through 36" diameter shall be of cast iron or ductile iron body, resilient seated wedge type valves conforming to the requirements of AWWA Standard C 509 and/or AWWA Standard C 500. Unless specifically approved in writing by the Engineer all valves shall be from one manufacturer and all parts interchangeable.

Gate valves shall conform to ASTM A-536 as it relates to cast iron or ductile iron manufacturer of the body, bonnet and gate. Shell thickness of components shall conform to the thickness in Table 2, Sect. 4.4 of AWWA Standard C 509 or AWWA Standard C 500 as appropriate. Valve body and bonnet coating shall conform to AWWA Standard C 550 and include fusion bonded epoxy coating for the interior and exterior surfaces of the valve.

The gate shall be completely covered with a rubber coating securely fixed to all ferrous surfaces. The gate and rubber coating shall conform to ASTM D429.

Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain O-rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure.

Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves.

A.2 Double Disc Valves:

Gate valves larger than 36" diameter shall be ductile iron body, double disc parallel seat conforming to AWWA Standard C 500. All valves shall be from one manufacturer with interchangeable parts.

Gate valves shall conform with ASTM A536 as it relates to manufacturer of body, bonnet and gate constructed of ductile iron. Entire valve body and bonnet shall be coated on interior and exterior surfaces.

Gates shall be constructed of cast iron smooth and continuous without pockets on either face. Cam surfaces shall be open to the bottom. Gate ring seals shall be inserted into a dovetail groove under pressure and make up a single insertable finish.

Gate valves shall operate as a bottom wedging design with a two-part wedge contact. Wedge and Hook shall be separate castings.

Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain O-rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure.

Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves. All rollers, tracks and scrapers shall be of bronze casting.

Bypasses shall be supplied and installed as a part of all valves. Bypass shall be a minimum of 3" diameter and operating mechanism shall be of resilient seated wedge type.

B. Valve Boxes:

All valve boxes shall be adjustable screw type with a base sized to fit over the valve yoke and a lid with "water" cast integral. All valve boxes shall be constructed of domestic or foreign cast iron that complies with the requirements of ASTM A48. Valve boxes shall be the appropriate range of adjustment for the site and Contractor should minimize the use of extensions.

C. Air Valve:

All air valves shall operate as both an air/vacuum valve and air release valve simultaneously in one unit. The air/vacuum portion of the appurtenance shall operate such that during the filling operation, or when necessary, it will allow large amounts of air to be expelled from the line to avoid substantially compressing air in the line and also operate to effectively allow air to reenter the line in the case that internal pressures would approach negative values, such as happens with line breaks or separations. The air release portion of the valve shall operate such that it automatically releases minute amounts of air as necessary while in service. All air valves must conform to AWWA Standard C512.

All air valves shall contain a rating of 150 psi with a test rating of 300 psi.

Body and cover shall be manufactured of cast iron conforming to ASTM A126, Class B. The float shall be stainless steel with stainless steel guide and rated to withstand ultimate system surge pressure successfully. Valves 4" and larger shall have floats of stainless steel with dual stainless steel guides and rated to withstand ultimate system surge pressure successfully. The body and cover shall be constructed of cast iron and be concentrically located. All internal parts shall be stainless steel or Buna-N rubber.

D. Tapping Sleeve and Valve:

All sleeves shall have flanged outlet of appropriate size and strength to accommodate the tapping valve. Tapping valve shall be resilient seat wedge gate valve design with each flange capable of accepting the sleeve, tap machine face, or mechanical joint connection to adjacent pipe.

Tapping sleeves up to 12" shall be Stainless Steel Wrap Around type. Tapping sleeves 12" and larger shall be Ductile Iron Full Body type. All tapping sleeve and valves shall be of the size and type detailed on the plans.

Stainless steel tapping sleeves shall be constructed of two-piece stainless steel jointed by grade 18-8 stainless steel bolts. The gasket shall be girded virgin SBR compound rated for water service per ASTM D2000 and the gasket shall provide full range pipe coverage. Outlet pipe shall be constructed of grade 18-8 stainless steel and be schedule 5. All sleeves shall contain a ¾" test outlet with brass plug for the purpose of air testing the sleeve.

All connections to the existing system shall be coordinated with the Water Purveyor having jurisdiction.

1.5 INSTALLATION

A. Excavation:

This section shall cover the excavation and proper disposal of any and all materials disturbed during the construction of trenches which is further defined as all excavation necessary for the proper installation storm or sanitary sewers and any appurtenances and waterlines and any appurtenances. This section shall further cover any work deemed appropriate by the Engineer.

Excavation shall be done to the lines and grades as depicted or detailed on the plans or as directed by the Engineer. All work involving this section shall be coordinated with any Grading, Site Utility work or other construction on the project site and shall be maintained satisfactorily so that adequate drainage is provided at all times. Any roots that protrude into the trench lines shall be trimmed flush with the trench walls.

All excavation shall be open cut unless otherwise depicted on the plans or specifically authorized by the Engineer. If after excavation the bottom of the proposed trench is found to contain rock, materials which can not be removed with standard and prudent construction equipment or is unsuitable for providing a uniform bearing surface then same material shall be removed to a depth not less than 8" below proposed depth, backfilled with approved material and compacted. Excavation widths shall be such that not less than one full diameter of the pipe is clear between the outside face of the pipe and each closest trench wall or inside face sheeting, shoring, or trench box as necessary.

Excavated materials to be used during backfill operation shall be suitable material, significantly free from debris and/or rocks and approved by the Engineer. Acceptable material which is excavated shall be neatly and compactly deposited at the sides of the trench where space provides but at no time closer than 2'0" from the closest side of the trench. When stockpiling of material is required, the Contractor at his expense shall do so at an approved site and this site shall be kept and neat to avoid unsightly appearance. Stockpiling shall be arranged to allow for natural drainage without pollution of water by erosion.

B. Sheeting, Bracing and Trench Boxes:

As appropriate reference to OSHA Regulation 1926.652(b), the Contractor will be required to keep the sides of excavation vertical by sheet, bracing or the use of trench boxes to prevent movement by slides or settling of the side, to prevent injury or displacement of pipe or appurtenance or diminished the required working space adjacent to pipe. Furthermore, the Contractor may be required, for the purpose of preventing injury to persons, property or adjacent structures, to leave sheeting or bracing in place.

All measures employed, when required, shall extend a minimum of 18" above existing grade and a maximum of 48" above grade. In no case shall timbers, beams or other sheeting/bracing materials be left in the trench, which may form or promote voids that cannot easily be corrected during the backfilling operation or compaction of backfill. It is agreed upon by these specifications that where it is necessary to leave sheeting or bracing intact and backfilled that the Owner is under no obligation to pay Contractor for time or materials involved in constructing such measures. Contractor shall assume and accept any and all risk associated with or encumbered by failure to implement proper and necessary sheeting, bracing or trench box use on any excavation and will be held responsible for caving, settlement and all other damages resulting there from.

C. Valves:

Prior to each installation, the Contractor shall make sure the interior is wiped clean and the valve is test operated by opening and closing. All valves shall be set with the operating mechanism plumb and at the location depicted on the plans.

Initial backfill shall be thoroughly compacted by hand around the valve body to a distance of 12" in all directions and compaction by mechanical means such as vibratory trench roller or striking compactor shall be thoroughly achieved to a distance of 3' 0" each side.

D. Valve Boxes:
A valve box shall be installed over every underground valve. All valve boxes shall be set plumb with the valve; the operating mechanism of the valve shall be centered in the top opening and their lid flush with finished grade.

E. Air Valves:
All air valves shall be installed in a cast iron meter box with a minimum of 18" by 24" clear inside dimension and at the exact location as depicted on the plans.

F. Tapping Sleeve and Valve:
All tapping sleeves shall be installed at the exact location as depicted on the plans. All tapping sleeves shall be installed per strict conformance with manufactures specification, flange perfectly horizontal with existing pipe and bolts tightened with a torque wrench to the proper specification. All tapping valves shall follow valve installation requirements. The tapping sleeve shall be air tested prior to performing the tap into the existing line.

1.6 BACKFILLING AND COMPACTION

A. Trenches shall be backfilled immediately upon approval of pipeline construction.

B. Roadways and Crossing:
Full depth and width of trench shall be backfilled by placing material in uniform layers not to exceed 12" thick and shall be thoroughly compacted by approved mechanical compactors under optimum moisture conditions. Compaction of the trench shall be to 95% as determined by Standard Proctor Test for all areas outside the paved area and any depth exceeding 18" below finished surface of asphalt. The top 18" of any trench directly under pavement or within 36" of the edge of pavement shall be compacted to 100% as determined by Standard Proctor Test. If existing material is not suitable for obtaining compaction then select backfill shall be used when requested by the Engineer.

All paving and base course affected shall be removed and replaced with new material of equal or better quality with like texture and color as the adjacent pavement.

All backfill methods shall be in strict compliance with manufactures recommendations and all methods shall be instituted such that no damage, misalignment, or unjointing of the pipe or appurtenances is experienced.

Backfill shall be kept free of organics (grasses, sticks, stumps, roots etc.), stones (all stones over 1" diameter within first 12" of backfill and all stones over 2.5" diameter for the remainder of the backfill), any frozen soil or other soil which is not suitable for backfill (highly plastic clay) or any other objectionable items. All backfill shall be installed and graded in a manner that erosion or saturation will not negatively affect the backfilled area.

Heavy equipment shall not be operated over any pipe or appurtenance until it has been properly backfilled and has minimum cover as required by the plans. Where any part of the required cover is above proposed finished grade, the Contractor shall place, maintain and lastly remove such material at no additional cost to the Owner. Any pipe or appurtenance, which becomes misaligned, shows excessive settlement or has been damaged by the Contractor shall be corrected or replaced as deemed necessary by the Engineer/Owner at no additional cost to the Owner.

Prior to acceptance, the Contractor shall properly maintain all installations in such a manner that they will operate without failure.

C. Finish Grading:

All areas disturbed shall be graded to a continuous finish without irregularities or abrupt changes and shall not consist of areas, which will retain water or cause foreseeable future maintenance. Prior to acceptance, all debris, excess material, trash or any unsightly occurrence shall be removed and the project site shall be in a neat and satisfactory condition.

END OF SECTION

SECTION 2402 – FIRE HYDRANTS AND APPURTENANCES

1.1 INTRODUCTION

The scope of work covered under this section shall be to furnish all labor, equipment, materials and any other items that are necessary for the proper installation of fire hydrants. Fire Hydrants shall conform to the applicable requirements of AWWA Standard C502 (Latest Edition) for dry barrel, traffic model type.

1.2 CATALOG CUT SUBMITTALS

Contractor shall submit 4 copies of catalog cuts to Engineer for review that are required to complete the work as described in the associated plans. Engineer will retain two sets of original submittals and return two sets to the Contractor with the appropriate response annotated.

1.3 STORAGE AND HANDLING

The Contractor shall inspect the materials upon receipt for visible defects prior to off loading. The Contractor shall unload all fire hydrants and valves so as to avoid any deformation or other injury. The Contractor shall implement appropriate measures during storage such that no storm water may pass through or encumber the materials. All materials shall be stored in such manner that they will drain and so protect them from contamination or freezing.

If any material is found to be defective during installation, then same material shall be removed and replaced with appropriate quality and type at the Contractors expense.

1.4 MATERIALS

A. Fire Hydrants:

All fire hydrants shall comply with all applicable standards of AWWA Standard C502 (Latest Edition) for dry barrel, traffic model type. The traffic model shall consist of a break away flange and stem which will allow the upper section of the hydrant barrel and operating stem to separate from the lower components upon impact and not cause damage to the lower section. All hydrants shall contain O-ring seal for the operating stem which prevents contact between the stem and water at all times. All hydrants shall have an automatic oiler system which introduces lubricant every time the stem is operated.

Fire hydrants shall consist of two 2½ inch hose nozzles and one 4½ inch pumper nozzle all nozzles shall be reverse thread into the barrel and the thread pattern shall be National Standard Threads as per Appendix A of AWWA Standard C502. Furthermore the operating nut shall be pentagonal shaped with 1½ inch between the point and flat. Hydrants shall be operated open left (counterclockwise) with a 4½ inch compression base seat opening against pressure. All hydrants shall be capable of operating against 250 psi working pressure and shall withstand 500 psi hydrostatic test pressures.

All hydrants shall have standard 6 inch mechanical joint connections and shall be no less than 3 foot 6 inch bury unless otherwise noted on the plans. All hydrants shall be painted the appropriate color as indicated on the plans and shall have reflective bead bonnets. Following installation and testing and before final acceptance all fire hydrants shall be painted with epoxy paint to an acceptable appearance resulting in uniform color and no oxidation or rusting.

All fire hydrant iron parts shall be fabricated of ductile iron.

The fire hydrant main valve shall be 4½ inch minimum and shall be of the full compression design, opening against and closing with pressure. The valve seat ring shall thread into a bronze sub-seat and all gaskets sealing the seat ring shall be bronze to bronze surface.

Drain valves shall be bronze and allow complete draining of all residual water in the hydrant barrel. Draining shall be automatic and not dependent on separate operation.

All bolting and fasteners shall be stainless steel.

The operating mechanism shall utilize two O-ring seals between the revolving nut and bronze sheathed upper section of the valve rod. The top of the rod shall also be fitted with a travel stop nut to limit downward travel of the rod. A thermoplastic thrust washer shall be used to reduce friction in the thrust collar while opening the hydrant. All weather grease shall be used to provide permanent lubrication.

1.5 INSTALLATION

All fire hydrants shall be connected to the main waterline with a 6 inch leg consisting of the same material as the main waterline and having at least the same depth of bury. All fire hydrants shall be installed plumb with the pumper nozzle facing parallel to the roadway and with the center of the lowest outlet not less than 18 inches or more than 24 inches above finished grade. Hydrants shall be rodded to the 6 inch gate valve and the valve rodded to the branch tee or mounted directly to a hydrant tee. Backfill around fire hydrants shall be thoroughly compacted to finished grade and not less than seven cubic feet of clean stone meeting gradient #67 shall be placed 6 inches under, around the base, and up the barrel to insure proper residual drainage from the barrel. A solid and sound cap block shall be set under the fire hydrant shoe for a solid base.

Fire hydrants shall be located, painted and buried to the depth shown on the plans.

END OF SECTION

SECTION 2500 – LEAKAGE TESTING

1.1 INTRODUCTION

All structures are required to be watertight and all pressure and gravity piping and pipelines shall be tested by the Contractor as directed by this section and/or the Engineer/Owner. All tests shall be organized by the Contractor at the Engineers convenience.

All labor, equipment, water, materials, gauges, meters and any other items shall be furnished by the Contractor at his expense. In the case of a failed test, minor defects will be corrected and retested immediately. Any failure due to a major defect will constitute stopping the test and rescheduling with Engineer/Owner.

1.2 STRUCTURES

All fluid containing structures shall be subject to a gravity pressure test by filling the structure with water to overflow, or as directed by the Engineer, and observing the water level for a period not less than 24 hours. Leakage will be considered to be within the allowable limits for structures when there is no visible sign of leakage evident by either moisture on exposed surfaces or water level drop in excess of 1 inch within the 24 hour period. All wall castings or penetrations shall be plugged temporarily during the test period.

If leakage exceeds the allowable limit, the work shall be repaired by removing and replacing the defective portions, waterproofing the inside and outside or by other methods as approved by the Engineer.

1.3 PRESSURE PIPING

All pressure piping shall be subject to a hydrostatic pressure/leakage test in accordance with AWWA C600 (Ductile) or AWWA C605 (PVC).

Upon satisfactorily constructing the pipeline, including all appurtenances called for on the associated plans, and effectively backfilling the trench the hydrostatic test shall be conducted.

The Contractor shall prepare a testing plan/schedule to be approved by the Engineer, which will effectively test the entire section to be constructed, and at no time test more than 4,000 linear feet of pipeline at one time.

As the pipeline is being filled with water in preparation of the test, all air shall be expelled from the pipe. If sufficient exit points are not available, the Contractor at his expense shall install air reliefs of a type and location as approved by the Engineer.

The pipeline shall be subjected to a hydrostatic pressure of 150 psi or 50 psi above existing line static pressures, whichever is greater, for a period of 2 hours or as specified by the Engineer. Pressure shall be applied to the line by means of hand pump for lines 2" and smaller or by approved mechanical means for larger lines

Allowable leakage shall not exceed that determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{148{,}000}$$

L	=	Allowable leakage in gallons per hour.
S	=	Length of line under test in feet.
D	=	Nominal diameter of pipe in inches.
P	=	Average test pressure in psi.

Any visible leak shall be corrected to minimize water leakage no matter of the allowable leakage calculation.

All pipe and appurtenances found to be defective during the hydrostatic test shall be removed and/or corrected at the Contractors expense and Engineers approval.

All materials shall be subject to manufacturer's recommendations for storage, pre-testing, etc.

After a successful test has been obtained the Contractor shall notify the Engineer in writing and request written recognition from Engineer of acceptable test results.

END OF SECTION

SECTION 2501 – STERILIZATION

1.1 INTRODUCTION

Before being placed into service and after successful hydrostatic pressure test, all newly constructed or repaired pipelines or structures, which will hold or carry potable water, shall be chlorinated and flushed or cleaned as directed by this specification and the Engineer. The Contractor shall chlorinate all pipelines and/or structures by use of liquid chlorine gas/water mixture or the use by use of calcium hypochlorite granules. All sterilization procedures shall be according to AWWA Standard C651-14.

Prior to chlorination all dirt and foreign matter shall be removed by thoroughly Preliminary Flushing or cleaning of the pipelines and/or structures.

1.2 PRELIMINARY FLUSHING

Prior to chlorination, pipelines shall be filled with water to eliminate air pockets and shall be flushed to remove all dirt and particulate matter. Contractor shall be responsible for providing means of measuring water such that a velocity sufficient to remove any and all debris is reached.

1.3 CHLORINE APPLICATION

All sterilization procedures shall be as specified below or as prescribed by AWWA Standard C651-14. The chlorine gas/water mixture shall be introduced into the pipelines or structure by means of an approved method by the Engineer and at such rate that all lines or structures contain a chlorine dosage of not less than 100 ppm. The retention time shall be not less than 24 hours and shall produce not less than 10 ppm at any point in the pipeline or structure at the end of the retention period. All valves, fire hydrants and appurtenances shall be opened and closed numerous times during the contact period.

Pipelines and structures may, at Contractors option, be chlorinated in sections isolated by means of gate valves or as approved by Engineer.

Chlorine gas/water mixture shall be dosed into the pipeline or structure to be sterilized by means of a tap and corporation stop placed onto the line as convenient to Contractor and approved by Engineer.

As a substitute to chlorine gas/water mixture, the Contractor may add calcium hypochlorite to the pipe as it is being installed. Such sterilization shall be achieved by placing the granules at the upstream end of the section to be tested and at 500’ intervals at a dosage correlating to the sizes shown below:

Calcium Hypochlorite dosage per 500' of line	
Pipe Dia.	Calcium Hypo chlorite (oz.)
2"	0.42
4"	1.7
6"	3.8
8"	6.7
10"	10.5
12"	15.1
16"	26.8
18"	33.97
20"+	D^2 x 15.1

*Where D is the inside pipe diameter in feet, D = d/12

After chlorination period is complete, all water shall be flushed from the pipeline or structure until it is equal quality to the existing supply and proved to the Engineer/Owner to be acceptable through Chemical and Bacteriological testing.

During the flushing period each valve and fire hydrant shall be operated numerous times to provide through flushing of the system and removal of all highly chlorinated water. The line shall set for a minimum of 48 hours following flushing at which time samples shall be pulled and stored in properly sterilized containers for bacteriological testing in a number to be determined by the Engineer and at the Contractors expense. The number of samples will be based on one sample per 4,000 linear feet of main and all dead ends. All bacteriological testing must be completed by a state-approved,certified laboratory. Per rule .1001. Upon receipt of successfully passing results, in duplicate, the line shall at the Engineers/Owners discretion be deemed acceptable.

Highly chlorinated water shall not be released into the existing distribution main or the surrounding environment. All water retained in the line shall be flushed until such time as the representative sample is identical to the existing water quality. All water shall be expelled from the lines and sprayed vertically so remaining chlorine is significantly dissipated through aerosolizing the chlorine or approved chemical dechlorination method as approved by the Engineer.

END OF SECTION

SECTION 2570 – BITUMINOUS PAVEMENT REPAIR

1.1 INTRODUCTION

The scope of this section is to furnish all labor, equipment, materials and any other items necessary to replace or repair all asphalt surfaces. All work shall be performed in conformance with the applicable sections of the North Carolina Department of Transportation, Division of Highways, "Standard Specification for Roads and Structures"(Latest Edition).

