WithersRavenel
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PROJECT MANUAL

FINAL SPECIFICATIONS – FOR BIDDING – NOT FOR CONSTRUCTION

for the

Town of Trent Woods

Trent Woods Stormwater Improvements – Coquina Cir. & Carteret Dr.

November 11, 2024

WithersRavenel Project No. 24-0504

NORTH CAROLINA PROFESSIONAL SEAL 042669 ENGINEER WESLEY R. PERRY 11-8-2024

Wesley “Ross” Perry, PE, CFM

WithersRavenel

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ADVERTISEMENT FOR BIDS

Project: Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.
Owner: Town of Trent Woods
898 Chelsea Road, Trent Woods, NC 28562
Engineer: WithersRavenel, Inc.
137 S. Wilmington St, Suite 200, Raleigh, NC 27601

Pursuant to NC G.S. 143-129 and 2 CFR Part 200 of Federal Regulations, **sealed Bids for the construction of the Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr. will be received by Town of Trent Woods, at Town Hall, 898 Chelsea Road, Trent Woods, NC 28562, until 2:00 PM local time on December 17, 2024**, at which time the Bids received will be publicly opened and read. Bids may be submitted by mail or courier. Bids received after this time will not be accepted. While there is an option to attend the Bid Opening virtually, hardcopy bids are still required to be received. To participate in the virtual bid opening, you must email Lindsay Kalmus at lkalmus@withersravenel.com no later than 24 hours prior to the start of the meeting.

The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

A pre-bid conference will be held at 11:00 local time on November 21, 2024 via online videoconference. Interested parties are encouraged to attend this conference to review the plans, ask for additional information or clarification, and to visit the project site. Bidders are encouraged to tour the project area prior to the pre-bid meeting. Attendance at the Pre-Bid Conference is highly encouraged but is not mandatory. To participate in the virtual pre-bid conference, you must email Lindsay Kalmus at lkalmus@withersravenel.com no later than 24 hours prior to the start of the meeting.

Complete digital bidding documents are available at http://withersravenel.com/bid/ or https://www.questcdn.com/. You may download the digital documents for $25 by inputting Quest project 9377961 on the website's search page. Please contact QuestCDN.com at (952) 233-1632 or info@questcdn.com for assistance in membership registration, downloading, and working with this digital project information.

All questions related to this bid shall be submitted in writing to Lindsay Kalmus at lkalmus@withersravenel.com **prior to 2:00 pm local time on November 29th, 2024** to receive consideration. Questions received after that time may not be answered or accepted. A Final Addendum will be provided prior to the Bid Date.

It is the bidder's responsibility to ensure that they are included on the project contact lists for addenda, meeting information, and other pertinent project updates. Bidders are responsible for the review of any addenda for the project and shall acknowledge the addenda on the bid form. To qualify, all bids shall be submitted using bid forms contained in the Contract Documents. Incomplete or segregated bids will not be accepted. All bids must be accompanied by a certified or cashier's check or bid bond in the amount of 5% of the total amount bid made payable to the Owner. No bid shall be withdrawn for a period of **60 consecutive calendar days** after bid opening except as provided in Instructions to Bidders. Bidders must be licensed contractors in the State of

North Carolina as required by the NCGS Chapter 87. The Owner reserves the right to reject any/all bids, to waive formalities, or to reject non-conforming, non-responsive, or conditional bids. The Owner reserves the right to award a contract to the lowest, responsive, responsible bidder or bidders, taking into consideration quality, performance, and time.

This project is funded with a portion of approximately $4.1M of Local Assistance for Stormwater Infrastructure (LASII) American Rescue Plan Act (ARPA) award from the NC Division of Water Infrastructure, approximately $855K of Clean Water State Revolving Funds (CWSRF), and potential other local funds.

The Owner is an Equal Opportunity Employer and encourages bidding by small, minority and female (M/WBE) contractors and does not discriminate on the basis of race, color, religion, sex, national origin, handicap/disability, age, or familial status. Bids from qualified disadvantaged business enterprise (DBE), and historically underutilized businesses (HUB) are encouraged. Bidders shall be required to submit with their Bids affidavits of “Good Faith Efforts” in the recruitment of Minority Businesses.