1.2 PERFORMANCE

Asphalt mixtures shall not be prepared or placed when the average ambient temperature is less than 40 degrees farenheight, during rainy weather, when sub grade or base course is frozen, when sub grade or base course is showing evidence of excess moisture or when the surface to be adjoined to is excessively moist and would prevent proper bonding with the new surface.

Preparation and construction of sub grade, base course and surface course shall be completed immediately after completion of all underground piping or structures, installation of curb and gutters, all yard piping, conduits and other facilities passing under paved areas and all structural slabs and foundations required within or adjacent to the paved areas.

1.3 INSTALLATION

A. Sub grade Preparation:
Sub grade preparation activities shall be in strict conformance with Section 500 or Section 505, where applicable, of the "Standard Specifications for Road and Structures" (Latest Edition) issued by NCDOT- Div. of Highways.

B. Aggregate base Course Installation:
Application of aggregate base course shall be in strict conformance with Section 520 of the "Standard Specification for Roads and Structures" (Latest Edition) issued by NCDOT- Div. of Highways.

C. Bituminous Plant Mix – General:
The work covered under this section of this specification shall be performed in strict conformance with Section 610 and Section 620 of the "Standard Specifications for Road and Structures" (Latest Edition) issued by NCDOT- Div. of Highways.

D. Prime Coat:
The work covered under this section of this specification shall be performed in strict conformance with Section 600 of the "Standard Specifications for Road and Structures" (Latest Edition) issued by NCDOT- Div. of Highways.

E. Tack Coat:
The work covered under this section of this specification shall be performed in strict conformance with Section 605 of the "Standard Specifications for Road and Structures" (Latest Edition) issued by NCDOT- Div. of Highways.

F. Bituminous Surface Course (S 9.5B):
The work covered under this section of this specification shall be performed in strict conformance with NCDOT Superpave specifications (Latest Edition) issued by NCDOT- Div. of Highways.

G. Traffic Markings:
The Contractor shall repair and restore any traffic markings that were damaged, destroyed or covered during the construction operation. All work shall be done in accordance with the requirements and specifications of NCDOT and in conformance with the MUTCD Manual (Latest Edition). The payment for work under this section shall be included in the unit bid price for bituminous surface coat and no additional payment will be made.

H. Existing Structures:
All existing structures which fall under or near repaired or restored bituminous areas shall be adjusted to final grade prior to application. All work under this section shall be included in the unit bid price for bituminous surface coat and no additional payment will be made if depicted on the plans. All encountered structures, which were not depicted on the plans or visible, will be paid at agreed upon price by Contractor and Engineer/Owner.

I. Testing and Acceptance:
All work in this section shall be subject to thickness and compaction tests as deemed necessary by the Engineer/Owner. All tests shall be included in the unit bid price for bituminous paving and paid by the Contractor. All tests found to be in nonconformance require the removal, replacement and restoration of areas in question. For additional tests requested by the Engineer/Owner, the Owner will pay for all successful tests and the Contractor shall pay for tests resulting in nonconformance and repair area as previously discussed. Compaction test shall be required as follows:

1. One test per intersection.
2. One test per road crossing less than 100 feet.
3. One test per 500 feet for excavations in a bituminous area.

Upon submittal of successful test reports and aesthetic acceptance, the Contractor shall be given an acceptance of the work in writing. The Contractor shall remain responsible for all improvements until final acceptance of the project.

END OF SECTION

SECTION 2660 – WATER SYSTEM

1.1 INTRODUCTION

The scope of this section is to furnish all labor, equipment, materials and all other items that are customary and normally required to install and complete installation of ductile iron, polyvinyl chloride (PVC) and copper water lines in accordance with the plans. All pipe and incidental material shall be of the type specified in the plans and these specifications unless written variance is granted by the Engineer. All pipe storage/handling, excavation, bedding, laying, jointing and backfilling shall be accomplished as specified herein. Payment shall be made as depicted in the unit prices and measured as the actual laying length with no deduction for valves or fittings.

1.2 CATALOG CUTS SUBMITTALS

Contractor shall submit 4 copies of catalog cuts to Engineer for review for all materials that are required to complete the work as described in the associated plans. Engineer will retain two sets of original submittals and return two sets to the Contractor with the appropriate response annotated.

1.3 STORAGE AND HANDLING

The Contractor shall inspect the materials upon receipt for visible defects prior to off loading. The Contractor shall unload pipe so any deformation or other injury to the pipe is avoided. The Contractor shall implement appropriate measures during storage such that no storm water may pass through or encumber the materials. Pipe shall not be rolled or dragged over gravel, rock, asphalt or concrete during handling or staging. In the event of damaged material, the damaged section may be cut away from the undamaged section and disposed of with the undamaged portion being used. The Engineer may reject material that is severely damaged or injured in whole or part. In no event shall any pipe or material be placed along the project site by rolling off a truck or trailer and allowed to strike the ground. Striking pipe or material in this manner will damage the pipe, material, lining or casting of same and will be deemed defective and rejected by the Engineer.

If defective material is discovered after installation, it shall be removed and replaced or repaired with acceptable materials by the Contractor at their sole expense.

1.4 MATERIALS

A. Pipe size less than 3” diameter that is installed below grade and outside building shall comply with one or more of the following:
    1. Seamless Copper Tubing: Type “K” roll form to comply with ASTM B 88-62 and installed with wrought copper (95-5 Tin Antimony solder joints) fittings in accordance with ANSI B16.22.
    2. Polyvinyl Chloride Water Pipe: Pipe shall conform to ASTM D 2241 with SDR 21 rating or SCH 13.5 and shall be continually marked with manufacturer’s name, pipe size, cell classification, SDR rating and

ASTM D 1748 classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3139 with factory supplied elastomeric gaskets and lubricant.

B. Pipe size larger than 3" that is installed below grade and outside building shall comply with one of the following as depicted on the plans:

1. Ductile Iron Pipe:

All materials shall be true to theoretical form throughout, first quality with smooth interior and exterior and free from imperfections. All materials shall be available fro inspection by the Engineer/Owner at any point from production to installation for the purpose of rejecting defective materials or altering to meet intended specification. All rejected material shall be immediately removed from the project site upon written notice from the Engineer.

All cited or referenced specifications or standards shall be the latest revisions under that identification or in the case of abandoned standards any such superseding standard. This shall be true for all specifications or standards except such requirements that clearly are not applicable.

Ductile iron pipe shall be manufactured in accordance with AWWA Standard C151. All Ductile iron pipe shall be class 350 psi unless specified differently on the plans and shall contain a cement mortar lining, unless specified differently on the plans, not less than 1/16" thick as specified in AWWA Standard C104. Wall thickness for all ductile iron pipes shall be in conformance with AWWA Standard C150. Standard laying conditions shall be assumed to be type 2 unless specified differently on the plans. The exterior of pipe shall be coated to a thickness of not less than 5 mils, as specified in AWWA Standards C110 & C115, with an asphaltic material.

1. a. Flanged Joints:

Flanged pipe shall have flanges with long hubs, shop fitted on the threaded end of pipe, shall be 125 lb. rated and accurately faced at right angles to the pipe axis so a complete fit is readily obtained. When required, flanges shall be tapped for stud bolts. The face of all flanges shall be drilled smooth and true and completely coated with coal tar finish, varnish or other approved anti-corrosion agent. Immediately prior to installation, flange faces shall be cleaned with a wire brush until the face is significantly consistent of bare metal.

Ductile iron flanged joint pipe shall conform to AWWA Standards C110 & C115 and shall have a minimum thickness of Class 53. Flanged end pipe shall be accurately measured and ordered so that no field cutting of pipe is necessary unless specifically approved by the Engineer. Unless approved no field alteration of flanged pipe will be allowed. Attempts to field cut pipe shall result in immediate rejection of all material affected. All flanged joints shall be properly aligned with no external force applied to the pipe or flange to achieve alignment. All bolts and gaskets shall be furnished by the Contractor installing the pipe for all joints, including such joints as the Contractor may be connecting to equipment or appurtenances which they did not supply or install.

Flanged joints shall be jointed with properly sized and type bolts as recommended by the manufacturer. Stud or tap bolts shall be used only as indicated on the plans. Steel or tap bolts shall be cadmium plated with true and sound fitting threads. Cadmium plating shall be by an approved process with a thickness of 3 to 5/10,000 of an inch. The Contractor, upon request, shall supply written confirmation of plating to the Engineer.

1. b. Mechanical Joints:

All mechanical joint pipe shall be manufactured in accordance with AWWA Standard C111, C151 and C150 as applicable with a rating of class 350 psi.

All bolts shall be finish tightened by means of a torque wrench to the specified torque as recommended by the manufacturer in such a manner as the pipe is sealed evenly around to the joint. If effective sealing is not obtained by following the above procedures then the joint shall be disassembled, cleaned and reassembled following the above procedures.

Bolts shall be high-grade steel, low alloy type with tee head and American Standard threads. Mechanical joint gland shall be cast iron and gasket shall be plain rubber.

1. c. Slip Joints:

Slip joint pipe shall be manufactured in accordance with AWWA Standards C 151 & C 150 as applicable with a rating of class 350 psi.

Bells of pipe shall be contoured to receive a bulb shaped circular rubber gasket and spigot end shall have sufficient taper to facilitate installation. Jointing shall be achieved by lubricating joint with approved lubricant, guiding spigot end of pipe into bell end of adjacent pipe until contact is made with gasket and exerting enough compressive force to drive the spigot forward into the bell until they achieve full contact. No joint shall exceed the maximum deflection allowed by the manufacturer, normally 8" in an 18' joint.

1. d. Restrained Joint:

Restrained joints shall consist of standard ductile iron slip bell with gaskets containing metal wedges. Wedges shall be manufactured of stainless steel and the gasket rubber shall be manufactured in accordance with ANSI/AWWA C111/A21.11. Bells shall be manufactured in accordance with ANSI/AWWA C153/A21.53. The joints shall be designed for a working pressure of 200 psi. Restrained joints shall be American "Fast Grip", U.S. Pipe "Field-Lok", or approved equal.

1. e. Ball and Socket Joints:

When specified ductile iron ball and socket joint pipe shall conform to AWWA Standards C150 & C151 as applicable and shall have a minimum thickness class of 55. The spherical socket shall be manufactured with applicable material requirements of ASTM A536 and threaded onto the ductile iron pipe barrel with threads conforming to ANSI B2.1 adapted to standard ductile iron pipe. The ball end of joint shall be integrally cast with the pipe barrel and accurately machined to fit into the adjoining pipe socket and provide constant compression of the gasket through deflection of up to 15 degrees of the assembled joint and shall maintain a watertight joint in all directions. The inside surface of the ball shall be shaped so that the waterway shall not be significantly impacted at any degree of deflection. A substantial external locking ductile iron gland shall prevent longitudinal separation.

Ball and Socket joints shall be American "Flex-Lok", U.S. Pipe "USIFLEX", or approved equal.

2. Fittings:
All ductile iron fittings shall by in conformance with AWWA Standards C110 & C111 for underground piping as applicable and shall be mechanical joint type unless otherwise specified on the plan. If flanged pipe is specified then it shall be in conformance with AWWA Standard C110 for exposed piping.

All fittings shall be manufactured in conformance with AWWA Standards C111 & C104 as applicable and shall be cement mortar lined unless otherwise specified on the plans. All fittings shall have rated working pressure of 250 psi unless otherwise specified on the plans.

3. Polyvinyl Chloride Pipe (PVC)
All materials shall be true to theoretical form throughout, first quality with smooth interior and exterior and free from imperfections. All materials shall be available for inspection by the Engineer/Owner at any point from production to installation for the purpose of rejecting defective materials or altering to meet intended specification. All rejected material shall be immediately removed from the project site upon written notice from the Engineer.

All cited or referenced specifications or standards shall be the latest revisions under that identification or in the case of abandoned standards any such superseding standard. This shall be true for all specifications or standards except such requirements that clearly are not applicable.

3. a. PVC Pipe 4" Diameter and Larger:
All PVC pipe 4" and larger shall be manufactured in conformance with AWWA Standard C900, ASTM 2241 and shall conform to the requirements of DR 18 class 150 psi or DR 14 class 200 psi. The exterior of all PVC shall bear a continuous stamp indicating the AWWA certification, DR ratio, size and manufacturer.

All PVC shall have a bell with integral rubber gasket and be slip joint manufactured in accordance with AWWA C151.

Bells of pipe shall be contoured to receive a bulb shaped circular rubber gasket and spigot end shall have sufficient taper to facilitate installation. Jointing shall be achieved by lubricating joint with approved lubricant, guiding spigot end of pipe into bell end of adjacent pipe until contact is made with gasket and exerting enough compressive force to drive the spigot forward into the bell until they achieve full contact. No joint shall exceed the maximum deflection allowed by the manufacturer, normally 11" in a 20' joint.

4. Fittings:
All ductile iron fittings shall by in conformance with AWWA Standards C110 & C111 for underground piping as applicable and shall be mechanical joint type unless otherwise specified on the plan. If flanged pipe is specified then it shall be in conformance with AWWA Standard C110 for exposed piping.

All fittings shall be manufactured in conformance with AWWA Standards C111 & C104 as applicable and shall be cement mortar lined unless otherwise specified on the plans. All fittings shall have rated working pressure of 250 psi unless otherwise specified on the plans.

1.5 INSTALLATION

A. Excavation:

This section shall cover the excavation and proper disposal of any and all materials disturbed during the construction of trenches which is further defined as all excavation necessary for the proper installation of storm or sanitary sewers and any appurtenances and waterlines and any appurtenances. This section shall further cover any work deemed appropriate by the Engineer.

Excavation shall be done to the lines and grades as depicted or detailed on the plans or as directed by the Engineer. All work involving this section shall be coordinated with any Grading, Site Utility work or other construction on the project site and shall be maintained satisfactorily so that adequate drainage is provided at all times. Any roots that protrude into the trench lines shall be trimmed flush with the trench walls.

All excavation shall be open cut unless otherwise depicted on the plans or specifically authorized by the Engineer. If after excavation the bottom of the proposed trench is found to contain rock, materials which cannot be removed with standard and prudent construction equipment or is unsuitable for providing a uniform bearing surface then same material shall be removed to a depth not less than 8" below proposed depth, backfilled with approved material and compacted. Excavation widths shall be such that not less than one full diameter of the pipe is clear between the outside face of the pipe and each closest trench wall or inside face sheeting, shoring, or trench box as necessary.

Excavated materials to be used during backfill operation shall be suitable material, significantly free from debris and/or rocks and approved by the Engineer. Acceptable material which is excavated shall be neatly and compactly deposited at the sides of the trench where space provides but at no time closer than 2'0" from the closest side of the trench. When stockpiling of material is required, the Contractor, at his expense, shall do so at an approved site and this site shall be kept and neat to avoid unsightly appearance. Stockpiling shall be arranged to allow for natural drainage without pollution of water by erosion.

Protection of existing pavement structures from damage due to staining from excavated material and to improve cleanup shall be obtained by placing a 1" layer of sand or rock dust over all asphalt or concrete surfaces which are planned or reasonably anticipated to have excavated material directly on during construction.

B. Sheeting, Bracing and Trench Boxes:

As appropriate reference to OSHA Regulation 1926.652(b), the Contractor will be required to keep the sides of excavation vertical by sheet, bracing or the use of trench boxes to prevent movement by slides or settling of the side, to prevent injury or displacement of pipe or appurtenance or diminished the required working space adjacent to pipe. Furthermore, the Contractor may be required, for the purpose of preventing injury to persons, property or adjacent structures, to leave sheeting or bracing in place.

All measures employed, when required, shall extend a minimum of 18" above existing grade and a maximum of 48" above grade. In no case shall timbers, beams or other sheeting/bracing materials be left in the trench, which may form or promote voids that cannot easily be corrected during the backfilling operation or compaction of backfill. It is agreed upon by these specifications that where it is necessary to leave sheeting or bracing intact and backfilled that the Owner is under no obligation to pay Contractor for time or materials involved in constructing such measures. Contractor shall assume and accept any and all risk associated with or encumbered by failure to implement proper and necessary sheeting, bracing or trench box use on any excavation and will be held responsible for caving, settlement and all other damages resulting there from.

C. Foundations:

Trench foundation shall be "Type 2" as defined in AWWA Standard C151 unless otherwise noted on the plans. Pipe bedding shall be as shown in the plans for the typical cross section for the type of pipe and location for which it is being installed. Pipe foundation shall be uniformly firm and compacted and shall be consistent with lines and grades as detailed on the plans.

Trench bottom shall be formed to follow the bottom third of the pipe, where soil conditions allow. All installations shall conform to a uniform bearing surface throughout the length of the pipe to fully and evenly support the barrel of the pipe. Bell holes shall be excavated under each bell of each joint such that no undue stress is borne by the bell of pipe thus leading to damage of the material. If undercut is required due to unsuitable soil, rock or through normal construction then suitable material shall be replaced and compacted with uniform support of the pipe provided for the entire length of the pipe. At no time shall undercut for rock be less than 8" from the proposed grade so to prevent future damage. Undercut limits for unsuitable material for supporting pipe loading shall be determined by and constructed according the Engineer. Continued unsuitable soil may require replacing bottom of trench to grade with washed stone or, in extreme cases, concrete cradles. If washed stone or concrete cradles are specified then the Engineer, at unit price for materials, shall allow additional compensation to the Contractor.

The Contractor shall remove all water that may be encountered or which may accumulate in the trenches by pumping or bailing and no pipe shall be laid until the water has been successfully removed from the trench. Water so removed from the trench shall be disposed of in a manner as not to cause injury to completed work, work in progress or any adjoining area.

D. Installing Pipe:

All installation practices should be in strict conformance with the manufacturer's recommendations, AWWA Standards C600 and C605, and the construction specifications. Where any conflicts exist the Contractor shall inform the Engineer immediately and the applicable AWWA Standard shall take precedence. The Engineer shall be furnished installation manuals for any such product that a discrepancy arises or they deem appropriate.

Customary and reasonable tools, implements and facilities satisfactory to the Engineer shall be provided and used for the safe and progressive installation of pipe. All pipe, fittings, valves and other materials shall be hoisted into trench by means which are acceptable and are not conducive to injury of pipe, fittings, valves, and any other materials or there protective coatings or dangerous to any personnel who may be in the trench or vicinity. All pipe hoisted into the trench shall be clean and free from defects. Pipe shall be laid on the prepared foundation so as a straight, uniform flow line exists upon completion.

When cutting pipe lengths are necessary, the Contractor shall practice normal and prudent care so that all cuts are at right angles to the flow line of the pipe. If a skewed cut is specified then the Contractor shall perform the cut as required by the plans. All slip joint pipe which is cut shall be ground to a taper on the cut end to match the manufacturers taper so pipe may be jointed as intended by the manufacturer.

All PVC pipe installed shall be chased continuously with a 14 gauge stranded, coated copper wire with the coating being royal or light blue. Wire shall be pulled taut so as to prevent damage from backfill and compaction operation or re-excavation in the future. Wire shall be taped no less than every 10 feet and at the taper of every bell end. Wire shall be pulled into every valve box with no less than 2x the depth of bury in length of wire left in the box for future connection to facilitate location. Wire shall be extended in an identical manner along fire hydrant legs and extended along the barrel to ground surface and looped around the base of the upper section at the flange.

Pipe joints shall be sound and in strict compliance with the manufacturer's recommendations. Maximum deflection allowed shall be as allowed by the manufacturer but at no time should be greater than 2 degrees or 8" per 18' joint without special expanded deflection bells being provided. All pipe which is damaged, broken or will not join shall be removed immediately and stockpiled for inspection by the Engineer. Pipe that is damaged during backfill or compaction operations shall be removed and replaced or repaired as directed by the Engineer.

All water lines shall have a minimum 12" vertical separation from storm sewer and shall have a minimum vertical separation of 18" from sanitary sewer when crossing. When crossing sanitary sewer lines the waterline shall cross above the sanitary sewer line. Horizontal separation of 10'0" shall be maintained from all sanitary sewers. If separations cannot be maintained then the Engineer shall be notified and both the waterline and sanitary sewer line shall be constructed of ferrous material such as ductile iron.

Pipe shall not be installed except in the presence of the Engineer or at his specific direction. In the event pipe is installed without the specific direction of the Engineer, then the Contractor may be required to clean, test, uncover for inspection or remove the sections as directed by the Engineer.

1.6 BACKFILL AND COMPACTION

A. Trenches shall be backfilled immediately upon approval of pipeline construction.

B. <u>Roadways and Crossing:</u>

Full depth and width of trench shall be backfilled by placing material in uniform layers not to exceed 12" thick and shall be thoroughly compacted by approved mechanical compactors under optimum moisture conditions. Compaction of the trench shall be to 95% as determined by Standard Proctor Test for all areas outside the paved area and any depth exceeding 18" below finished surface of asphalt. The top 18" of any trench directly under pavement or within 36" of the edge of pavement shall be compacted to 100% as determined by Standard Proctor Test. If existing material is not suitable for obtaining compaction then select backfill shall be used when requested by the Engineer.

All paving and base course affected shall be removed and replaced with new material of equal or better quality with like texture and color as the adjacent pavement.

All backfill methods shall be in strict compliance with manufacturer's recommendations and all methods shall be instituted such that no damage, misalignment, or unjointing of the pipe or appurtenances is experienced. Backfill shall be kept free of organics (grasses, sticks, stumps, roots etc.), stones (all stones over 1" diameter within first 12" of backfill and all stones over 2.5" diameter for the remainder of the backfill), any frozen soil or other soil which is not suitable for backfill (highly plastic clay) or any other objectionable items. All backfill shall be installed and graded in a manner that erosion or saturation will not negatively affect the backfilled area.

Heavy equipment shall not be operated over any pipe or appurtenance until it has been properly backfilled and has minimum cover as required by the plans. Where any part of the required cover is above proposed finished grade, the Contractor shall place, maintain and lastly remove such material at no additional cost to the Owner. Any pipe or appurtenance, which becomes misaligned, shows excessive settlement or has been damaged by the Contractor shall be corrected or replaced as deemed necessary by the Engineer/Owner at no additional cost to the Owner.

Prior to acceptance, the Contractor shall properly maintain all installations in such a manner that they will operate without failure.

C. Finish Grading:

All areas disturbed shall be graded to a continuous finish without irregularities or abrupt changes and shall not consist of areas, which will retain water or cause foreseeable future maintenance. Prior to acceptance, all debris, excess material, trash or any unsightly occurrence shall be removed and the project site shall be in a neat and satisfactory condition.

Cleanup and seeding is part of the pipeline installation. No more than 4,000 linear feet of waterline may be laid prior to completion of cleanup of the first section of pipeline laid. During construction no more than 4,000 linear feet or 2 weeks' time may pass before cleanup and seeding is performed.

END OF SECTION

SECTION – 02661 WATER SYSTEM DESIGN

Part I General

1.1 General Description: This section covers the acceptable design principles, system requirements and system specifications section references for water system design and layout.
1.2 General Intentions: The work covered under this section includes standards and general regulations for water system references, component sizing, professional involvement and layout.
1.3 All water system improvements shall be designed, significantly inspected, tested, and certified to NCDEQ and System by a North Carolina Licensed Professional Engineer.
1.4 Record Drawings, release of liens, consent of surety, Engineer's certification, approved/witnessed static pressure test and approved/certified Bacteria test are ALL required as minimum documents for system to be accepted for addition to Public Water System. Absence of any one document shall be grounds for non-approval.
1.5 All system improvements shall be installed in accordance with these and all referenced specifications and shall become the sole benefit and responsibility of the Public Water System upon completion and acceptance.
1.6 In the event of donated systems, the developer shall submit a written request to the Public Utilities Director requesting acceptance of the system by the Public Water System detailing the length, material and construction cost.
1.7 All donated systems shall have a one-year workmanship and materials warranty.

Part II Referenced Specifications

2.1 North Carolina Department of Environmental Quality Public Water Supply Minimum Design Criteria.
2.2 City of Hickory Water System Construction Specification Sections: 02222, 02227, 02668, 02400, 02401, 02402, 02500, 02501 and 02660.

Part III Plan and Specification Submittal

3.1 North Carolina Department of Environmental Quality Public Water Supply Minimum Design Criteria shall be followed.
3.2 The Public Utilities Director or Authorized Representative shall approve all plans and specifications for waterline extensions.
3.3 All waterline extensions connecting to the Public Water System or any Tributary system shall be permitted as required by NCDEQ under the signature of the Public Water Supply Authorized Representative.
3.4 No waterline extensions shall be allowed without prior written consent of the water availability and plans and specification approval by the Public Utilities Director.

3.5 All plans and specifications submitted shall be reviewed and approved, approved with notes or disapproved, as appropriate, within 20 days of submittal and returned to the submitting Professional Engineer.
3.6 Upon receipt of returned plans, professional engineer will respond appropriately and resubmit to Public Utilities Director with completed NCDEQ-PWS Waterline Extension Application (Current Edition), Engineer's Report and corrected copy of plans.
3.7 Submitting Professional Engineer shall complete all necessary encroachments, permits, reports, submittals, revisions etc. as may be required to obtain project approval to begin construction.

Part IV Minimum Line Size

4.1 No line smaller than 8-inches in diameter shall be extended to dead-end.
4.2 Waterlines 6-inches in diameter or smaller are allowed only with approval of Public Utilities Director and only in the event of looped conditions between lines of larger size and feed from different sources.
4.3 Fire hydrants shall not be placed on lines smaller than 6-inches in diameter.
4.4 Waterlines 2-inches in diameter are allowed only with approval of the Public Utilities Director and in the following cases:
    a. 1,000 linear feet or less in length.
    b. Main line blow-off installed on end.
    c. No possibility of future extension to serve other properties.
    d. No more than 20 residential service connections on the line.
4.5 Two-inch waterlines may be looped to allow for up to 40 residential service connections as approved by Public Utilities Director.
4.6 Phased Construction of waterlines must be extended to the furthest side of the last property being served by that phase.
4.7 Waterline extensions proposed must be sized to serve property in basin.
4.8 Waterlines that may be extended to serve future properties shall be minimum of 8-inches in diameter.
4.9 Master Meters are allowed for Townhome, Condominium, Apartment or Multi-Tenant Office use as approved by the Director.
4.9.1 Service Connection Meters shall be sized to meet the current NC Building Code as a minimum, with the following sizes being required based on AWWA Manual M6, current edition, and NCAC 15A: 18C.0802 and .0902:
    a. 2-inch meters shall not serve in excess of 16 residential units, or equivalent.
    b. 3-inch meters shall not serve in excess of 28 residential units, or equivalent.
    c. 4-inch meters shall not serve in excess of 50 residential units, or equivalent.

Part V Approvals

5.1 All waterline extensions shall be designed by a NC licensed Professional Engineer, reviewed and approved by the Public Utilities Director of the Public Water System, permitted by the Authorized Representative of the Public Water System through NCDEQ and all other agencies.

Part VI Ownership and Maintenance

6.1 The Public Water System will assume sole benefit and responsibility of the improvements once all sections of the specification have been satisfied.

END OF SECTION

SECTION 02668 - WATER SERVICE CONNECTIONS

1.0 DESCRIPTION:

Water service connections shall include tapping the main line and providing all saddles, corporation stops, fittings, service lines, copper setters, meters, meter boxes and other incidentals required for proper installation.

1.1 Related Work: See the following sections for related specifications.

Section 02933 – Seeding and Mulching

2.0 MATERIALS:

Shop drawings, catalog cuts and related data for service pipe and appurtenances shall be submitted to the Director of Public Utilities for approval.

2.1 Copper Setter (Meter Setter): shall be of copper and brass, domestic manufacture and of the proper size for the service on which they are installed. The setters shall be equipped with a double check valve outlet and padlock wings on the key valve. ¾" – 1" copper setters shall be Mueller H1404-2A or approved equal. 1½" - 2" copper setters shall be Mueller H1423-2A or approved equal.

2.2 Corporation Stops: shall be of brass, domestic manufacture and of the proper size for the service on which they are installed. Where dictated by the tapping angle, eighth or quarter bend couplings shall be provided. Suitable brass adapters for coupling to service pipe shall be provided. Corporation stops shall be Mueller 300 B-25008 or approved equal.

2.3 Tapping Saddles: shall be of ductile iron saddles with double high tension, low alloy steel straps. Tapping saddles shall be Romac style 202, Mueller BR2-B, or approved equal.

2.4 Service Pipe and Fittings:

2.4.1 Polyethylene Tubing:

Tubing: AWWA C901, Polyethylene (PE3408), Pressure Pipe (Class 200), DR=9

Fittings: AWWA C901, fusion or compression connection

2.4.2 Copper Tubing:

Tubing: ASTM Specification B-88, Type K, Seamless, Annealed

Fittings: AWWA C800 flared or compression fittings

2.5 Pipe Connection Clamps: shall be of stainless steel.

2.6 Meters:

2.6.1 General: All meters shall be Neptune Compound meters or approved equal.

2.6.2 Certification: The meters are to be accepted on a certificate furnished by the Manufacturer that meters have met the requirements of the Standard Specifications for Water Meters, as adopted by the American Water Works Association (AWWA).

2.6.3 Delivery: Registers shall be direct reading with sweep hand and shall record in cubic-feet and totalized on five odometer wheels. The registers shall be of the hermetically sealed gear train and register type with magnet drive.

2.6.4 Guarantee: Each and every meter shall be guaranteed for a period of no less than one year from date of purchase against faulty material and workmanship. Hermetically Sealed Registers shall be guaranteed for a ten-year period.

2.7 Meter Boxes: shall be 18" deep Fastec MBX-1 cast iron, or approved equal, for ¾" and 1" meters. Meter Boxes for 1½" and 2" meters shall be Fastec MBX-5 cast iron, or approved equal. Lid of meter box shall clearly be marked "Water".

3.0 INSTALLATION: Service connections shall be installed at locations as designated by the Owner. Installation shall be made in a manner acceptable to the Director.

3.1 Taps: Proper size taps shall be made on the distribution line. A corporation stop, with the proper bend and service pipe adapter, shall be installed in the tap.

3.2 Backfill: Ditches and cleanup of the work area shall meet approval of the Director.

END OF SECTION

SECTION 2900 – RESTORATION OF SURFACES

1.1 INTRODUCTION

The scope of this section is to furnish all labor, equipment and materials necessary for the proper restoration of existing surfaces disturbed or damaged as a result of any construction activity not specifically detailed for other landscaping or restoration in any other part of this specification. Any damage to existing surfaces or structures shall be restored to original condition or better using like materials and workmanship to the original.

1.2 INSTALLATION

All pervious surfaces shall be dressed smooth and seeded in strict accordance with the section of these specifications entitled Seeding and Landscaping. Shoulders of all roads shall be restored as specified for lawns. Wooded areas or fields shall be restored raked smooth and seeded as specified in the section entitled Seeding and Landscaping.

A. Ditches:

Ditches shall be regarded to the original grade or such grade that flow is maintained to prevent ponding or standing water. If the grade must be altered, the Engineer shall approve the final grade and all adjacent slope grades with the Contractor performing the work as directed by the Engineer. The surface of all ditches shall be returned to the same condition as found before commencing work. The unit price for this work shall be encumbered in pipeline installation prices.

B. Concrete Walks:

Concrete walks removed or damaged as a part of the construction operation shall be replaced with new Class B concrete formed and poured in place and installed to match the original line, grade and general appearance of the existing walk. Concrete shall be poured to match the original walk thickness, but not less than 4” thick, over a thoroughly compacted and leveled sub grade. Walks shall be float finished, edged with an edging tool and grooved at intervals to match the existing walk, or at intervals not exceeding the width, uniform throughout the length of the replacement measured in one direction. This work shall be paid at unit price.

C. Driveways

Concrete drives removed or damaged as a part of the construction operation shall be replaced with new Class B concrete formed and poured in place and installed to match the original line, grade and general appearance of the existing drive. Concrete drives shall be poured the same thickness of the original drive, but not less than 4” thick, and shall contain reinforcing steel, mating, etc. to match the original drive. Prior to placing the concrete a 4” aggregate base course shall be placed in the drive area and leveled. The Contractor shall be responsible for coordinating restoration with property owner and allowing for curing time.

Bitumous or Asphaltic concrete drives shall be restored to the original base and asphalt thickness. As a minimum, all bitumous or asphaltic concrete drives shall consist of 6" base course and 2" surface material. Base material shall be thoroughly compacted and leveled to provide the appropriate depth of support and surface material shall be compacted in 2" lifts and topped with the appropriate depth to match the existing surface grade. All work done under this provision shall be performed in accordance with the section entitled Bituminous pavement Repairs. The Contractor shall be responsible for coordinating restoration activities with the property owners.

All unpaved drives shall be surfaced with not less than 4" of Crusher-run gravel and topped with similar surface material as the existing drive. The final drive shall consist of the 4" base and not less than 3" of surface material to match the existing drive. All unpaved drives shall be restored to a condition better than the original when encountered.

All drives shall be temporarily replaced with 4" of Crusher-run installed level with the existing drive surface and maintained until such time as the permanent drive can be restored. Restoration should not take more than three weeks without approval from the Engineer/Owner.

D. Roadway Replacement

Bituminous or Asphaltic pavements shall include all areas paved with blacktop; built-up pavements, oil and stone, tar and stone or any similar pavements constructed with a bituminous or asphalt and stone material.

Immediately upon completion of installation of underground piping and structures, the trench shall be backfilled and compacted to specification and roadway shall be repaired. The excavated area shall be restored to match the original material. In the case of tar and stone, oil and stone or other unprocurable material the repair shall consist of asphalt repair. The repair shall consist of a 12" aggregate base course, and a 4" surface course as defined in the specification entitled Bituminous Pavement Repairs. If Engineer deems appropriate then the Contractor may be allowed to surface treat damaged pavements outside of the excavation without removal of existing surface and base courses by overlaying the area in question and matching back to the existing surface.

Portland cement concrete road surfaces shall be replaced with Class B concrete and shall have equal thickness and reinforcing steel as the original roadway. Prior to placing concrete an aggregate base course of 6" thickness shall be placed and compacted.

The Contractor shall repair or replace any and all traffic markings damaged, removed or covered during construction. All existing manholes or valve covers shall be raised to finished grade prior to paving to prevent covering of existing infrastructure. The Contractor shall include this work as a part of the project and shall not seek additional compensation outside of the original unit prices. All such inquiries shall be requested and approved by the Engineer.

All differential settlement shall be corrected immediately as directed by the Engineer and the Engineer shall approve corrections.

All work under this category shall be performed in accordance with NCDOT Standards and shall be subject to inspection by the local representative for conformance with the requirements and specifications.

E. Lawns and Landscaped Areas

All lawns and disturbed area shall be regarded to match the existing grade prior to construction. Lawns, as previously defined, shall be graded, seeded and fertilized in strict conformance with the section of this specification entitled Seeding and Landscaping. Top soiled areas shall be replaced with topsoil of equal or better quality and quantity.

All shrubs, hedges, ornamental trees, flower or other items constituting landscaping shall be replaced to the original condition with the same items as removed or similar materials at property owner's approval.

F. Curb and Gutter

Curb and gutter sections removed, damaged, destroyed or otherwise impacted by the construction operation, Contractor or his agents shall be replaced with new Class B concrete to a condition matching or similar to that existing before construction activities. If curb and gutter cannot be matched exactly to the original condition, the Engineer shall approve alteration.

G. Damage to any Structure

All damage to existing structures shall be repaired by materials and workmanship equal to the original construction. At the direction of the Engineer, sufficiently damaged structures may require total replacement to the extent deemed appropriate by the Engineer. The Engineer shall approve all such replacements and unless otherwise noted separate payment for the repair or replacement will not be allowed.

END SECTION

SECTION 2930 – SEEDING AND LANDSCAPING

1.1 INTRODUCTION

This section covers the furnishing of all labor, equipment, material and any other items necessary for landscaping of all areas of the site disturbed by construction operations and all earth surfaces of embankments including rough and fine grading, topsoil if required, fertilizer, lime, seeding and mulching. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary for successful establishment and growth of grasses or legumes.

1.2 CATALOG CUT SUBMITTALS

Contractor shall submit 4 copies of catalog cuts to Engineer for review for all materials that are required to complete the work as described in the associated plans. Engineer will retain tow sets of original submittals and return two sets to the Contractor with the appropriate response annotated.

1.3 STORAGE AND HANDLING

Contractor shall take all prudent and customary measures to ensure that all materials stay moisture free and are not degradated by storage or handling. All lime and fertilizer shall be kept free from hardening or caking and if this occurs they shall be pulverized to their original state. All seed shall be further protected such that it is not subjected to heat or rodents. If degradation occurs and the materials no longer hold the mineral values advertised then they shall be removed from the site and new materials applied.

1.4 MATERIALS

A. Lime

The quality of lime and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Lime Law and regulations adopted by the NC- Board of Agriculture.

Lime shall be agriculture grade ground dolomite limestone. It shall contain not less than 85% of the calcium and magnesium carbonates and shall be of such fineness that at least 90% will pass a No. 10 sieve and at least 50% will pass a No. 100 sieve.

B. Fertilizer

The quality of fertilizer and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer Law and regulations adopted by the NC- Board of Agriculture.

Fertilizer shall be 10-10-10 grades. Upon written approval of the Engineer a different grade of fertilizer may be used, provided the rate of application is adjusted to provide the same amounts of plant food.

C. Seed

The quality of seed and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Seed Law and regulations adopted by the NC- Board of Agriculture.

The NC-Dept. of Agriculture shall have approved seed or any agency approved by the Engineer before being sown, and no seed will be accepted with the date of test more than 9 months prior to the date of sowing. Such testing does not relieve the Contractor from responsibility for furnishing and sowing seed that meets these specifications at the time of sowing. When a low percentage of germination causes the quality of seed to fall below the minimum pure live seed specified, the Contractor may elect, subject to approval of the Engineer, to increase the rate of seeding sufficiently to obtain the minimum pure live seed contents specified, provided that such an increase in seeding does not cause the quantity of noxious weed seed per square yard to exceed the quantity that would be allowable at the regular rate of seed.

Seed shall be entirely free from bulbets or seed of Johnson Grass, Nutgrass, Sandbur, Wild Onion, Wild Garlic and Bermuda Grass. The specifications for restricted noxious weed seed refers to the number per pound, singly or collectively, of Blessed Thistle, Wild Radish, Canada Thistle, Corncockel, Field Bindweed, Quackgrass, Dodders, Dock, Horsenettle, Bracted Plantain, Buckhorn or Wild Mustard; but in no case shall the number of Blessed Thistle or Wild Radish exceed 27 seeds of each per pound.

D. Mulch

Straw shall be free of weed seed or any other species, which would be detrimental or deterring to specified grass maturation. Straw shall be from oat, rye or wheat species and threshed to limit seed content.

E. Tack

Emulsified asphalt or organic tack shall be applied uniformly over straw so as to ensure proper hold and give uniform appearance over the entire area. Tack shall be applied by spraying onto surface immediately after applying straw. Application rates will vary dependent upon conditions. Organic tack shall be used when the ambient temperature is below freezing

1.5 PREPERATION

A. Protection of Existing Vegetation

The Contractor shall not remove or damage vegetation, which is outside the Clearing Limits established by the Owner/Engineer or as displayed on the plans. All trees that are damaged and scheduled to remain shall be repaired in an acceptable manner promptly to prevent progressive deteriation. Vegetation which is scheduled to be replaced or is damaged beyond repair during construction operations shall be replaced with a similar size and species. Where this is not feasible the property owner shall be compensated for the vegetation damaged. Damage incurred during construction operations and due to insufficient protection shall be paid at the Contractors expense.

Existing vegetation not indicated for removal shall be protected against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark or smothering of vegetation by placing stockpiles of excavated material against the trunk or excessively over roots within the drip line. Vegetation shall also be protected against excessive vehicle or foot traffic within the drip line.

Roots cut during excavation shall be properly protected by either asphalt sealing or in some cases wrapping exposed roots in wet burlap to prevent drying.

B. Grading

Rough grading of the area shall be achieved as soon as the excavated area is backfilled and compacted. Rough grading shall be defined as all material restored which is required to bring the area to finish grade and acceptable surface drainage for storm water which provides for water to flow from the site in such a manner as that it does not place unusual risk to unsuspecting users of adjacent areas or inhabitants.

Fine grading of the area shall be achieved in a timely manner after completion of rough grading of the area. Fine grading shall consist of shaping final contours to ensure proper drainage and removing all debris or construction waste materials to provide an acceptable appearance. Construction area subject to finish grading shall have soil loosened to a depth of not less than 6 inches in a manner approved by the Engineer to promote seed growth. All finish landscaping shall be completed on a section-by-section basis where it is reasonable to expect completion of landscaping.

All grading, landscaping, and erosion control measures shall be properly pursued and maintained in order to maintain and acceptable appearance of the project. If such time occurs as this perception is degraded then the Engineer may suspend progress on the project until the issues are appropriately addressed.

C. Surface and Bed Preparation

The Contractor shall smooth or shape surface contours outside the project site when such contours are detrimental to the seedbed preparation or will pose foreseeable problems with future maintenance of the area. The Engineer shall direct the Contractor to what extent outside areas shall be affected or the Contractor may elect to work with individual property owners with written verification delivered to the Engineer/Owner of the agreement with the property owner's signature.