INSTRUCTIONS TO BIDDERS

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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 in the number and 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

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit, with the bid, (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Evidence of Bidder's authority to do business in the state where the Project is located

B. Bidder's state or other contractor license number, if applicable

C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others"

D. Other required information regarding qualifications

3.02 A Bidder's failure to submit required qualification information with the bid may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

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

4.01 *Site and Other Areas*

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

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:

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

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

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

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous 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. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder 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.

D. 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.

E. 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*

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

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

F. 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;

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

H. 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;

I. 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

J. 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 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 encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 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 less than seven days prior to the date for opening of

Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, 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 5% 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 one day longer than the number of days to bid withdrawal as described in Article 2 of the Bid Form, 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 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. 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 at least 15 days prior to the date for receipt of 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 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 All bidders shall submit to Owner with Bid a list of the Subcontractors or Suppliers proposed for the Work. If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.04 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 official address of the partnership 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 official address of the firm shall be shown.

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

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 official address of the joint venture 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 include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 15 – SUBMITTAL OF BID

15.01 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

TRENT WOODS STORMWATER IMPROVEMENT PROJECT - COQUINA CIR. & CARTERET DR.

A mailed Bid shall be addressed to:

Charles Tyson

Town of Trent Woods

898 Chelsea Road

Trent Woods, NC 28652

15.02 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 If within 72 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned; all in accordance with North Carolina General Stature 143-129.1. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner 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 whose bid is in the best interests of the Owner.

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 ten 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.

ARTICLE 22 – SALES AND USE TAXES

22.01 The Contractor shall pay all applicable sales, consumer, use and other similar taxes required by law. The Contractor is responsible for reviewing the pertinent State Statutes involving the sales tax and sales tax exemption and complying with all requirements. The Contractor shall include all Federal, State, and local taxes in his bid. The Contractor shall indemnify, defend and hold harmless, Owner, Engineer and their employees, agents and representatives from and against any and all claims, damages, losses, penalties, fines and tax liabilities whatsoever resulting from Contractor's failure to include such taxes in his bid, pay any such tax, or comply with any applicable tax requirements or statutes.

ARTICLE 23 – RETAINAGE

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

ARTICLE 24 – CONTRACTS TO BE ASSIGNED

24.01 Not Used

SECTION 00 03 00

INFORMATION AVAILABLE TO BIDDERS

The following information is available:

- SUE Vacuum Excavation Forms

Prior to reviewing the information and/or Report(s), interested Bidders will be required to sign a release form stating that it is understood the information is for general information purposes only; no warranties or guarantees are implied. A copy of the report(s) is attached to the end of this section.

"CONTRACTOR" hereby acknowledges and agrees that the following information and/or report(s) are provided by OWNER solely for general information purposes and are not part of the Contract Documents; no warranties or guarantees are implied.

CONTRACTOR: _____

(Name of Company)

Accepted By: _____

(Name of the CONTRACTOR's Representative)

Title: _____

(Title of the CONTRACTOR's Representative)

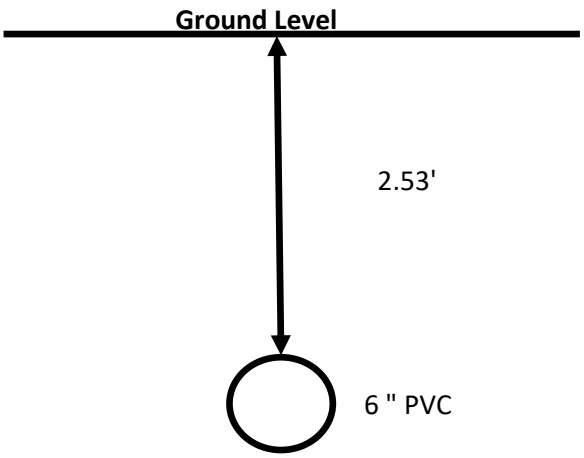
Date: _____

END OF SECTION

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Number	24-0504		**Test Hole #**	#1
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	9/25/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT, JR
Utility	**1**	**2**	**Notes:**	
Type	Water			
Size	6"			
Material	PVC			
Depth	2.53'			
Direction	SW - NE			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491530.625
Material			**Easting**	257795.478
Depth			**Elevation**	14.995'
Direction			**Pipe Elevation**	12.465'

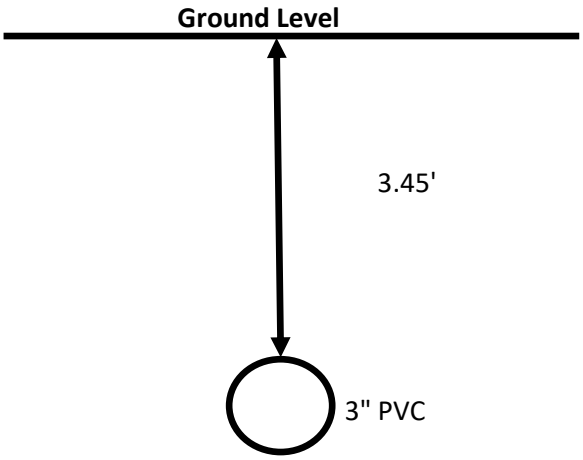


Datum Description:

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Number	24-0504		**Test Hole #**	#2
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	9/25/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT, JR
Utility	**1**	**2**	**Notes:**	
Type	Sewer Service			
Size	3"			
Material	PVC			
Depth	3.45'			
Direction	SW-NE			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491378.922
Material			**Easting**	2570880.215
Depth			**Elevation**	14.348'
Direction			**Pipe Elevation**	10.898'

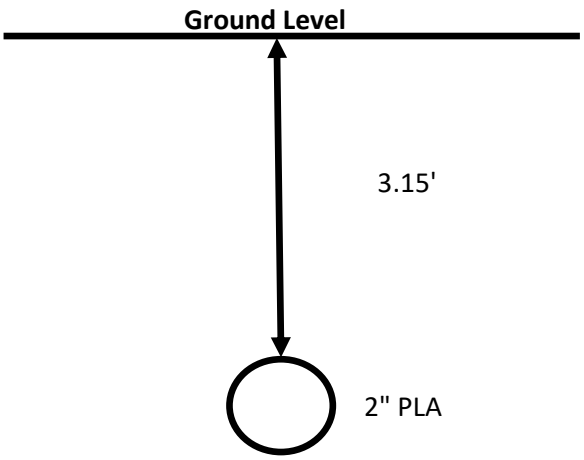


Datum Description:

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Number	24-0504		**Test Hole #**	#3
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	9/25/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT, JR
Utility	**1**	**2**	**Notes:**	
Type	Gas			
Size	2"			
Material	PLA			
Depth	3.15'			
Direction	N-S			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491380.277
Material			**Easting**	2570879
Depth			**Elevation**	14.314'
Direction			**Pipe Elevation**	11.164'

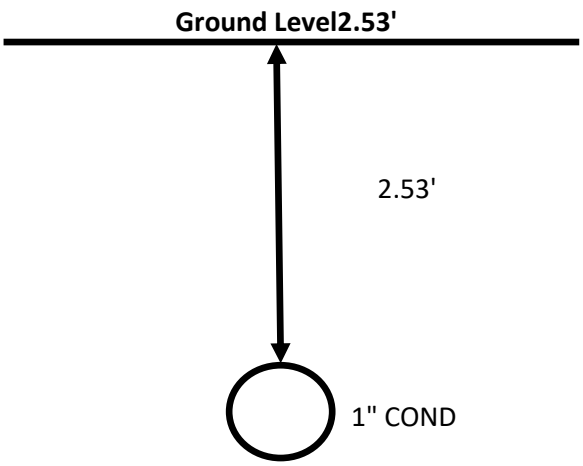


Datum Description:

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Number	24-0504		**Test Hole #**	#4
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	9/25/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT, JR
Utility	**1**	**2**	**Notes:**	
Type	Fiber Optic			
Size	1"			
Material	COND			
Depth	2.53'			
Direction	N-S			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491411.755
Material			**Easting**	2570909.058
Depth			**Elevation**	14.314'
Direction			**Pipe Elevation**	11.784'