1.c Level Areas and Slopes Less than 2:1

The construction area shall have soil loosened to a depth not less than 6 inches and shall be free from all debris, clods and all other irregularities which would prohibit a smooth, shaped finish grade. Top 3 inches of soil shall be worked to a clod free finish suitable for planting seed.

2.c Slopes Greater Than 2:1

The construction area shall have soil loosened and acceptable for vegetation growth but the surface shall be free from all debris, clods and other irregularities. The surface may be track finished, scarified, grooved or punctured so as to provide a place for seed and other planting material to lodge. In the case of such slopes the Engineer may allow partial completion of the slope sections at different times to promote stabilization. If the vegetation growth is acceptable the Engineer may allow this to remain as the permanent ground cover.

The Contractor shall not pursue the finished preparation of surface areas to be landscaped if the soil is frozen, marginally wet or when the Engineer deems it unsuitable for working conditions.

D. Rate of Application

Seed shall be applied by means of Broadcast Spreader, Hydro-Seeder or other previously approved method. In no case shall seed, lime, or fertilizer be spread by hand. The rates of application for seed, lime and fertilizer shall be as follows, unless a variance is permitted by the Engineer in writing prior to performing work.

1.d Limestone

In the absence of a soil test performed at the Contractors expense and given to the Engineer on letterhead from the testing laboratory, Limestone shall be applied at the rate of 2000 lb/ acre.

2.d Fertilizer

In the absence of a soil test performed at the Contractors expense and given to the Engineer on letterhead from the testing laboratory, Fertilizer shall be applied at the rate of 1000 lb/ acre. Fertilizer shall be 10-10-10 grade, unless a variance is permitted by the Engineer in writing prior to performing work. A second application at 500-lb/ acre shall be applied to the area when the grass has reached a blade height of 3 inches or 45 days which ever comes first.

3.d Seed

The type and rate of application shall vary at different times of the year and shall be applied at the rate and type appropriate for the time of year. All rates of application are measured in pounds per acre.

a. Fall and Winter (Sept. 1 to May 1)
85 pounds of Ky-31 tall fescue mixed with 15 pounds of rye grain.

b. Spring and Summer (May 1 to September 1)
100 pounds of Ky-31 tall fescue mixed with 10 pounds of rye grain.

c. Cut of Fill slopes greater than 2:1
The application rate on cut or fill slopes greater than 2:1 shall include the appropriate mix above for the time of year along with; 40 lb/acre of sericea lespedeza (hulled in spring or summer and unhulled in fall and winter) and either15 pounds of Sudan grass in spring and summer or 25 pounds of rye cereal per acre in fall and winter.

4.d Mulch

Mulch shall be straw mulch applied at a rate of approximately 3000 pounds per acre. Straw shall be applied at such rate necessary to thoroughly cover and protect all finish grading, seed, lime and fertilizer but not smoother the maturation of seed.

E. Application

Application of all limestone, fertilizer, seed and mulch shall be completed immediately following final preparation of the seed bed and shall not be pursued during a time when the Engineer deems weather to be non-conducive for seed growth, i.e. ground wet, frozen, etc. Lime, fertilizer and seed shall be distributed uniformly over the prepared seedbed at the specific rate of application and then harrowed, raked, or otherwise thoroughly worked or mixed into the seedbed. Immediately following the covering operation, the seedbed shall be properly compacted as directed in the manner and degree approved by the Engineer.

When a hydraulic seeder is used for application of seed and fertilizer, the seed shall not remain in water containing fertilizer for more than 1 hour prior to application unless otherwise permitted by the Engineer.

The Engineer may permit modifications to the requirements for covering or compacting lime, fertilizer and seed in the prepared seedbed if the Contractor requests modification due to height, steepness of slope or non-conducive soil conditions. Modifications may be considered if the case of: Slopes greater than 2:1 and Slopes where surface is to rocky to successfully permit compaction or covering of the seedbed. Modifications may be permitted to include reduction of application rates and reduction or elimination of compaction requirements.

All equipment normal and prudent for the preparation of seedbed and uniform distribution of lime, fertilizer and seed shall be approved by the Engineer prior to use on the project. In the event of malfunctioning or improperly maintained equipment, the Engineer reserves the right to suspend work on the project until such time as the equipment is restored to good repair and properly operational.

F. Mulching

Mulch shall be spread uniformly over all seeded areas at a rate of 1 ½ to 2 tons per acre in a continuous, uniform blanket. Mulch shall be spread by hand or by approved mechanical shredder or blower which will provide a uniform blanket. An acceptable application shall be one that completely covers the ground but still allows some sunlight to penetrate and air to circulate while providing effective soil moisture conservation and reduced erosion. Mulching operation shall be pursued immediately following final seedbed preparation.

Tack or other approved binding material shall be applied over top of mulch in all necessary areas to ensure mulch will be held in place during adverse conditions. The rate and method of application shall be completed as directed by the Engineer.

The Contractor shall implement sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water or other causes. The Contractor shall remove completely any blockage to drainage structures, which may occur.

G. Maintenance

Grassed areas shall be accepted when a 95% cover of permanent grasses is achieved and weeds are not the dominant foliage. The Contractor shall keep all grassed areas in good condition, reseeding and mowing if and when necessary as directed by the Engineer. A good lawn shall be established over the entire project area and shall be maintained by the Contractor in an approved manner and kept in an approved condition until final acceptance.

The Contractor shall protect against washouts on slopes and ditch sections by a manner approved by the Engineer. Any damage or failure due to any cause shall be corrected by being either repaired or completely redone as may be directed by the Engineer. Areas of damage or failure resulting either from negligence on the part of the Contractor in performing construction operations or from not taking sufficient precautions to control erosion and silt as required throughout the various sections of the specifications, shall be repaired by the Contractor as directed by the Engineer at no cost to the Owner.

End of Section

APPENDIX A

Owner Obtained Permits, Encroachment and Occupancy Agreements

ROY COOPER
Governor

ELIZABETH S. BISER
Secretary

DOUGLAS R. ANSEL
Interim Director

NORTH CAROLINA
Environmental Quality

February 1, 2023

LETTER OF APPROVAL WITH MODIFICATIONS

Catawba County
Attention: Mary Furtado, County Manager
25 Government Drive
Newton, North Carolina 28658

RE: Project Name: Highway 16 Waterline
Project ID: CATAW-2023-009
Acres Approved: 3.9 acres
County: Catawba
City: Maiden
Location: Highway 16
River Basin: Catawba
Stream Classification: Other
Submitted By: Highfill Infrastructure Engineering, P.C.
Date Received by LQS: January 5, 2023
Plan Type: New

Dear Ms. Furtado:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable with modifications and hereby issue this letter of Approval with Modifications. The Modifications Required for Approval are listed on the attached page. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of April 1, 2019, all new construction activities are required to complete and submit an electronic Notice of Intent (eNOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction General Permit. After the form is reviewed and found to be complete, you will receive a link with payment instructions for the $100 annual permit fee. After the fee is processed, you will receive the COC via email. As the Financially Responsible Party shown on the FRO form submitted for this project, you MUST obtain the COC prior to commencement of any land disturbing activity. The eNOI form may be accessed at deq.nc.gov/NCG01. Please direct questions about the eNOI form to the Stormwater Program staff in the Raleigh central office. If the owner/operator of this project changes in the future, the new responsible party must obtain a new COC.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

1. The approved E&SC plan as well as any approved deviation.

2. The NCG01 permit and the COC, once it is received.

3. Records of inspections made during the previous 30 days.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, it is determined that the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. In addition, it would be helpful if you notify this office of the proposed starting date for this project.

Your cooperation is appreciated.

Sincerely,

Jerry W. Eplin, PE
Assistant Regional Engineer
Land Quality Section

JWE

Enclosure: Certificate of Approval
Modifications Required for Approval
NCG01 Fact Sheet

c: Highfill Infrastructure Engineering, P.C.
Attention: David Wolf, PE
380 Knollwood St, Suite 734
Winston-Salem, North Carolina 27103

MODIFICATIONS REQUIRED FOR APPROVAL

Project Name: Highway 16 Waterline
Project ID: CATAW-2023-009
County: Catawba
Reviewed by: Jerry W. Eplin, PE

1. It is understood that the limits of disturbance (LOD) is entirely within existing rights of way or easements. No work is approved outside of the existing rights of way or easements. No haul roads or staging areas are included within the LOD. If haul roads and staging areas are needed, the Erosion and Sediment Control Plan will require revision.

2. All potentially affected property owners must be notified prior to utility construction even though the activity is covered under an easement. [G.S. 113A-54.1(a1)]

3. Additional measures may be required - The applicant is responsible for the control of sediment on-site. If the approved erosion and sedimentation control measures prove insufficient, the applicant must take those additional steps necessary to stop sediment from leaving this site. [15A NCAC 4B .0115]

CERTIFICATE OF PLAN APPROVAL

The posting of this certificate certifies that an erosion and sedimentation control plan has been approved for this project by the North Carolina Department of Environmental Quality in accordance with North Carolina General Statute 113A – 57 (4) and 113A – 54 (d) (4) and North Carolina Administrative Code, Title 15A, Chapter 4B.0107 (c). This certificate must be posted at the primary entrance of the job site before construction begins and until establishment of permanent groundcover as required by North Carolina Administrative Code, Title 15A, Chapter 4B.0127 (b).

HIGHWAY 16 WATERLINE - HIGHWAY 16 - MAIDEN - CATAWBA CO.

Project Name and Location

2-1-2023

Date of Plan Approval

CATAW-2023-009

Project Number

NCG01 Certificate of Coverage #

James W. Gill, PE

Asst. Regional Engineer

Fact Sheet on the New NCG01 Permit

April 2019

The NC Construction General Permit (also known as "NCG01") was renewed on April 1, 2019. The updated permit does not significantly change the measures that are required to be implemented on construction sites. However, there are some organizational and technical updates to the permit as described below. Most notably, there is a new process in which construction sites will obtain official coverage under an NCG01 permit through an electronic process. DEMLR worked with a broad team of stakeholders to make all of these updates. If you have questions, contact Annette Lucas at Annette.lucas@ncdenr.gov or (919) 707-3639.

Organizational Updates

The new permit:

- Repeats state requirements for E&SC Plans and organizes them with federal construction activity requirements;
- Is clearly organized by topic; and
- Has less text and more tables.

Technical Updates

The new permit:

- Requires that the E&SC Plan meet SWPPP requirements (p. 2);
- Provides a list of items that must be included in the SWPPP, such as the construction sequence, plans, calculations, etc. (p. 2-4);[1]
- Has updated language on bypasses and upsets that is tailored to construction activities (p. 10);
- Puts all timeframes for inspections, record-keeping and reporting in "calendar days" for clarity and consistency (p. 11-14);[2]
- Changes the inspection frequency (during business hours) to at least once per 7 calendar days and after every storm $\geq$ 1.0 inch (previously 0.5 inch);[3] and
- Excludes weekends, state and federal holidays from normal business hours unless construction activities take place (p. 23).

[1] This list is based on website guidance by the DEMLR Sediment Program.

[2] The number of calendar days was selected to be as equivalent as possible with the previous permit.

[3] The intent is to provide predictability to the inspection schedule.

Acronyms to Know

COC: Certificate of Coverage, proof of coverage under an NCG01 permit
DEMLR: NC Division of Energy, Mineral, and Land Resources
E&SC: Erosion & Sedimentation Control
e-NOI: Notice of Intent, application form for the NCG01 permit
e-NOT: Notice of Termination, form for closing out the NCG01 permit
SWPPP: Stormwater Pollution Prevention Plan, required by the NCG01



The NCG01 Process

The new NCG01 applies to permits approved on or after April 1, 2019.

Permittees will no longer receive a copy of the NCG01 permit in the mail with their E&SC Plan approvals and be considered as covered under the permit. Federal rules require that DEMLR receive an NOI on each construction project and issue each construction project its own COC.

Under the new NCG01 process, construction sites will continue to receive approval for E&SC Plans from either DEMLR or the delegated local E&SC program just like before. After receiving E&SC Plan approval, permittees will officially obtain coverage under the NCG01 by completing an e-NOI (available at deq.nc.gov/NCG01). The e-NOI will only take about 20 minutes to fill out and submit on-line.

Initially, there will be no charge associated with applying for an NCG01 permit but on or around June 1, 2019, DEMLR will begin charging a $100 annual general permit fee as required per §143-215.3D.

DEMLR is working on creating a single application form that will allow an applicant to simultaneously apply for an E&SC permit and an NCG01 COC. That effort is part of a larger Permit Transformation project at DEMLR.

Q&A About the New NCG01 Permit

Why do construction sites have to do this extra application step?
DEMLR is required by the EPA to issue a specific COC to every construction site that disturbs one acre or more. DEMLR is working to create a form that combines the E&SC plan approval and e-NOI processes, but that will take more time. For now, DEMLR has created an efficient e-NOI process.

If an E&SC Plan is approved before April 1, which permit applies?
Projects with already approved E&SC Plans will automatically follow the new NCG01 permit, but will not need to fill out an e-NOI or pay an annual permit fee. However, the permittees should print the new permit and the two standard detail sheets and have them on site.

Will DEMLR offer tools to help permittees comply with the new NCG01?
Yes, DEMLR will provide two sample plan sheets at deq.nc.gov/NCG01 that can be placed into the E&SC plan set. The first covers the site stabilization and materials handling portions of the permit. The second sheet covers the inspection, record-keeping and reporting portions of the permit.

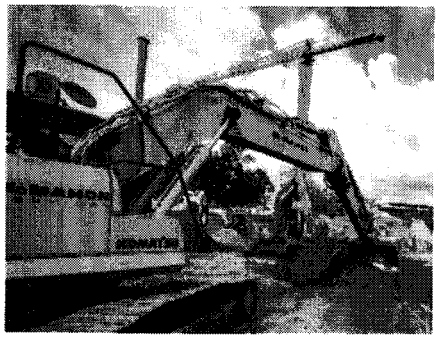
How will the new e-NOI submittal and COC process work?
Permittees will apply for E&SC Plan approvals from DEMLR or the local E&SC program like before. The E&SC approval letter will instruct the permittee to visit deq.nc.gov/NCG01 to submit an e-NOI form to DEMLR. The permittee may begin the construction activity after receipt of the COC (within three days*). The permittee must print and retain a copy of the permit and the COC on site. Initially, the COC will be issued for free but on or around June 1, 2019, a $100 annual general permit fee will be charged.

Who is allowed to submit an e-NOI form?
Submittal must be by a responsible corporate officer that owns or operates the activity, such as a president, secretary, treasurer, or vice president or a manager that is authorized in accordance with IV.B.6 of the NCG01 permit. Additional signatory options are set forth in IV.B.6 of the permit. It is possible for consultant to prepare the e-NOI, save it as a draft, and email it to the responsible entity for signature & submittal.

What happens to the COC when the construction activity is complete?
When a project is complete, the permittees will contact DEMLR or the local delegated program to close out the E&SC Plan. After DEMLR or the local E&SC program inform the permittee of the project close out via inspection report, the permittee will visit deq.nc.gov/NCG01 to submit an e-NOT.

Will there be a grace period for adherence to the new process?
DEMLR does not have the authority to grant a grace period from a federally mandated permit. Permittees will be informed of the new process via web site, E&SC Plan approval letters and list servs. If a construction activity disturbs one acre or more (or is part of common plan of development that disturbs one acre or more) fails to submit an e-NOI after approval of its E&SC Plan, this is a violation of federal permitting requirements and the permittee could be subject to a penalty assessment.

How does the new NCG01 affect the delegated local E&SC Programs?
Local programs will continue to review and approve E&SC plans. However, they will no longer send copies of the NCG01 with E&SC Plan approvals. DEMLR will provide sample language to use in local E&SC Plan approvals to advise permittees that they must submit an e-NOI to DEMLR.



Local programs are not required to check if permittees have submitted e-NOIs to DEMLR. However, if they wish to do this voluntarily, there will be a tool available on DEMLR's web site for them to view a list of construction projects that have submitted e-NOIs.

When local programs close out an E&SC Plan, the close-out letter will advise permittees that they must submit an e-NOT. DEMLR will provide sample language.

Local programs may approve E&SC plans that meet state sediment laws and rules even if those plans are not compliant with all of the NCG01 requirements. However, their permittees will be required to add two plan sheets (which will be provided by DEMLR) to their E&SC Plans to ensure that they fully comply with the ground stabilization, materials handling, and inspection, record-keeping and reporting portion of the NCG01 permit.

* *Or 24 business hours for a project approved under the DEMLR Express review program.*

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

March 2, 2023

Catawba County
Attention: Warren Wood, City Manager
P.O. Box 398
Hickory, North Carolina 28603

Re: Engineering Plans and Specifications Approval
Hwy 16 Waterline Extension
ARPA Project: SLFRP2831
Water System: Southeast Catawba County
Water System No.: NC2018004, Catawba County
Serial No.: 23-00105

Dear Applicant:

Enclosed please find one copy of the "Application for Approval..." together with one copy of the referenced engineering plans and specifications bearing the Division of Water Resources stamp of approval for the referenced project. These engineering plans and specifications are approved under Division of Water Resources Serial Number 23-00105, dated March 2, 2023.

Engineering plans and specifications prepared by Jordan T. Taylor, P.E., call for the installation of approximately 8,500 feet of 12-inch water main, fire hydrants, valves, and associated appurtenances along NC Hwy 16 Business between NC Hwy 150 and NC Hwy 16 Bypass in Catawba County, NC. The proposed extension along NC Hwy 16 Business will connect to an existing 12-inch water main at one end and to an existing 16-inch water main at the other end.

Please note that in accordance with 15A NCAC 18C .0309(a), no construction, alteration, or expansion of a water system shall be placed into service or made available for human consumption until the Public Water Supply Section has issued Final Approval. Final Approval will be issued and mailed to the applicant upon receipt of both an Engineer's Certification and an Applicant's Certification submitted in accordance with 15A NCAC 18C .0303 (a) and (c).

These plans and specifications in the foregoing application are approved insofar as the protection of public health is concerned as provided in the rules, standards and criteria adopted under the authority of Chapter 130A-317 of the General Statutes. This approval does not constitute a warranty of the design, construction, or future operation of the water system.

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

March 02, 2023

CATAWBA COUNTY
ATTN: WARREN WOOD, CITY MANAGER
PO BOX 398
HICKORY, NC 28603

Re: **Authorization to Construct (This is not a Final Approval)**
Issue Date: March 02, 2023
HWY 16 WATERLINE (ARPA: SLFRP2831)
Serial No.: 23-00105 Water System No.: NC2018004
Catawba County

Dear Applicant:

This letter is to confirm that a complete Engineer's Report and a Water System Management Plan have been received, and that engineering plans and specifications have been approved by the Department for **HWY 16 WATERLINE (ARPA: SLFRP2831), Serial No.: 23-00105.**

The "Authorization to Construct" is valid for 36 months from the issue date. Authorization to construct may be extended if the Rules Governing Public Water Supplies and site conditions have not changed (see Rule .0305). The "Authorization to Construct" and the engineering plans and specifications approval letter shall be posted at the primary entrance of the job site before and during construction.

Upon completion of the construction or modification, **and prior to placing the new construction or modification into service**, the applicant must submit an Engineer's Certification and Applicant's Certification to the Public Water Supply Section.

- **Engineer's Certification:** in accordance with Rule .0303 (a), the applicant shall submit a certification statement signed and sealed by a registered professional engineer stating that construction was completed in accordance with approved engineering plans and specifications, including any provisions stipulated in the Department's engineering plan and specification approval letter.
- **Applicant's Certification:** in accordance with Rule .0303 (c), the applicant shall submit a signed certification statement indicating that the requirements for an Operation and Maintenance Plan and Emergency Management Plan have been satisfied in accordance with Rule .0307 (d) and (e) and that the system has a certified operator in accordance with Rule .1300. The "Applicant's Certification" form is available at http://www.ncwater.org/ (click on Public Water Supply Section, Plan Review, Plan Review Forms).

Certifications can be sent by mail, fax (919-715-4374), or attachment to an e-mail message to **PWSSection.PlanReview@ncdenr.gov.**

If this "Authorization to Construct" is for a new public water system, the owner must submit a completed **application for an Operating Permit** and the appropriate fee. For a copy of the application for an Operating Permit please call (919) 707-9085.

Once the certifications and permit application and fee (if applicable) are received and determined adequate, the Department will issue a Final Approval letter to the applicant. In accordance with Rule .0309 (a), **no portion of this project shall be placed into service until the Department has issued Final Approval.**

Please contact us at (919) 707-9100 if you have any questions or need additional information.

Sincerely,

Jay Frick

Jay Frick
Deputy Section Chief
Public Water Supply Section
Division of Water Resources

cc: CLINTON COOK, P.E., Regional Engineer
HIGHFILL

North Carolina Department of Environmental Quality
Division of Water Resources

Authorization to Construct

Project Applicant:	**CATAWBA COUNTY**
Public Water System Name and Water System No.:	**SOUTHEAST CATAWBA COUNTY** **NC2018004**
Project Name:	**HWY 16 WATERLINE (ARPA: SLFRP2831)**
Serial No.:	**23-00105**
Issue Date:	**March 02, 2023**
Expiration Date:	36 Months after Issue Date

In accordance with NCAC 18C .0305, this Authorization to Construct must be posted at the primary entrance to the job site during construction.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

Catawba County

March 3, 2023

City of Hickory
PO Box 398
Hickory, NC 28603

SUBJECT: Approved encroachment E123-018-22-00345, for Water Main, Hydrants, and Valves to be placed along NC16 BUSINESS in Catawba County.

Attached is an approved encroachment agreement for installation of 8,504 LF of 12" DIP water main, 220 LF of 24" steel casing pipes with .25" wall thickness, (16) fire hydrants, (23) water valves, and (1) pressure reducer being installed by open trench and bore and jack methods to be installed along NC16 BUSINESS in Catawba County.

The encroaching party shall comply with all applicable state and federal environmental regulations and shall obtain all necessary state and federal environmental permits, including but not limited to, those related to sediment control, storm water, wetland, streams, endangered species, and historical sites.

Approval is given subject to provisions in the Agreement and attachments thereto which are made a part of the agreement.

An executed copy of the **Approved Encroachment** must be on the construction site at all times.

The encroaching party shall advise the District Engineer at (704) 748-2400 at least forty-eight (48) hours prior to the date of beginning work on installation of this encroachment. Furthermore, it will be necessary for you to notify the District Office in writing when work is completed on this installation.

The Department of Transportation does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought by any property owner by reason of the installation.

Sincerely,

DocuSigned by:
Travis Jordan
3736B5E303564F6...

Travis R. Jordan, PE
District Engineer
Division 12, District 3
TRJ:tcc

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION 12, DISTRICT 3
1031 EAST GASTON ST
LINCOLNTON, NC 28092

Telephone: (704) 748-2400
Fax: (704) 748-2403
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
1031 EAST GASTON STREET
LINCOLNTON, NC 28092

ROUTE NC-16 Business | PROJECT | COUNTY OF | STATE OF NORTH CAROLINA Catawba

DEPARTMENT OF TRANSPORTATION

-AND-
City of Hickory, 76 North Center Street
Hickory, NC 28601

RIGHT OF WAY ENCROACHMENT AGREEMENT
PRIMARY AND SECONDARY HIGHWAYS

THIS AGREEMENT, made and entered into this 3rd day of March 20 23 by and between the Department of Transportation, party of the first part; and City of Hickory Public Utilities party of the second part,

W I T N E S S E T H

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-16 Business, located In Catawba County, NC. Starting at approximately 770' North From the intersection of Rugged Hill Road and NC 16 Business Hwy connecting to the existing 12' waterline. The waterline will travel south along Highway 16 for approximately 8504 feet and connect to the existing 16" watermain approximately 245' north from the intersection of Hwy 16 and Hwy 150.

with the construction and/or erection of: 5 bore and jack crossings with 220 LF of 24" steel casing pipes (0.25" thickness) and ~8504 LF of 12" CL350 DIP (~8284' installed by open cut), 16 hydrants, 23 valves and 1 reducer.

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.

DEPARTMENT OF TRANSPORTATION

DocuSigned by:
BY: Travis Jordan
3736B5E303564F6...

Warren Wood, City Manager

PO Box 398, Hickory, NC 28603

Second Party

ATTEST OR WITNESS:

Debbie D. Miller

Debbie Miller, City Clerk

PO Box 398, Hickory, NC 28603

CITY OF HICKORY · SPES ET FIDES · INDUSTRIA · JUSTITIA · NULLA REPUGNUM · 1870 · NORTH CAROLINA

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.

EXHIBIT A
SPECIAL PROVISIONS

Encroachment ID:	**E123-018-22-00345**
Route:	**NC16BUS**
Project:	**Highway 16 Waterline Extension**
County:	**Catawba**
Encroaching Party:	**City of Hickory**
Work Description:	**8,504 LF of 12" DIP Water Main, 220 LF of 24" steel casing with .25" wall thickness, (16) Fire Hydrants, (23) Water Valves, and (1) reducer.**
Approval Date:	**03/03/2023**

Pre-Construction

Contact Offices & Outside Agency Issues/Contact/Info

1. Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the encroachment agreement.

2. **The encroaching party shall notify the District Engineer's Office three (2) business days prior to beginning construction. Please notify Michael Watson, by e-mail at mwatson@ncdot.gov or by telephone at (704)748-2400.**
3. Failure to provide these notifications prior to beginning construction is subject to the Division Engineer's discretion to cease construction activity for this encroachment. NCDOT reserves the right to cease any construction or maintenance work associated with this installation by the encroaching party until the construction or maintenance meets the satisfaction of the Division Engineer or their representative.

4. NCDOT Contacts:

Name	Title	Telephone	E-Mail
Travis R. Jordan, PE	District Engineer	(704) 748-2400	trjordan1@ncdot.gov
Michael Watson	Assistant District Supervisor	(704) 748-2400	mwatson@ncdot.gov
Todd Lutz	Engineering Technician III	(704) 748-2400	tlutz@ncdot.gov
Jeffrey Kanipe	Engineering Technician III	(704) 748-2400	jlkanipe@ncdot.gov
Travis Carswell	Engineering Technician I	(704) 748-2400	tccarswell@ncdot.gov

5. Prior to beginning work, it is the requirement of the Encroaching Party to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.

6. It shall be the responsibility of the encroaching party to determine the location of utilities within the encroachment area. **NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act** requires underground utilities to be located by calling 811 prior to construction. The encroaching party shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.

7. The encroaching party shall notify the appropriate municipal office prior to beginning any work within the municipality's limits of jurisdiction.

8. Excavation within **1000 feet** of a signalized intersection will require notification by the encroaching party to the Division Traffic Engineer at telephone number 980-552-4120 no less than one week prior to beginning work. All traffic signal or detection cables must be located prior to excavation. Cost to replace or repair NCDOT signs, signals, pavement markings or associated equipment and facilities shall be the responsibility of the encroaching party.

9. This agreement **does not authorize** installations within nor encroachment onto **Railroad Rights-of-Way**. Permits for installation within the **Railroad Right-of-Way** must be obtained from the Railroad and are the

responsibility of the encroaching party.

10. At the option of the District Engineer, a preconstruction meeting including representatives of NCDOT, the encroaching party, contractors and municipality, if applicable, shall be required. A pre-construction conference held between a municipality (or other facility owner) and a contractor without the presence of NCDOT personnel with subsequent construction commencing may be subject to NCDOT personnel ceasing any work on NCDOT right-of-way related to this encroachment until such meeting is held. Contact the District office to schedule.

11. At the discretion of the District Engineer, a **Notification For Utility / Non-Utility Encroachment Within NCDOT R/W form (see corresponding attachment)** with the scheduled pre-construction meeting and associated construction schedule details must be completed and submitted to the District Engineer's office a minimum of one week prior to construction.

12. At the discretion of the District Engineer, the encroaching party (not the utility contractor) shall make arrangements to have a qualified inspector, under the supervision of a Professional Engineer registered in North Carolina, on site at all times during construction. The registered Professional Engineer shall be required to submit a signed and PE sealed certification that the utility was installed in accordance with the encroachment agreement.

13. The encroaching party and their construction contractor must sign and submit the **NCDOT *Workforce Safety Plan for Encroachment Activities: COVID-19* form** to the District Engineer prior to construction.

14. The attached Duke Energy response to the NCDOT *COVID-19 Workforce Safety Plan* shall be applied for allemployees on the job site unless otherwise directed by the District Engineer.

Legal and Right-of-Way

15. This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the Division Engineer's office or their representative prior to construction or during construction if an issue arises during construction to warrant changes.
16. 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. It is the responsibility of the encroaching party to verify the right of way.

17. Encroaching party shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.

18. No commercial advertising shall be allowed within NCDOT Right of Way.

19. The encroaching party shall obtain proper approval from all affected pole owners prior to attachment to any pole.

Bonds

20. A Performance and Indemnity Bond in the amount of $ xxx.xx shall be posted with the District Engineer's Office by the Party of the Second Part prior to beginning any work within the NCDOT Right of Way. The bond shall be held for a minimum of one year after a satisfactory final inspection of the installation by NCDOT. The bond maybe held for a period longer than one year after completion if, in the opinion of NCDOT, the size or complexity of the installation warrants a longer period.

21. The release of the bond is subject to a final inspection by NCDOT. Contact the District office to schedule a Final Inspection and request to release of the bond.

Work Zone Traffic

22. Traffic control shall be coordinated with the District Engineer and the Division Traffic Engineer, MX. XXXX at

telephone (xxx) xxx-xxxx, prior to construction.

23. **WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM**

All personnel performing any activity inside the highway right of way are required to be familiar with the **NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG)**. No specific training course or test is required for qualification in the **Maintenance /Utility Traffic Control Guidelines (MUTCG).**

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

24. The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:

    a. **Manual on Uniform Traffic Control Devices (MUTCD**) – North Carolina has adopted the **MUTCD** to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the **MUTCD** as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of **MUTCD (Part 6, Temporary Traffic Control)**.

    b. **NCDOT Maintenance / Utility Traffic Control Guidelines** – This document enhances the fundamental principles and best practices established in **MUTCD (Part 6, Temporary Traffic Control)**, incorporating NCDOT- specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.

    c. **NCDOT latest Roadway Standard Drawings**.

25. If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.

26. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.

27. Traffic shall be maintained at all times. All lanes of traffic are to be open during the hours of **7:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M. Monday through Friday, during any time of inclement weather, or as directed by the District Engineer**. Any violation of these hours will result in ceasing any further construction by the Encroaching Party or their contractor.

28. Nighttime and weekend operations will **NOT** be allowed unless written approval is received from the District Engineer. If nighttime or weekend work is allowed or required, all signs must be retro-reflective, and a workzone lighting plan must be submitted for approval prior to construction.

29. Two-way traffic shall be maintained at all times unless designated by the District Engineer. Traffic shall not be rerouted or detoured without the prior written approval from the District Engineer. If the construction is within 1000 feet of a school location or on a designated bus route, the construction shall be coordinated with the

school start and end times to avoid traffic delays.

Utility or Non-Utility work approved under an encroachment agreement will **NOT** be allowed to work on **ANY Road**, detain and /or alter the traffic flow on or during **Holidays and Holiday weekends**, **special events, or any other time when traffic is unusually heavy**, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND WORK RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the District Engineer.

2. For **New Year's Day**, between the hours of **8:00 AM** December 31st and **8:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **8:00 PM** the following Tuesday.

3. For **Easter**, between the hours of **8:00 AM** Thursday and **8:00 PM** Monday.

4. For **Memorial Day**, between the hours of **8:00 AM** Friday and **8:00 PM** Tuesday.

5. For **Independence Day**, between the hours of **8:00 AM** the day before Independence Day and **8:00 PM** the day after Independence Day.
   If **Independence Day** is on a Friday, Saturday,Sunday or Monday, then between the hours of **8:00 AM** the Thursday before Independence Day and **8:00 PM** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **8:00 AM** Friday and **8:00 PM** Tuesday.

7. For **Thanksgiving Day**, between the hours of **8:00 AM** Tuesday and **8:00 PM** Monday.

8. For **Christmas**, between the hours of **8:00 AM** the Friday before the week of Christmas Day and **8:00 PM** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas.

30. Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.

31. Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility or within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers and signage in accordance with the **MUTCD**, **MUTCG** and the ***NCDOT Roadway Standard Drawings*.**

32. At the discretion of the District Engineer, a traffic control plan shall be developed and submitted under the seal and signature of a Licensed North Carolina Professional Engineer prior to construction. The plan shall be specific to the site and adequately detailed. Issues such as the close proximity to intersections shall be addressed.

33. The Contractor shall not begin the construction until after the Traffic Control Devices have been installed in accordance with the **MUTCD**, **MUTCG** and **NCDOT Latest Roadways Standard Drawing or the Approved Plan.**

34. Any pavement markings that are damaged or obliterated shall be restored by the encroaching party at no expense to NCDOT.

35. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with **The American with Disabilities Act Accessibility Guidelines**. The encroaching party must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the **NCDOT Pedestrian Work Zone Accommodations Training** found at https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be.

Roadside Environmental

36. 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, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at 980-552-4250.

37. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.

38. The **Verification of Compliance with Environmental Regulations (VCER-1) form** is required for **all non-utility encroachment agreements or any utility encroachments when land disturbance within NCDOT right of way exceeds 1 acre**. The **VCER-1 form** must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.

39. The contractor shall not begin the construction until after the erosion control devices havebeen installed to the satisfaction of the District Engineer or their representative.

40. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest **NCDOT Standards Specifications for Roads and Structures** and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this encroachment shall be replaced with plants of like kind or similar shape.

    The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

Shoulder and Median Areas

August 1 - June 1		**May 1 - September 1**	
20#	Kentucky Bluegrass	20#	Kentucky Bluegrass
75#	Hard Fescue	75#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas

August 1 - June 1		**May 1 - September 1**	
100#	Tall Fescue	100#	Tall Fescue
15#	Kentucky Bluegrass	15#	Kentucky Bluegrass
30#	Hard Fescue	30#	Hard Fescue
25#	Rye Grain	25#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Tall Fescue Cultivars

2 Millennium	Coyote	Inferno	Olympic Gold	Signia
Avenger	Davinci	Justice	Padre	Silverstar
Barlexas	Dynasty	Jaguar 3	Paraiso	Southern Choice II
Barlexas II	Dominion	Kalahari	Picasso	Stetson
Barrera	Duster	Kentucky 31	Piedmont	Tarheel
Barrington	Endeavor	Kitty Hawk	Pure Gold	Titan Ltd

Biltmore	Escalade	Kitty Hawk 2000	Prospect	Titanium
Bingo	Falcon II, III, IV & V	Lexington	Quest	Tomahawk
Bravo	Fidelity	Magellan	Rebel Exeda	Tacer
Cayenne	Finesse II	Masterpiece	Rebel Sentry	Trooper
Chapel Hill	Firebird	Matador	Regiment II	Turbo
Chesapeake	Focus	Matador GT	Rembrandt	Ultimate
Constitution	Grande II	Millennium	Rendition	Watchdog
Chipper	Greenkeeper	Montauk	Scorpion	Wolfpack
Coronado	Greystone	Mustang 3	Shelby	

Approved Kentucky Bluegrass Cultivars

Alpine	Apollo	Arcadia	Arrow	Award
Bariris	Bedazzled	Bordeaux	Champagne	Chicago II
Envicta	Impact	Midnight	Midnight II	Rugby
Rugby II	Showcase	Sonoma		

Approved Hard Fescue Cultivars

Chariot	Firefly	Heron	Kenblue	Minotaur
Nordic	Oxford	Reliant II	Reliant IV	Rhino
Scaldis II	Spartan II	Stonehenge	Warwick	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Temporary seeding

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

Fertilizer Topdressing

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

41. Prior to installation, the Encroaching Party shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.

42. The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.

43. The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.

STIP (or Division Managed) Projects

44. State Transportation Improvement Project (STIP) **-XXXXXX is scheduled for future construction. Any encroachment determined to be in conflict with the construction of this NCDOT project shall be removed and/or relocated at the encroaching party's expense.

Construction

General

45. An executed copy of the encroachment agreement, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.

46. The Encroaching Party and/or their Contractor shall comply with all **OSHA** requirements. If **OSHA** visits the work area associated with this encroachment, the District Office shall be notified by the encroaching party immediately if any violations are cited.

47. Any **REVISIONS** marked in **RED** on the attached non-PE sealed plans shall be incorporated into and made part of the approved encroachment agreement.

48. 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.
49. All Open cuts shall be backfilled, paved and traversable prior to removing the lane closure.

50. The encroaching party shall notify the District Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the Division Engineer or their representative.

51. **The encroaching party shall notify NCDOT for an inspection before covering any new or altered**

pipe or drainage structure. The encroaching party may be required to uncover any new or altered drainage within the right of way that has not been inspected.

52. A minimum of 5 feet clearance is required for utility installations beneath or near drainage pipes, headwalls, and a minimum of 2 feet clearance below the flowline of streams. If directional drilling, a minimum of 10 feet clearance distance is required from drainage structures and a minimum of 5 feet below flowline of streams.

53. At points where the utility is placed under existing storm drainage, the trench will be backfilled with excavatable flowable fill up to the outside diameter of the existing pipe.

54. Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Zone. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.

55. Guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the District Engineer or their representative.

56. The resetting of the Control of Access fence shall be in accordance with the applicable NCDOT standard and as directed by the District Engineer or their representative.

57. Right of Way monuments and markers disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.

58. All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the District Engineer or their representative.

59. Any utility markers, cabinets, pedestals, meter bases and services for meter reading required shall be as close to the Right of Way line as possible. If it is not feasible to install at or near Right of Way line, then written approval shall be obtained from NCDOT prior to installation.

60. All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction

61. Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.

62. If the approved method of construction is unsuccessful and other means are required, prior approval must beobtained through the District Engineer before construction may continue.

63. All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the District Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.

Engineering

64. All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: **ASTM Standards, Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings, NCDOT Asphalt Quality Management System manual**, and the approved plans.

65. 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 Professional Engineer for approval prior to construction.

66. Prior approval for any blasting must be obtained from the District Engineer or their representative.

67. Regulator stations, metering stations, cathodic test stations, and anode beds are not permitted within NCDOT right of way. Header wires are permitted.

68. Non-Utility Communication and Data Transmission installations (ground mounted type or Small Cell pole- mounted type) must adhere to guidelines in the **Utilities Accommodations Manual** and, when located within municipal jurisdictions, are subject to review and approval by municipal ordinances and any additional municipal approval for proximity to historic districts and landmarks. All wiring and related telecommunications work shall conform to the latest regulations by the **Federal Communications Commission**.

69. All wiring and related electrical work shall conform to the latest edition of the **National Electrical Safety Code**.

70. All utility facilities, including manholes, valve boxes, meter boxes, splice boxes, junction boxes, vaults and access covers, within NCDOT right of way shall have been designed for HS-20 loading rated for continuous traffic. A listing of currently approved manholes and vaults is available at: https://apps.ncdot.gov/vendor/approvedproducts/Default.aspx verify approved product # (NP--------).

Location Within Right-of-Way

71. All utility access points, such as manholes, vaults, handholes, splice boxes and junction boxes shall be located as close to the right of way line as possible and shall not be placed in the ditch line, side slopes of the ditches or in the pavement. All manholes, handholes, splice boxes, junction boxes and vaults and covers shall be flush with the ground when located within the vehicle clear zone. Slack loops for telecommunications in industry standard housing units shall be buried a minimum of 18 inches when buried or meet minimum NCDOT vertical and horizontal clearances when installed aerially.

72. Fire Hydrants shall be of the breakaway type. Hydrants shall be placed near the right of way line. In curb and gutter sections with written approval from the District Engineer, the hydrants may be placed at 6' behind the back of the curb or minimum 2’ back of sidewalk.

73. Luminaire and/or utility poles and guy wires shall be set as close to the Right of Way line as practical and outside the Clear Zone in accordance with the latest version of the **AASHTO Roadside Design Guide** (See corresponding attachment) or made breakaway in accordance with the requirements of NCHRP Report 350. Any relocation of the utility poles from the original design due to Clear Zone requirements shall require a re-submittal for the utility design. **(see corresponding attachment)**

74. Luminaire and/or utility poles shall be set a minimum of 5’-6” behind face of any guardrail or otherwise sufficiently protected. However, standard placement may be reduced to 3’-6” behind face of guardrail when posts are spaced 3’-1 ½”, or where speed limit is less than 55 MPH.

75. Hot box (aka ASSE 1060) or Safe-T-Cover type enclosures covering utility main pipe joints, backflow preventers, valves, vent pipes, cross connections, pumps, grinders, irrigation assemblies, transformers, generators, and other similar large appurtenances shall be located outside sight distance triangles and off of the NCDOT Right-of-Way.