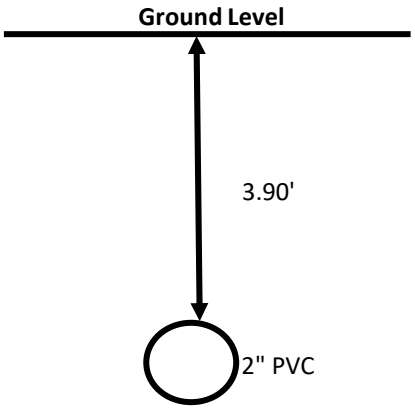


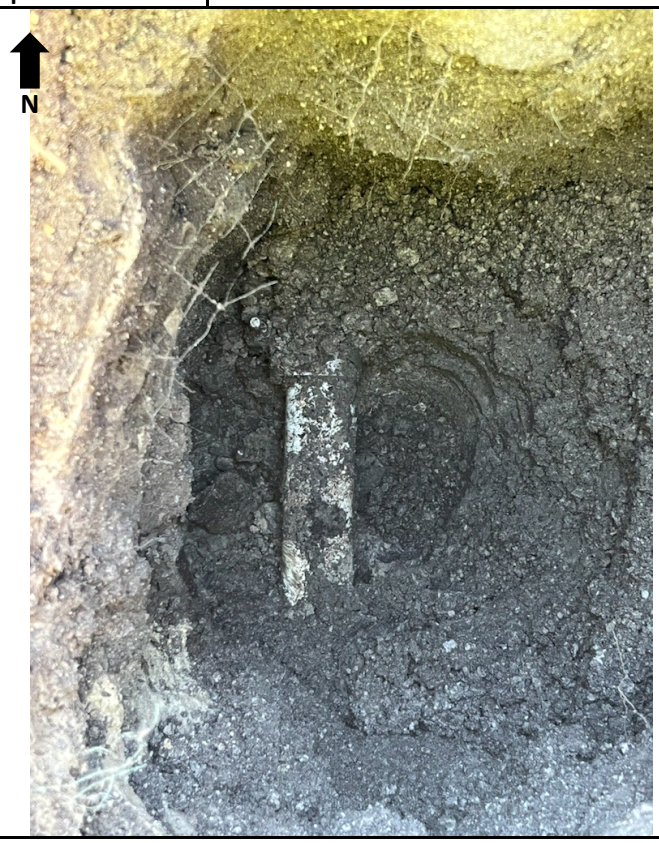
Datum Description:

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Numbe	24-0504		**Test Hole #**	#5
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	10/2/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT
Utility	**1**	**2**	**Notes:**	
Type	Water			
Size	2"			
Material	PVC			
Depth	3.90'			
Direction	N-S			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491386.663
Material			**Easting**	2570883.126
Depth			**Elevation**	14.766'
Direction			**Pipe Elevation**	10.866'



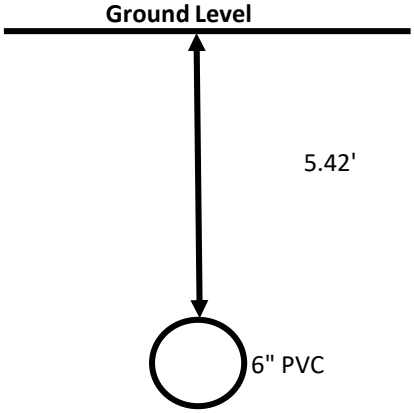


Datum Description:

WithersRavenel
Our People. Your Success.

Vacuum Excavation Form

Job Numbe	24-0504		**Test Hole #**	#6
Project	Trent Woods SW Improvement Project		**Soil Type**	Dirt
Client	WithersRavenel		**Surface Material**	Grass
Location	Coquina Cir., Trent Woods, NC		**Asphalt Thickness**	N/A
Date	10/2/2024		**Method Used**	Vacuum Excavation
			Field Crew	CB, ZT
Utility	**1**	**2**	**Notes:**	
Type	Sewer		Pipe was confirmed. No Picture due to hole collapsing and filling with ground water table.	
Size	6"			
Material	PVC			
Depth	5.42'			
Direction	N-S			
Utility	**3**	**4**		
Type			**Survey Company**	Withersravenel
Size			**Northing**	491315.943
Material			**Easting**	2570961.018
Depth			**Elevation**	13.952'
Direction			**Pipe Elevation**	8.532'



Datum Description:

SECTION 00 03 40

NON-COLLUSIVE AFFIDAVIT

_____ 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 affidavit, 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.

Dated: _____

(CONTRACTOR)

By: _____

State Of: _____

County Of: _____

Subscribed and sworn to before me this _____ Day of _____

Notary Public

My commission expires: _____

END OF SECTION

SECTION 00 03 50

AUTHORITY TO EXECUTE CONTRACT

If the Bidder is a Corporation, attach to this page a certified copy of corporate resolutions of the Board of Directors of the Corporation authorizing an officer of the Corporation to execute the Agreement contained within this document on behalf of the Corporation.

END OF SECTION

Town of Trent Woods
Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.

TABLE OF CONTENTS

Page

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Charles Tyson
Town of Trent Woods
898 Chelsea Road
Trent Woods, NC 28652

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 60 consecutive calendar 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 any thing of value likely to influence the action of a public official in the bidding process;

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

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

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

ARTICLE 5 – BASIS OF BID

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

See Attached Bid Form

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.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete within 90 consecutive calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 120 consecutive calendar days after the date when the Contract Times commence to run.

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; in an amount of five (5) percent (%) of the total price bid in the form of a (CIRCLE ONE):

Bid Bond

Certified Check

Cashier's Check

B. 00 03 00 - Information Available to Bidder's - Acknowledgement

C. 00 03 40 - Non-collusive Affidavit

D. 00 04 10 - Bid Form - Addenda Acknowledgement

E. 00 04 12 - E-Verify Affidavit

F. 00 04 20 – Bidders Qualifications Forms

G. Contractor License

H. 00 04 21 - DBE Affidavits (If Required)

1. Affidavit A - Listing of Good Faith Efforts
2. Affidavit B - Intent to Perform Contract With Own Workforce

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.: _____
(where applicable)

ITEMIZED BID TAB

TRENT WOODS STORMWATER IMPROVEMENT PROJECT - COQUINA CIR. & CARTERET DR.