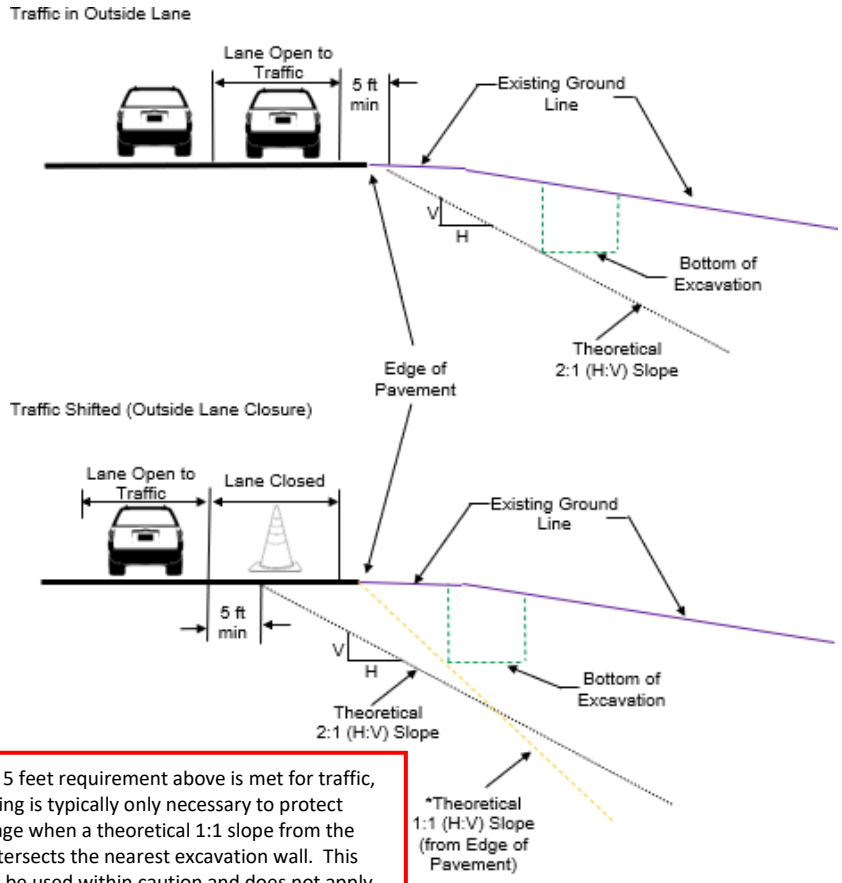
76. Sprinkler heads shall be located a minimum of 10 feet from the edge of pavement, edge of shoulder, or back of curb whichever is greater and shall be directed so that water does not spray or drain on the roadway surface, sidewalk, or passing vehicles at any time. Upon completion of the installation and prior to activation of the system, the Encroacher shall contact the District Engineer to schedule a test of the system to verify the spray pattern. Sprinkler systems shall not be operated during periods of high wind or freezing weather, or to the extent that the subgrade adjacent to the pavement structure becomes saturated. NCDOT reserves the right to require immediate termination and removal of any sprinkler system which in its judgement and opinion adversely affects safety, maintenance, or operation of the roadway.

Excavation

77. Excavation material shall **NOT** be placed on pavement.

78. It is the responsibility of the encroaching party or their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.

79. The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. Temporary shoring is required when a theoretical 2:1 slop from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



*If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used within caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Additional guidance provided below.

80. If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Type B or C soils as defined by OSHA Technical Manual. Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

    Temporary shoring shall be designed and constructed in accordance with current **NCDOT Standard Temporary Shoring** provisions (refer to https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx and see SP11 R002).

    a. Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the District Engineer for review and approval prior to construction. (See **NCDOT Utilities Accommodations Manual** for

more information on requirements for shoring plans, design calculations, and subsurface investigation report.) **Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation**.

b. All trench excavation inside the limits of the theoretical 2:1 slope plus 5 feet requirement, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.

c. The trench backfill material shall meet the **Statewide Borrow Criteria**. The trench shall be backfilled in accordance with Section 300-7 of the latest **NCDOT Standard Specifications for Roads and Structures**, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.

d. At the discretion of the District Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The encroaching party shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the encroaching party (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the encroachment agreement and that the backfill material meets the Statewide Borrow Criteria.

e. The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.

81. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.

Directional Bore

82. NCDOT required information for Encroachments using Horizontal Directional Drilling (HDD). In addition to submittal requirements outlined in the **NCDOT Utilities Accommodations Manual**, this information must be submitted either explained on this form or in other documentation submitted for the encroachment requests using HDD. **(see corresponding attachment)**
83. Boring equipment will be provided of a type and size to facilitate boring in the local geologic conditions and shall be able to facilitate the encroachment work.

84. When Horizontal Directional Drilling (HDD) is used, the following stipulations apply:

a. Use drilling fluids as appropriate for the type soils but use of water alone is prohibited. Pump drilling fluids only while drilling or reaming. Directional boring using jetting with a Bentonite (or equivalent material) slurry is recommended. Monitor flow rates to match the amount leaving the bore hole and donot increase pressure or flow to free stuck drill heads, reamers or piping. Open cutting to retrieve stuck drill heads is not allowed without prior permission from the District Engineer.

b. The minimum depth shall adhere to the table below for transverse and longitudinal (under non-controlled access, partial controlled access, or limited controlled access roadway) installations and refers to maximum diameter of hole drilled and not the dimension of the carrier or encasement pipe.

Diameter of Drilled Hole (Backream)	Minimum Depth of Cover

2” to 6”	5 feet
>6” to 15”	12 times hole diameter (e.g. 6 inch hole means 6 feet minimum depth)
>15” to 36”	15 feet or greater

c. Under fully controlled access roadway installations, the minimum depth for transverse crossings shall be 15 feet under any pavement (ramps or thru lanes).

d. An overbore (backream diameter) shall not be more than 1.5 times the outside diameter of the pipe or encasement under any highway for pipes 12 inches in diameter or less. For pipes with outer diameter larger than 12 inches, the overbore may be longer than outer diameter of pipe plus 6 inches. An overbore exceeding 1.5 times greater than the outside diameter of the pip or encasement may 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 1.5 times the outside diameter of the pipe or encasement will appropriately arch and no damage will be done to the pavement or sub-grade.

e. Directional boring is allowed beneath embankment material in naturally occurring soil.

f. All directional bores shall maintain ten (10) feet minimum (clear) distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. Directional bores are not allowed beneath bridge footings, culvert wingwall footings, slope protection or retaining walls.

g. The tip of the drill string shall have a cutter head

h. Detection wire shall be installed with non-ferrous material.

i. 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.

Aerial Clearances

85. Vertical Clearance of overhead power and communication lines shall meet the National Electrical Safty Code requirements except the minimum vertical clearance shall be 18' for crossings over NCDOT roadways (24' over Fully Controlled Access roadways) and 16' for parallel installations.

86. In relation to the bridge, the utility line shall be located with minimum clearances as indicated on the attachment for NCDOT Required Clearances for Aerial Installations by Encroachment Near Bridge Structures. **(see attached)**

Pavement Detail and Repair

87. “Potholing” pavement cores to expose existing utilities shall be made with an 18” diameter keyhole pavement core. Pavement core locations shall not be placed in the wheel path whenever possible. Vacuum excavation shall be utilized to expose underground utilities. Pavement cores shall be repaired within the same working day. The pavement core shall be retained and reused to fill the core hole. The excavation shall be backfilled and compacted with select material to the bottom of the existing pavement structure or as indicated by the District Engineer. The retained core shall be placed in the hole and secured with a waterproof, mechanical joint. If the pavement core is damaged and cannot be re-used, the core may be replaced with the surface mix, S9.5B. The asphalt patch shall match the thickness of the existing asphalt or four inches, whichever is greater. All materials must be listed on the **NCDOT Approved Products List (APL)** found at: https://apps.ncdot.gov/vendor/approvedproducts/.

88. The minimum pavement design for pavement repair shall be according to **NCDOT Standard Drawing 654.01** (https://connect.ncdot.gov/resources/Specifications/2018StandardRdwyDrawings/Division%2006%20 Asphalt%20Bases%20and%20Pavements.pdf) and shall include a mechanical overlay extent to be a minimum of 25 feet each side of the pavement repair area OR as directed by the District Engineer.

89. Pavement cuts shall be repaired the same day the cuts are made unless an asphalt patch cannot be accomplished the same day due to material availability or time restrictions. When the asphalt patch is

not feasible, the following apply:

a. The pavement cut shall be filled to the surface with ABC stone or Flowable Fill per **NCDOT's Standards and Specifications.**
b. Once the cut is filled, a minimum ¾-inch steel plate shall be placed and pinned to prevent moving. Platesshall be designed large enough to span a minimum of 1-foot on all sides on the pavement cut.
c. When flowable fill is used, it shall cure for 24 hours prior to any asphalt material placement. Flowable fill bleed water shall not be present during paving operations. Paving shall not cause damage (shoving, distortion, pumping, etc.) to the flowable fill.
d. Install and leave "BUMP" signs according to MUTCD until the steel plate has been removed. Once the flowable fill has cured, remove the steel plate, and mill/fill according to the directions of the District Engineer.
e. All pavement cuts must be sealed with NCDOT approved sealant to prevent future pavement separation or cracking.

90. Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform encroachment work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Encroaching Party.

Post Construction

Close Out/Inspection

91. **The Encroaching party shall notify the District Engineer's office within 2 business days after construction is complete in writing on letter head with copy of initial Approval Letter.** The District Engineer may perform a construction inspection. Any deficiencies may be noted and reported to the encroaching party to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.

92. At the discretion of the District Engineer, a final inspection report may be provided to the encroaching party upon satisfactory completion of the work.

93. A written acknowledgement of the completed work by the District Engineer's office begins the one-year warranty period associated with the performance bond.

94. If the actual construction differs from the approved plans associated with this encroachment, a copy of "as-built" plans shall be submitted to the District Engineer's office in a PDF format and in a current ESRI GIS format within 4 weeks of construction.

APPENDIX B

Report of Subsurface Exploration

Geotechnical Engineering Report
Highway 16 Waterline
Catawba County, North Carolina
S&ME Project No. 219328

PREPARED FOR:

Highfill Infrastructure Engineering, P.C.
380 Knollwood Street, Suite 734
Winston-Salem, North Carolina 27103

PREPARED BY:

S&ME, Inc.
9751 Southern Pine Boulevard
Charlotte, North Carolina 27529

August 24, 2022

August 24, 2022

Highfill Infrastructure Engineering, P.C.
380 Knollwood Street, Suite 734
Winston-Salem, North Carolina 27103

Attention: Mr. Jordan Taylor, P.E.
jtaylor@hiepc.com

Reference: **Geotechnical Engineering Report**
Highway 16 Waterline
Maiden, Catawba County, North Carolina
S&ME Project No. 219328
NC PE Firm License No. F-0176

Dear Mr. Taylor:

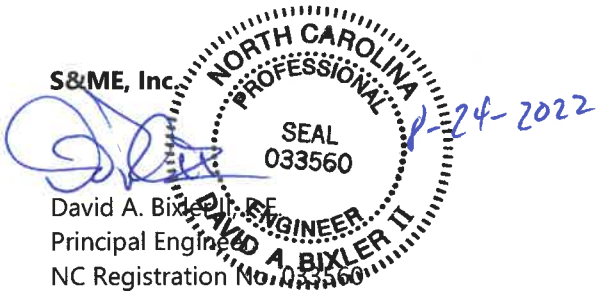
S&ME, Inc. (S&ME) is pleased to submit this Geotechnical Engineering Report for the new water line extension in Catawba County, North Carolina. Our services were provided in general accordance with our proposal No. 219328 dated October 8, 2021 as authorized by email by you on July 22, 2022.

The purpose of the geotechnical study was to determine the general subsurface conditions at the site and to evaluate those conditions with regard to the design and construction of the project. This report presents our findings together with our conclusions and recommendations for site construction.

S&ME appreciates the opportunity to assist you during this phase of the project. If you should have any questions concerning this report or if we may be of further assistance, please contact us.

Sincerely,

S&ME, Inc.



David A. Bixler II, PE
Principal Engineer
NC Registration No. 033560

Jordan Titus, P.E. (S.C.)
Project Engineer

DAB/JT/wj

Table of Contents

1.0 Introduction 1
1.1 Project and Site Descriptions 1
1.2 Purpose and Scope 1
2.0 Exploration Procedures 1
2.1 Soil Test Borings 1
2.2 Laboratory Testing 2
3.0 Area Geology and Subsurface Conditions 2
3.1 Physiography and Area Geology 2
3.2 Subsurface Conditions 4
4.0 General Recommendations 5
4.1 Existing Underground Utilities 5
4.2 Site Preparation 6
4.3 Excavations 6
4.4 Temporary Dewatering 7
4.5 Fill Material and Placement 7
5.0 Limitations of Report 8

List of Figures

Figure 3-1: Physiographic Provinces of North Carolina
Figure 3-2: Typical Piedmont Weathering Profiles

Appendix

Site Vicinity Plan, Figure 1
Boring Location Plan, Figures 2a and 2b
Legend to Soil Classification and Symbols
Boring Logs, B-1 through B-15

1.0 Introduction

1.1 Project and Site Descriptions

Project information is based on e-mail correspondence from Mr. Jordan Taylor with Highfill Infrastructure Engineering, P.C. (HIE) to Mr. David Bixler with S&ME on October 6, 2021. The e-mail correspondence included the proposed number of soil test borings and depths and an electronic drawing showing the proposed alignment for a new waterline. An updated electronic drawing was provided via e-mail on July 29, 2022.

The proposed alignment for the waterline is in Catawba County, North Carolina. The new waterline will be approximately 8,000 linear feet in length traversing parallel to and west of NC Business Highway 16 from the intersection of NC Highway 150 north to the intersection of NC Highway 16. The alignment includes two creek crossings and a crossing of NC Highway 16 near the northern terminus of the alignment. The drawing indicates the waterline will be 12-inches in diameter. We assume the waterline will be installed mostly by cut and cover techniques.

1.2 Purpose and Scope

The purpose of this geotechnical study was to explore the subsurface conditions along the planned alignment and develop geotechnical recommendations for the design and construction of the proposed project. S&ME has completed the following scope of geotechnical services for this project:

- Visited the site to observe site surface conditions and mark test locations.
- Contacted North Carolina 811 to have them mark the locations of existing underground utilities in the exploration areas.
- Subcontracted traffic control measures.
- Mobilized an ATV-mounted drill rig and crew to the site.
- Drilled 15 soil test borings.
- Attempted water level measurements in the boreholes.
- Backfilled the boreholes with soil cuttings and hole closure devices.
- Patched roadway surface with cold-patch asphalt.
- Performed geotechnical analysis and prepared this geotechnical report.

2.0 Exploration Procedures

2.1 Soil Test Borings

In order to explore the general subsurface conditions at the project site, 15 soil test borings (Borings B-1 through B-15) were drilled to depths of 2.2 to 8 feet below the existing ground surface on August 4 and August 5, 2022. The borings were advanced at the approximate locations shown on the Boring Location Plan (Figures 2a and 2b) in the Appendix. The boring locations were selected by HIE and staked by an S&ME representative.

A CME 55 drill rig mounted on a truck was used to advance the soil test borings using hollow-stem, continuous flight augers. Standard Penetration Test (SPT) split spoon sampling was performed at designated intervals in the soil test borings in general accordance with ASTM D1586 to provide an index for estimating soil strength and relative density or consistency. SPT tests were performed with a hydraulic automatic hammer. In conjunction with the SPT testing, samples are obtained for soil classification purposes. Representative portions of each soil sample were placed in sealed containers and taken to our laboratory.

Water level measurements were attempted in the borings at the termination of drilling activities. All borings were backfilled with soil cuttings and hole closure devices after the water level measurements were obtained. Cold-patch asphalt was placed at the ground surface in Borings B-2, B-5 through B-8, and B-13 through B-15.

2.2 Laboratory Testing

Once the split-spoon samples from the soil test borings were received in our laboratory, a geotechnical staff professional visually and manually examined each sample to estimate the distribution of grain sizes, plasticity, organic content, moisture condition, color, presence of lenses and seams and apparent geological origin. The soils were classified in general accordance with the Unified Soil Classification System (USCS). The results of the classifications, as well as the field test results, are presented on the individual boring logs in the Appendix. Similar soils were grouped into strata on the logs. The strata contact lines represent approximate boundaries between the soil types; the actual transition between the soil types in the field may be gradual in both the horizontal and vertical directions.

3.0 Area Geology and Subsurface Conditions

3.1 Physiography and Area Geology

The site is located in the Kings Mountain Belt of the Piedmont Physiographic Province of North Carolina as shown in Figure 3-1. The Piedmont Province generally consists of well-rounded hills and ridges, which are dissected by a well-developed system of draws and streams. The Piedmont Province is predominantly underlain by metamorphic rock (formed by heat, pressure and/or chemical action) and igneous rock (formed directly from molten material), which were initially formed during the Precambrian and Paleozoic eras. The volcanic and sedimentary rocks deposited in the Piedmont Province were the host for the metamorphism and were changed to gneiss and schist. The more recent Paleozoic era had periods of igneous emplacement, with at least several episodes of regional metamorphism resulting in the majority of the rock types seen today.

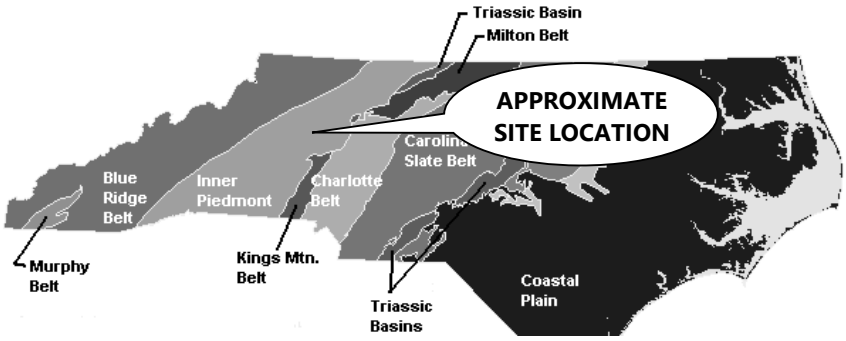


Figure 3-1: Physiographic Provinces of North Carolina

The topography and relief of the Piedmont Province have developed from differential weathering of the igneous and metamorphic rock. Because of the continued chemical and physical weathering, the rocks in the Piedmont Province are now generally covered with a mantle of soil that has weathered in place from the parent bedrock. These soils have variable thicknesses and are referred to as residuum or residual soils. The residuum is typically finer grained and has higher clay content near the surface because of the advanced weathering. Similarly, the soils typically become coarser grained with increasing depth because of decreased weathering. As the degree of weathering decreases, the residual soils generally retain the overall appearance, texture, gradation and foliations of the parent rock.

The boundary between soil and rock in the Piedmont is not sharply defined. A transitional zone termed "Partially Weathered Rock" is normally found overlying the parent bedrock. Partially Weathered Rock (PWR) is defined for engineering purposes as residual material with Standard Penetration Resistances (N-values) exceeding 100 blows per foot and is identified as Intermediate Geomaterial (IGM) on the boring logs. The transition between hard/dense residual soils and PWR occurs at irregular depths due to variations in degree of weathering. A depiction of typical weathering profiles in the Piedmont Province is presented in Figure 3-2.

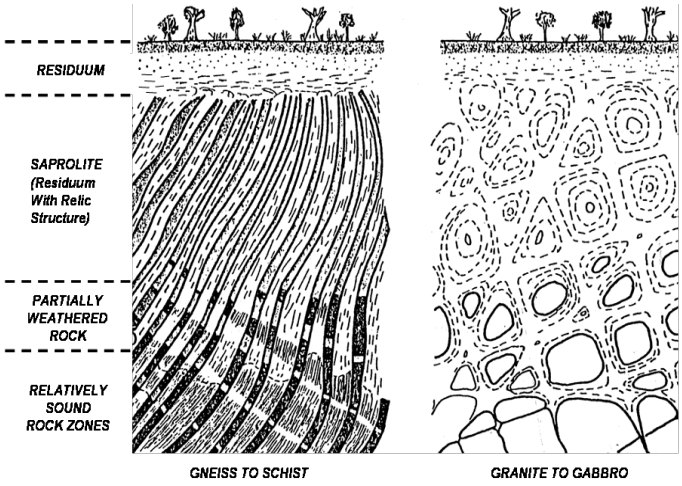


Figure 3-2: Typical Piedmont Weathering Profiles

Water is typically present in the residual soils and within fractures in the PWR or underlying bedrock in the Piedmont. On upland ridges in the Piedmont, water may or may not be present in the residual soils above the PWR and bedrock. Fluctuations in water levels are typical in residual soils and PWR in the Piedmont, depending on variations in precipitation, evaporation and surface water runoff. Seasonal high water levels are expected to occur during or just after the typically wetter months of the year (November through April).

Based on our knowledge of the site, portions of the natural geological profile of the site have been modified by past grading activities including the placement of fill. Fill soils can vary in composition and consistency, and the engineering characteristics of these soils can be difficult to predict. Although there is no specific correlation between the degree of compaction of existing fill and the results of standard penetration testing, a qualitative assessment of existing fill can often be made based on visual observation of the fill materials sampled in the borings and the general magnitude of the penetration test values.

3.2 Subsurface Conditions

Subsurface conditions as indicated by the borings generally consist of a layer of topsoil or asphalt underlain by fill soils, residual soils, PWR, and mass rock. The generalized subsurface conditions at the site are described below. For more detailed soil descriptions and stratifications at a particular boring location, the respective boring log should be reviewed. The elevations indicated on the boring logs were obtained from Google Earth™ and should be considered approximate. The northings and eastings indicated on the boring logs should also be considered approximate.

Surface Materials: Borings B-1, B-3, B-4, and B-9 through B-12 encountered approximately 2 to 4 inches of topsoil. Borings B-2, B-5 through B-8, and B-13 through B-15 encountered approximately 7 to 12 inches of asphalt. Actual thicknesses of surface materials will vary along the alignment.

Fill Soils: Existing fill soil was encountered underlying the surficial materials in Borings B-1, B-2, B-3, B-6 through B-10, B-12, and B-13 to depths ranging from about 2.5 and 4 feet. The fill soil consisted of firm to very stiff sandy

silt (USCS classification ML), sandy lean clay (CL), and sandy elastic silt (MH) and loose to dense clayey sand (SC) and silty sand (SM). The SPT N-values ranged from 6 to 47 blows per foot (bpf) in the fill soil, and the majority of the fill soil was noted as moist. Boring B-3 was terminated in fill at a depth of 4 feet.

Residual Soils: Residual soils were encountered underlying the surficial materials or the fill soils in each of the borings, except for B-1, B-2, and B-14. The residuum generally consisted of very soft to very stiff sandy silt (ML), sandy lean clay (CL), and sandy elastic silt (MH) and medium dense to dense clayey sand (SC) and silty sand (SM). SPT N-values ranged from 2 to 36 bpf in the residual soils, and these residual soils were noted as dry to moist, except B-2 which was noted as wet.

Partially Weathered Rock: Partially Weathered Rock (PWR) was encountered in Borings B-1, B-5, B-8, B-13, and B-14. The PWR was first encountered at depths ranging from 1 to 6 feet below the existing ground surface. When sampled, the PWR generally broke down into silty sand.

Auger Refusal Material: Borings B-1, B-5, B-8, B-13, and B-14 were terminated prior to reaching their planned drilling depths upon encountering auger refusal at depths ranging from 2.2 to 6.8 feet below the existing ground surface. Auger refusal is a relative term used to define material that could not be penetrated with the drilling equipment used at the site. Auger refusal may result from the presence of boulders, rock ledges, lenses, or seams, or the top of parent bedrock. Rock coring, which was beyond the scope of this project, would be required to confirm the type and continuity of the refusal material. However, based on the conditions encountered across the site, we anticipate that the auger refusal material is the top of parent bedrock.

Groundwater Levels: Groundwater was not encountered in any borings at the completion of drilling operations. Groundwater levels tend to fluctuate with seasonal and climatic variations, and also with some types of construction operations. Therefore, groundwater may be encountered during construction at depths not indicated by the borings.

4.0 General Recommendations

Our conclusions and recommendations are based on the project information outlined previously and, on the data, obtained from the field and laboratory testing program. If the proposed alignment is changed or significantly differs from the outlined, or if conditions are encountered during construction that differ from those encountered by the soil test borings, S&ME requests the opportunity to review our recommendations based on the new information and make any necessary changes.

4.1 Existing Underground Utilities

Based on our site reconnaissance, we understand that existing utility lines are currently located near the planned alignment. These utility lines can provide a conduit for water to enter excavations; therefore, special attention should be given to the proximity of these lines to the construction areas and adequate protection provided to prevent surface water from entering and ponding in the excavations. Additionally, care should be taken as to not damage the utility lines during construction.

Excavations resulting from removal of existing utility lines should be backfilled with properly compacted structural fill as outlined later in this report. This is of particular importance if new utilities will bear in backfilled trench excavations. For any utilities that are not removed, care should be taken as to not damage the utility lines during construction. As such, it may be prudent to have a detailed Subsurface Utility Engineering (SUE) survey performed (if it has not already been performed) prior to final design and construction to identify the locations and depths of existing utilities. Final designs and construction plans can be adjusted to avoid existing underground utilities or plan for their removal/protection accordingly.

4.2 Site Preparation

Surficial topsoil, pavements, debris, and other deleterious materials should be removed a minimum of 5 feet from the area to reduce the potential of these materials from entering the excavation and/or being mixed with the soils to be used as backfill, where possible.

4.3 Excavations

PWR was encountered in Borings B-1, B-5, B-8, B-13, and B-14. The PWR was first encountered at depths ranging from 1 to 6 feet below the existing ground surface. These five borings also encountered auger refusal material at depths ranging from 2.2 to 6.8 feet below the existing ground surface.

It must be emphasized that the depth and location of weathered rock, boulders, and mass rock varies erratically in the Piedmont Physiographic Province. In addition, the transition from residual soil to rock can be very gradual or very abrupt. The following presents our comments regarding excavation of these various materials based on our experience which includes that excavation of PWR and rock is dependent upon the equipment and methods used by the contractor and the diligence used for excavation of this material. These items should be agreed upon and understood by all parties prior to grading.

Low to High Consistency Fill and Residual Soils
These materials can be excavated by routine earthmoving equipment. That is, local excavation for shallow utility trenches can be accomplished by a heavy backhoe or tracked excavator.

Partially Weathered Rock
Our experience in this geological area indicates that the upper 2 to 3 feet of PWR, and lenses of PWR, can generally require the use of pneumatic hammers, hydraulic hammers, or blasting to excavate in confined excavations.

Mass Rock
The results of the excavation below the refusal levels in the borings should be expected to require the use of rock excavation measures, including pneumatic tools, hoe ram attachments, and/or blasting. We suggest the following clause for rock definition be considered for use in preparing project specifications:

> Trench Excavation - Any material which cannot be excavated with a Caterpillar 345 or equivalent, occupying an original volume of at least ½ cubic yard or more, and which requires blasting or other rock excavation methods.

If PWR, rock, or boulders are encountered at pipe bearing elevation, over-excavation of these materials may be required foot and then material should be replaced with properly compacted structural fill. Replacement of these materials will help alleviate excessive stresses that may cause damage to pipes caused by the differential bearing conditions.

Temporary excavations to construct the new water line should be shored and braced or the slopes flattened (laying back) to obtain a safe working environment. Excavations should be sloped or shored in accordance with local, state and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. Soils consistent with OSHA type B and C soils were encountered at the site. The contractor's competent person should evaluate the soil types in regard to these safety standards. We recommend that all excavated soils be placed away from the edges of the excavation, at a distance equaling or exceeding the depth of the excavation. This should be determined during excavation by the contractor's competent person. The contractor is solely responsible for site safety; this information is provided only as a service and under no circumstances should we be assumed responsible for construction site safety.

4.4 Temporary Dewatering

Groundwater was not at the termination of drilling. Depending on the excavation depths, temporary dewatering may be required during installation at the crossing. The contractor should be prepared to implement dewatering methods, if needed. Water levels tend to fluctuate with seasonal and climatic variations, as well as with some types of construction operations. Water may be encountered during construction at depths not indicated during this study.

Temporary dewatering can be accomplished through temporary excavations and sump pumps. Pumping from the sumps should be maintained continuously until fill placement is a minimum of 3 feet above the encountered water level. At no time should pumping be performed directly beneath the exposed pipe subgrade. Erosion and sediment control measures such as pumping through silt bags, temporary sediment traps, etc., should be incorporated into the construction plans.

Control of surface water at the site to reduce the potential from water collection in the excavations will also be critical. Positive site drainage should be maintained away from working areas at all times to prevent ponding of water.

4.5 Fill Material and Placement

All fill used for backfilling should consist of a clean (free of organics and debris) soil. The proposed fill should have a maximum dry density of at least 90 pounds per cubic foot as determined by a standard Proctor compaction test, ASTM D698. All fill should be placed in loose lifts not exceeding eight inches in thickness. The fill should be compacted to a minimum of 95 percent of its Standard Proctor maximum dry density and within 3 percent of the material's optimum moisture content. We recommend that field density tests, including one-point Proctor verification tests, be performed on the fill as it is being placed at a minimum frequency of one per lift while backfilling installation pit areas.

Backfilling around the pipe should be conducted in accordance with the pipe manufacturer's recommendations. Typically, backfill on the sides of the pipe should be brought up simultaneously to prevent differential loading on

the pipe. During backfilling, care should be taken to prevent over-compaction of the backfill, as this could result in increased lateral stresses against the pipe. Care should be taken to limit the maximum particle size to 3 inches within 18 inches of the pipe to avoid point loading the pipe, unless otherwise specified in the pipe manufacturer's specifications.

Based on the results of the soil test borings performed and our experience with similar type materials, the soils encountered appear suitable for re-use as fill below/around the pipes provided they are free of organics.

As excavations approach the water table, the moisture content of the soils will typically become higher and it will be difficult to achieve proper compaction. The soils may also become moist due to weather conditions and on-going construction activities. Therefore, moisture conditioning ("drying back" or "wetting") of the soils may be required prior to re-use as structural fill.

5.0 Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

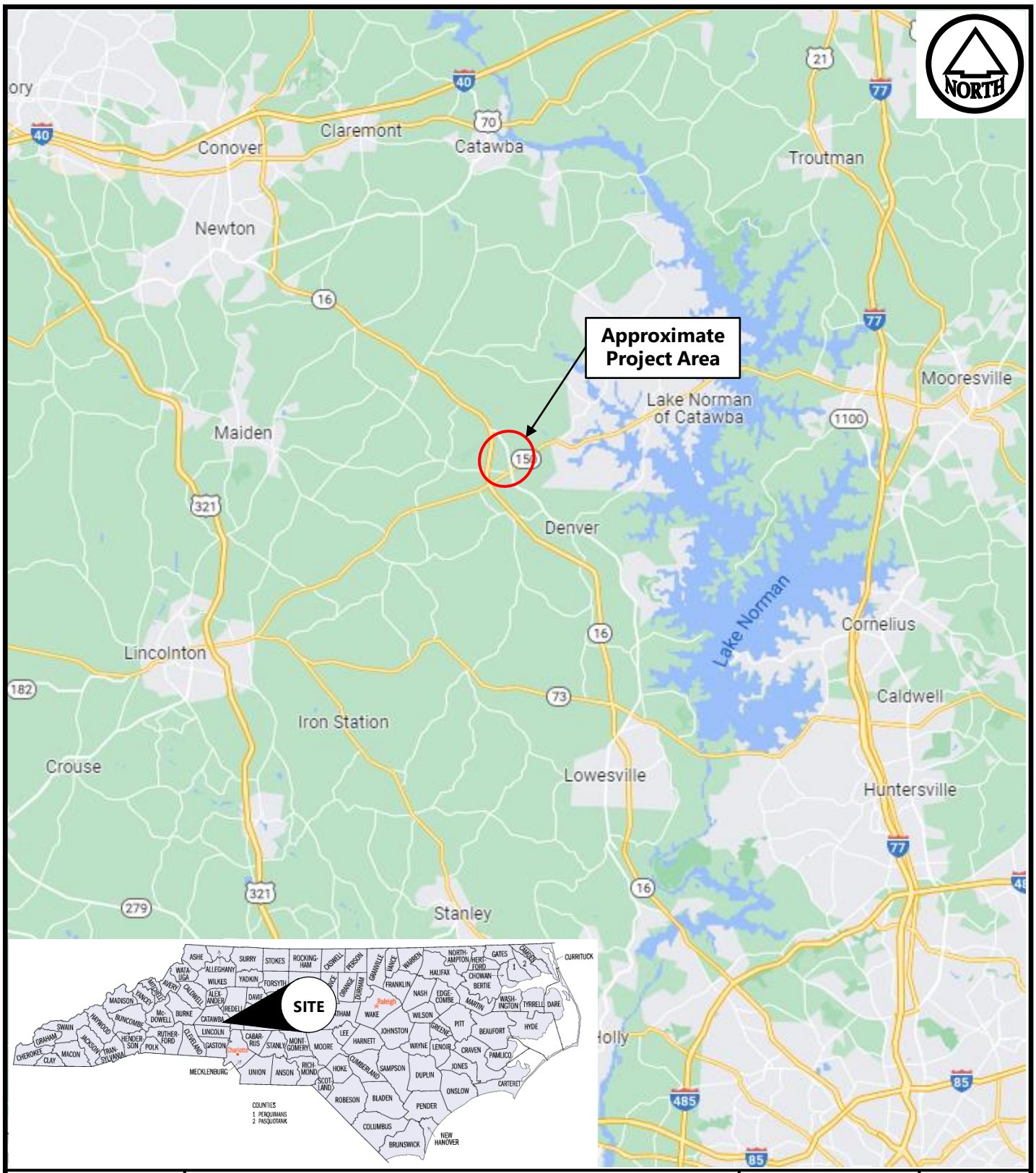
We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

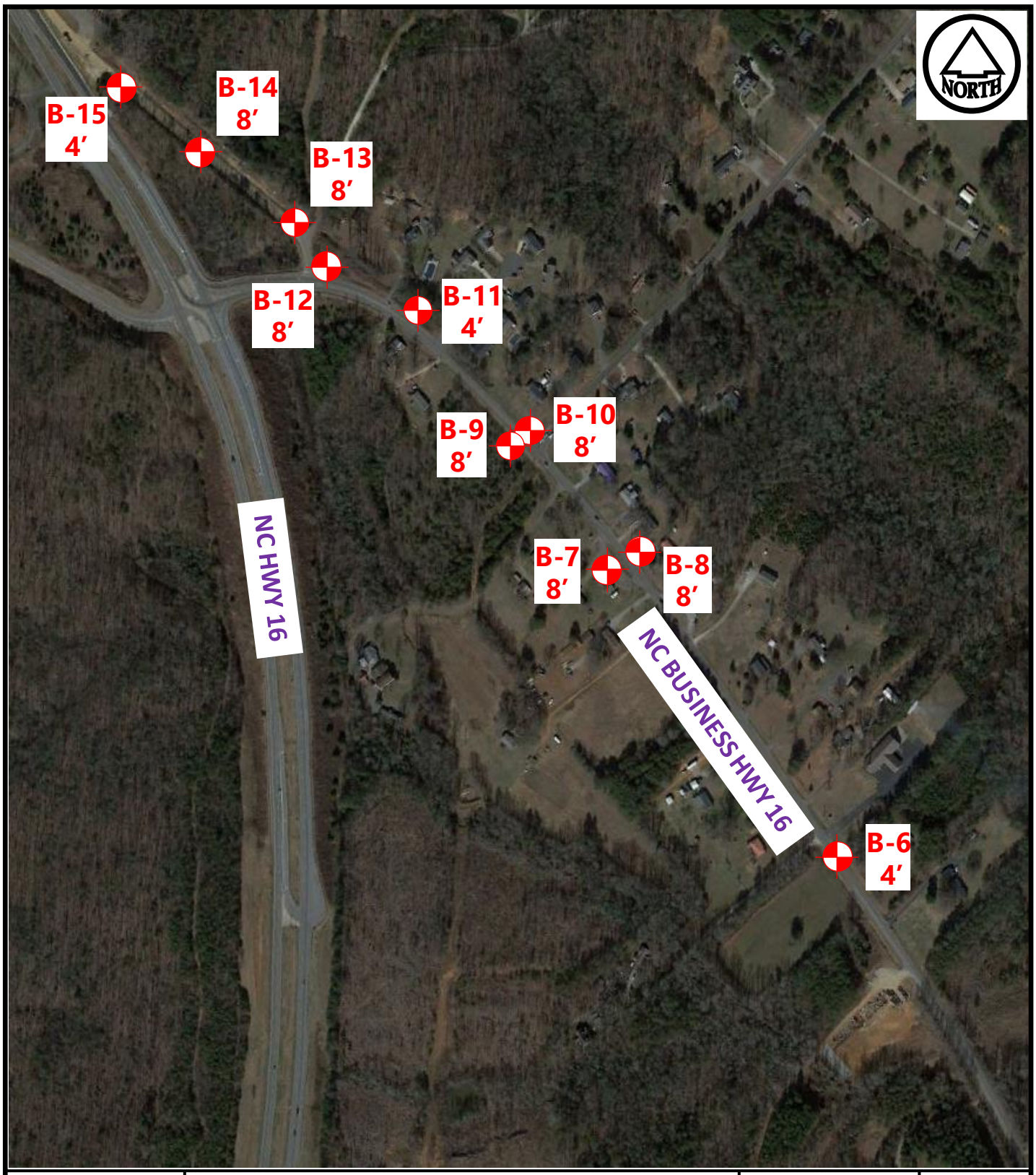
Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Appendix



	SITE VICINITY PLAN **HIGWAY 16 WATERLINE** NC BUSINESS HIGHWAY 16 MAIDEN, CATAWBA, NORTH CAROLINA	SCALE: NTS DRAWN BY: BRK CHECKED BY: DAB	FIGURE NO. 1
	PROJECT NO.: 219328	DATE: AUGUST 2022	



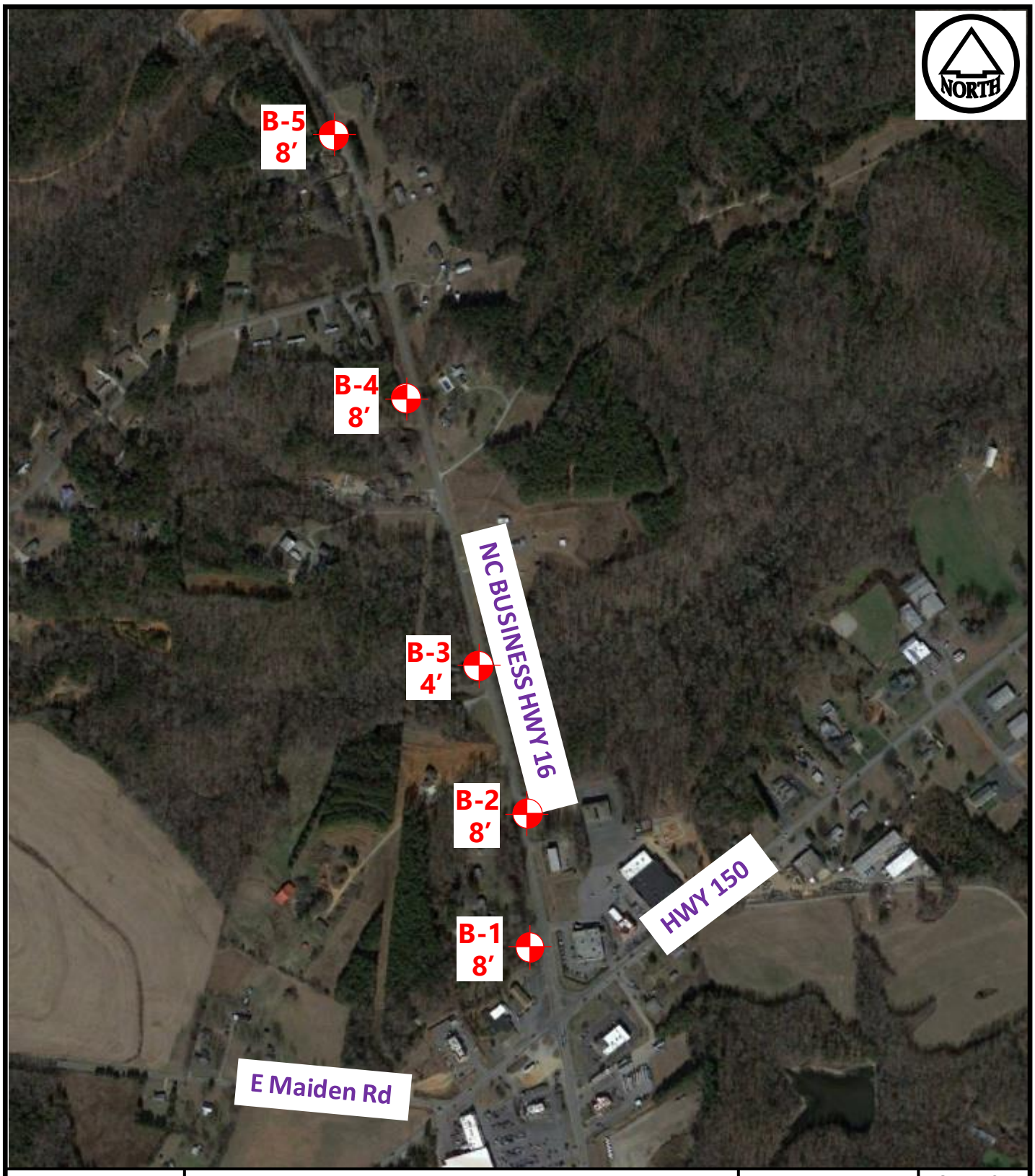
BORING LOCATION PLAN

HIGHWAY 16 WATERLINE

NC BUSINESS HIGHWAY 16

MAIDEN, CATAWBA COUNTY, NORTH CAROLINA

PROJECT NO.:	219328
SCALE:	NTS
DRAWN BY:	BRK
CHECKED BY:	DAB
DATE:	AUGUST 2022
FIGURE NO.	2a



	BORING LOCATION PLAN **HIGHWAY 16 WATERLINE** NC BUSINESS HIGHWAY 16 MAIDEN, CATAWBA COUNTY, NORTH CAROLINA	SCALE: NTS DRAWN BY: BRK CHECKED BY: DAB	FIGURE NO. 2b
	PROJECT NO.: 219328	DATE: AUGUST 2022	

TEST BORING LOG LEGEND

FINE AND COARSE GRAINED SOIL INFORMATION

COARSE GRAINED SOILS (SANDS AND GRAVELS)

N	Relative Density
0-4	Very Loose
5-10	Loose
11-30	Medium Dense
31-50	Dense
Over 50	Very Dense

FINE GRAINED SOILS (CLAYS AND SILTS)

N	Consistency	PPV, tsf
0-2	Very Soft	0.0-0.25
3-4	Soft	0.25-0.5
5-8	Firm	0.5-1.0
9-15	Stiff	1.0-2.0
16-30	Very Stiff	2.0-4.0
Over 30	Hard	4.0+

PARTICLE SIZE

Boulders	Greater than 300 mm (12")
Cobbles	75 mm—300 mm (3-12")
Gravel	4.75 mm—75 mm (3/16-3")
Coarse Sand	2 mm—4.74 mm
Medium Sand	.425 mm—2 mm
Fine Sand	0.075 mm—0.425 mm
Silts and Clays	Less than 0.075 mm

The STANDARD PENETRATION TEST as defined by ASTM D 1586 is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D. / 2.0-inch O.D. split barrel sampler is driven three 6-inch increments with a 140 lb. hammer falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The blow counts required to drive the sampler the final two 6-inch increments are added together and designated the N-value defined in the above tables.

ROCK PROPERTIES

RQD

Percent RQD	Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

ROCK HARDNESS

Very Hard	Rock can be broken by heavy hammer blows.
Hard	Rock cannot be broken by thumb pressure, but can be broken by moderate hammer blows.
Moderately Hard	Small pieces can be broken off along sharp edges by considerable thumb pressure; can be broken with light hammer blows.
Soft	Rock is coherent but breaks very easily with thumb pressure at sharp edges and crumbles with firm hand pressure.
Very Soft	Rock disintegrates or easily compresses when touched; can be hard to very hard soil.

KEY

Undisturbed Sample

Standard Penetration Test Sample

Rock Core Sample

Core Diameter (I.D.)	Inches
BQ	1-7/16
NQ	1-7/8
HQ	2-1/2

$$\text{RQD} = \frac{\text{Sum of 4" and Longer Rock Pieces Recovered}}{\text{Length of Core Run}} \times 100$$

(Rock Quality Designation)

$$\text{REC} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

(Recovery)

SOIL PROPERTY SYMBOLS

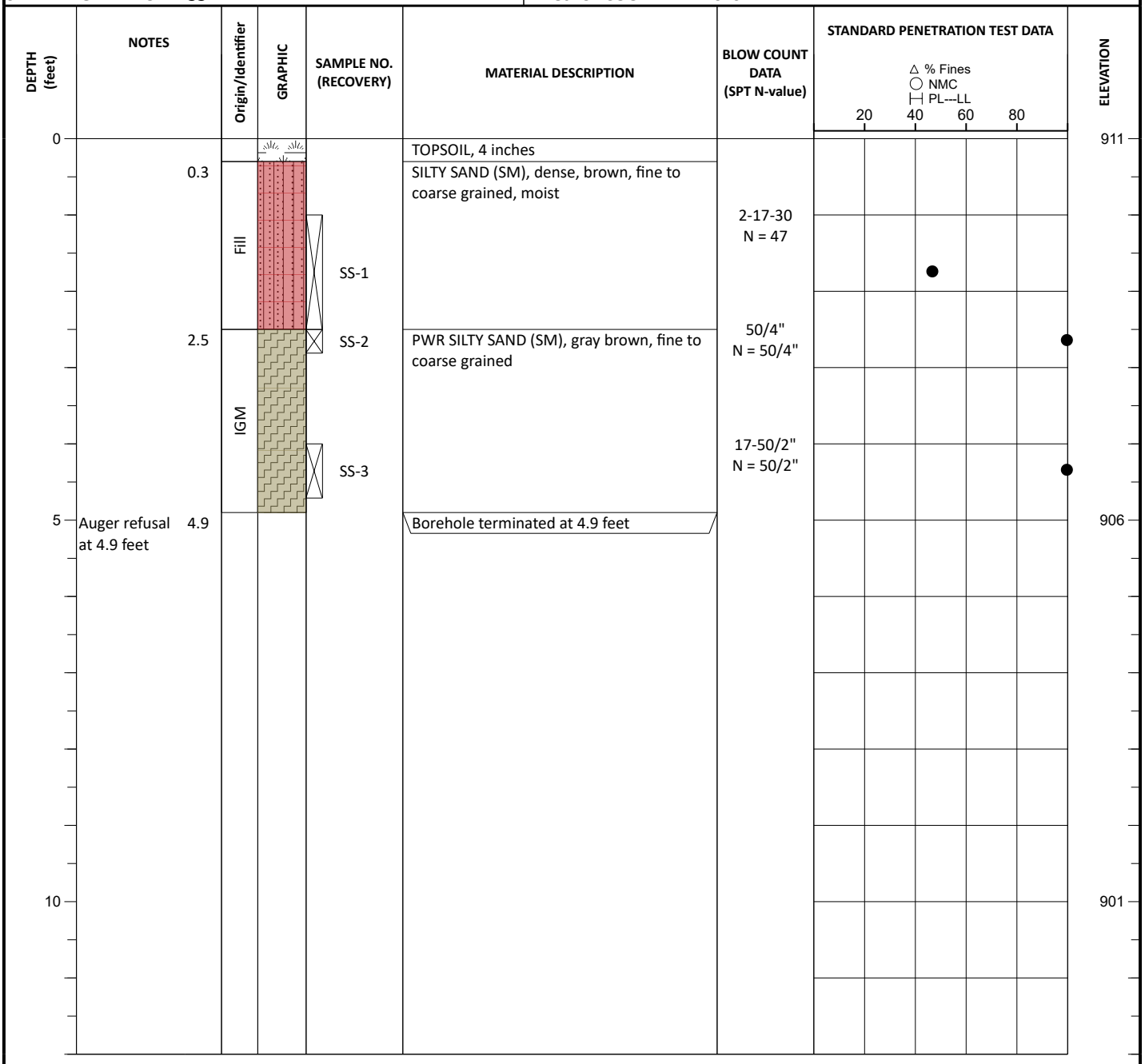
N	Standard Penetration, BPF
NMC	Natural Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plasticity Index, %
PPV	Pocket Penetrometer Value, TSF
Qu	Unconfined Compressive Strength, TSF
Yd	Dry Unit Weight, PCF
F	Fines Content

At Time of Drilling (ATD) — Groundwater observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.

End of Drilling — Groundwater measurement soon after all drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.

After Drilling — Groundwater measurements made in a borehole hours to days after drilling is complete. Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-01 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 911 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 4.9 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 664978.8 **EASTING:** 1386284.0
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-02 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 879 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 665659.5 **EASTING:** 1386197.0
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					ASPHALT, 8 inches			879
0.7		Fill		SS-1	SANDY LEAN CLAY (CL), very stiff, red brown, dry	28-10-9 N = 19		
2.5		Residuum		SS-2	SANDY SILT (ML), trace rock fragments, stiff to very stiff, red brown, wet	7-8-6 N = 14		
5				SS-3		7-15-6-9 N = 21		874
				SS-4	*very soft*	3-1-1-3 N = 2		
8.0					Borehole terminated at 8.0 feet			
10								869

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

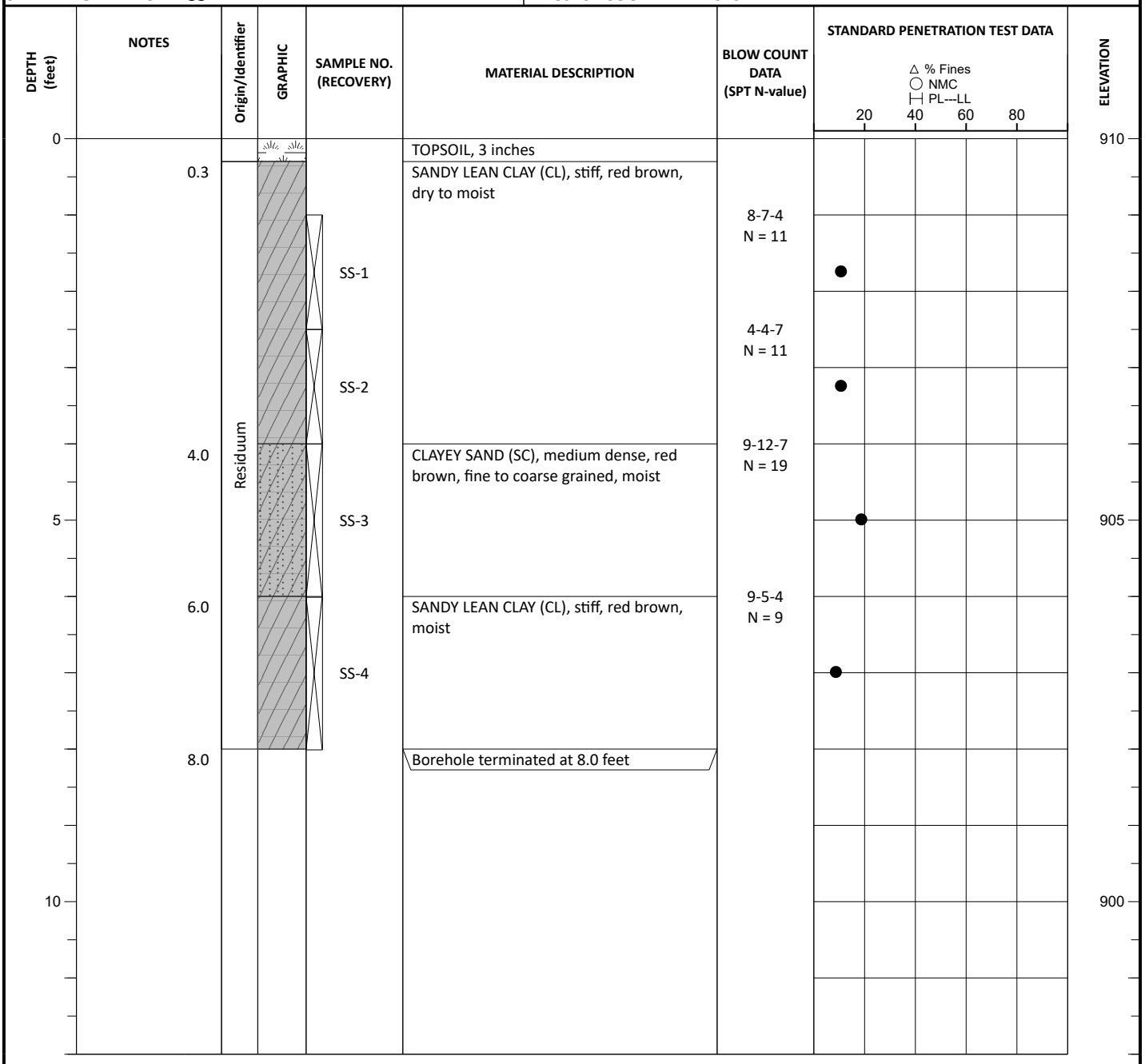
PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-03 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 858 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 4.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 666232.6 **EASTING:** 1386090.5
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80	ELEVATION
0								858
0.2					TOPSOIL, 2 inches SILTY SAND (SM), loose, brown, fine to coarse grained, moist			
		Fill		SS-1		2-4-4 N = 8	●	
2.5					SANDY ELASTIC SILT (MH), firm, red brown, moist	2-3-3 N = 6		
				SS-2			●	
4.0					Borehole terminated at 4.0 feet			
5								853
10								848

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-04 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 910 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 667476.7 **EASTING:** 1385856.7
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	



GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-05 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 903 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 6.8 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 668628.5 **EASTING:** 1385593.1
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					ASPHALT, 10 inches			903
0.8		Residuum		SS-1	CLAYEY SAND (SC), medium dense, brown red, fine to coarse grained, moist	21-6-8 N = 14		
2.5		Residuum		SS-2	SILTY SAND (SM), medium dense to dense, tan gray, fine to coarse grained, moist to dry	7-8-7 N = 15		
5		Residuum		SS-3		20-14-18-11 N = 32		898
6.0		IGM		SS-4	PWR, sampled as SILTY SAND (SM), gray brown, fine to coarse grained	25-50/4" N = 50/4"		
6.8	Sampler refusal at 6.8 feet				Borehole terminated at 6.8 feet			
10								893

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-06 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 903 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 4.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 669765.7 **EASTING:** 1384986.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					ASPHALT, 7 inches			903
0.6		Fill		SS-1	SANDY LEAN CLAY (CL), trace gravel, stiff, black brown, moist	18-8-5 N = 13	●	
2.5		Residuum		SS-2	SANDY ELASTIC SILT (MH), stiff, red brown, moist	5-5-4 N = 9	●	
4.0					Borehole terminated at 4.0 feet			
5								898
10								893

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-07 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 947 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 670731.0 **EASTING:** 1384366.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80	ELEVATION
0					ASPHALT, 11 inches			947
0.9		Fill		SS-1	SILTY SAND (SM), trace gravel, medium dense, black, fine to coarse grained, moist	7-5-6 N = 11	●	
2.5		Residuum		SS-2	SILTY SAND (SM), medium dense to dense, gray brown, fine to medium grained, moist	8-13-16 N = 29	●	
5				SS-3		15-20-16-13 N = 36	●	942
				SS-4		9-7-8-6 N = 15	●	
8.0					Borehole terminated at 8.0 feet			
10								937

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-08 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 948 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 5.4 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 670769.1 **EASTING:** 1384392.3
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80	ELEVATION
0					ASPHALT, 8 inches			948
		Fill		SS-1	CLAYEY SAND (SC), trace gravel, medium dense, black red, fine to coarse grained, moist	26-7-9 N = 16	●	
2.5		Residuum		SS-2	SANDY SILT (ML), very stiff, brown red, moist	6-7-16 N = 23	●	
				SS-3		17-50/5" N = 50/5"	●	
4.5		IGM			PWR, sampled as SILTY SAND (SM), gray black, fine to coarse grained			
5								943
5.4	Auger refusal at 5.4 feet				Borehole terminated at 5.4 feet			
10								938

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-09 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 963 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 671121.7 **EASTING:** 1384050.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					TOPSOIL, 3 inches			963
0.3		Fill		SS-1	SANDY LEAN CLAY (CL), trace gravel, stiff, black red, moist	5-6-3 N = 9	●	
2.5		Residuum		SS-2	SANDY ELASTIC SILT (MH), firm, red black, moist	2-3-4 N = 7	●	
4.0				SS-3	SANDY ELASTIC SILT (MH), firm, red, moist	3-3-3-3 N = 6	●	
5								958
6.0				SS-4	SANDY SILT (ML), stiff, red, moist	4-5-7-3 N = 12	●	
8.0					Borehole terminated at 8.0 feet			
10								953

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-10 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 965 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 671155.5 **EASTING:** 1384088.7
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20, 40, 60, 80)	ELEVATION
0					TOPSOIL, 2 inches			965
0.2		Fill		SS-1	CLAYEY SAND (SC), trace gravel, loose, red brown, fine to coarse grained, dry	2-3-4 N = 7	●	
2.5		Residuum		SS-2	SANDY LEAN CLAY (CL), stiff, red brown, moist	3-5-5 N = 10	●	
4.0				SS-3	SANDY SILT (ML), firm to stiff, red brown, moist	4-2-4-3 N = 6	●	
5								960
				SS-4		4-4-5-3 N = 9	●	
8.0					Borehole terminated at 8.0 feet			
10								955

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-11 *Sheet 1 of 1*
DATE DRILLED: 08/04/2022	**ELEVATION:** 985 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 4.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 671497.9 **EASTING:** 1383764.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80	ELEVATION
0					TOPSOIL, 4 inches			985
0.3		Residuum			SANDY SILT (ML), firm, tan brown, moist to dry			
				SS-1		2-2-3 N = 5	●	
				SS-2		3-4-4 N = 8	●	
4.0					Borehole terminated at 4.0 feet			
5								980
10								975

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/04/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-12 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 981 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 8.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Hole Closure Device	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 671675.3 **EASTING:** 1383447.6
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0								981
0.2		Fill		SS-1	TOPSOIL, 2 inches SANDY LEAN CLAY (CL), very stiff, brown, dry	8-7-10 N = 17		
2.5		Fill		SS-2	CLAYEY SAND (SC), loose, brown, fine to coarse grained, dry	8-6-3 N = 9		
4.0		Residuum		SS-3	SANDY SILT (ML), firm to stiff, red brown, moist	6-4-3-5 N = 7		
5								976
		Residuum		SS-4		4-8-4-5 N = 12		
8.0					Borehole terminated at 8.0 feet			
10								971

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-13 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 1013 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 6.7 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 671834.6 **EASTING:** 1383382.2
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					ASPHALT, 12 inches			1013
1.0		Fill		SS-1	SANDY SILT (ML), trace gravel, firm, black red, moist	3-4-4 N = 8	●	
2.5		Residuum		SS-2	SANDY SILT (ML), very stiff to hard, red brown, moist	6-11-9 N = 20	●	
5				SS-3		8-15-17-12 N = 32	●	1008
6.0		IGM		SS-4	PWR SILTY SAND (SM), gray brown, fine to coarse grained	38-50/2" N = 50/2"	●	
6.7	Sampler refusal at 6.7 feet				Borehole terminated at 6.7 feet			
10								1003

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-14 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 1031 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 2.2 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 672025.8 **EASTING:** 1383116.8
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA (△ % Fines, ○ NMC, ⊢ PL---LL; 20 40 60 80)	ELEVATION
0					ASPHALT, 12 inches			1031
		IGM		SS-1	PWR SILTY SAND (SM), tan brown, fine to coarse grained	17-50/5" N = 50/5"		
1.0								
2.2	Auger refusal at 2.2 feet				Borehole terminated at 2.2 feet			
5								1026
10								1021

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal

PROJECT:	Highway 16 Waterline S&ME Project No. 219328	BORING LOG: B-15 *Sheet 1 of 1*
DATE DRILLED: 08/05/2022	**ELEVATION:** 1045 ft	**NOTES:** Coordinates and elevations were estimated from Google Earth and should be considered approximate.
DRILL RIG: CME-55 (Truck)	**DATUM:** NAVD88	
DRILLER: Ted Miller	**BORING DEPTH:** 4.0 ft	
HAMMER TYPE: Automatic hammer	**CLOSURE:** Cuttings with Pavement Patch	
DRILLING METHOD: 3-1/4" HSA	**LOGGED BY:** Brandon Kebea	**NORTHING:** 672244.2 **EASTING:** 1382874.5
SAMPLING METHOD: SS	**PROJECT COORDINATE SYSTEM -** NAD 1983 StatePlane North Carolina FIPS 3200 Feet	

DEPTH (feet)	NOTES	Origin/Identifier	GRAPHIC	SAMPLE NO. (RECOVERY)	MATERIAL DESCRIPTION	BLOW COUNT DATA (SPT N-value)	STANDARD PENETRATION TEST DATA △ % Fines ○ NMC ⊢ PL---LL 20 40 60 80	ELEVATION
0					ASPHALT, 12 inches			1045
1.0		Residuum		SS-1	SANDY SILT (ML), very stiff, red brown, dry to moist	18-8-15 N = 23	●	
				SS-2		15-12-7 N = 19	●	
4.0					Borehole terminated at 4.0 feet			
5								1040
10								1035

GROUNDWATER		DATE	DEPTH (FT)	REMARKS
ATD	▽	08/05/2022		not encountered
END OF DRILLING	▼			
AFTER DRILLING	▼			
AFTER DRILLING	▼			

GROUNDWATER DEPTHS ARE NOT EXACT AND MAY VARY SUBSTANTIALLY FROM THOSE INDICATED. ATD = AT TIME OF DRILLING
LL=Liquid Limit, PL = Plastic Limit, NMC = Natural Moisture Content, PPV = Pocket Penetrometer (tsf), PTV = Pocket Torvane (tsf), AR = Auger Refusal