BID DUE DATE: 02:00 P.M. ON TUESDAY, DECEMBER 17, 2024 **LAST REVISED: NOVEMBER 11, 2024**

ITEM NUMBER	SPECIFICATION	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
SITE PREPARATION						
1	03 00 00	MOBILIZATION	LS	1		
2	01 04 00	CONSTRUCTION SURVEYING	LS	1		
3	03 00 00	TEMPORARY TRAFFIC CONTROL	LS	1		
					SUBTOTAL - SITE PREPARATION	$0.00
EROSION CONTROL						
4	02 00 10	FURNISH, INSTALL AND MAINTAIN INLET PROTECTION	EA	12		
5	02 00 10	FURNISH, INSTALL AND MAINTAIN TEMPORARY STONE CHECK DAMS	TON	25		
6	02 00 10	FURNISH, INSTALL AND MAINTAIN TEMPORARY WATTLES	EA	6		
7	02 00 10	FURNISH AND INSTALL NCDOT APPROVED GEOTEXTILE FABRIC (PERMANENT)	SY	165		
8	02 00 10	FURNISH AND INSTALL CLASS "B" RIP-RAP ALONG OUTFALL DITCH	TON	150		
9	02 00 90	TEMPORARY SEEDING & MULCHING (AS NEEDED)	AC	0.50		
					SUBTOTAL - EROSION CONTROL	$0.00
DEMOLITION, REMOVALS AND ABANDONMENT						
10	02 00 00 & 03 00 00	SITE CLEARING (INCLUDES TREE REMOVAL ALONG OUTFALL DITCH)	LS	1.00		
11	02 00 00 & 03 00 00	REMOVE AND DISPOSE OF ASPHALT (ROADWAY & DRIVEWAYS)	SY	39		
12	02 00 00 & 03 00 00	REMOVE AND DISPOSE CONCRETE (DRIVEWAYS)	SY	73		
13	03 00 00	REMOVE AND DISPOSE EXISTING 4" PVC	LF	60		
14	03 00 00	REMOVE AND DISPOSE EXISTING 15" RCP	LF	245		
15	03 00 00	ABANDON IN PLACE EXISTING 15" RCP	LF	50		
16	03 00 00	REMOVE AND DISPOSE EXISTING 24" RCP	LF	15		
17	03 00 00	REMOVE AND DISPOSE EXISTING 18" CMP	LF	25		
18	03 00 00	REMOVE AND DISPOSE EXISTING CATCH BASINS	EA	5		
					SUBTOTAL - DEMOLITION, REMOVALS AND ABANDONMENT	$0.00
SITE WORK						
19	02 00 00, 02 00 20, 02 00 30, & 02 00 40	EARTHWORK TO INCLUDE: - EXCAVATE EXISTING ROADSIDE DITCHS AND OUTFALL DITCH - FINE GRADING OF ROADSIDE SWALES	LS	1		
20	02 00 50	FURNISH AND INSTALL ASPHALT PAVEMENT PATCH	SY	39		
21	02 00 50	FURNISH AND INSTALL CONCRETE DRIVEWAY APRONS	SY	73		
22	02 00 90	FURNISH AND INSTALL SOD	SY	2100		
23	03 00 00	FURNISH AND INSTALL REPLACEMENT LANDSCAPING (1 GAL SHRUB)	EA	18		
23	03 00 00	FURNISH AND INSTALL REPLACEMENT LANDSCAPING (10 GAL DÉCOR TREE)	EA	0		
					SUBTOTAL - SITE WORK	$0.00
STORMWATER IMPROVEMENTS						
24	02 00 70	FURNISH AND INSTALL 24" RCP	LF	755		
25	02 00 70	FURNISH AND INSTALL 3'X3' I.D. DROP INLET STRUCTURE (NCDOT 840.14)	EA	11		
26	02 00 70	FURNISH AND INSTALL 5'X3' I.D. DROP INLET STRUCTURE (NCDOT 840.14)	EA	1		
27	02 00 70	FURNISH AND INSTALL 24" FLARED END SECTION	EA	2		
28	02 00 70	FURNISH AND INSTALL HEADWALL (NCDOT 838.80)	EA	1		
					SUBTOTAL - STORMWATER IMPROVEMENTS	$0.00
UTILITY RELOCATION						
29	02 00 60	RELOCATE WATER SERVICE LINE (1"-1.5" PVC)	EA	6		
30	02 00 60	RELOCATE WATER METER	EA	0		
31	02 00 60	RELOCATE WATER SERVICE LINE TO FIRE HYDRANT (6" PVC)	EA	1		
32	02 00 60	RELOCATE WATER MAIN (2" PVC)	EA	1		
33	04 00 35	FURNISH AND INSTALL 20 LF OF 4" 401 DI AT EACH SEWER SERVICE LINE CONFLICT	EA	3		
34	02 00 60	RELOCATE WATER VALVE (TO FIRE HYDRANT)	EA	1		
35	02 00 60	COORDINATE RELOCATION OF GAS SERVICE LINES WITH UTILITY OWNER	EA	1		
36	02 00 60	COORDINATE RELOCATION OF FIBER OPTICS SERVICE LINES WITH UTILITY OWNER	EA	2		
37	02 00 60	COORDINATE RELOCATION OF UNDERGROUND ELECTRIC UTILITY LINES WITH UTILITY OWNER	EA	1		
38	02 00 60	COORDINATE RELOCATION OF TELEVISION SERVICE LINES WITH UTILITY OWNER	EA	1		
39	02 00 60	COORDINATE RELOCATION OF TELEPHONE SERVICE LINES WITH UTILITY OWNER	EA	1		
40	04 00 10	CHLORINATE, FLUSH, AND LINE TEST (WATER LINE POST-CONSTRUCTION)	LS	1		
					SUBTOTAL - UTILITY RELOCATION	$0.00
					TOTAL BASE BID	**$0.00**

Please note regarding the above bid form:
1. Unit prices shall control over extension.
2. The quantities listed above are based on plans entitled 'Trent Woods Stormwater Improvement Project Coquina Cir. & Carteret Dr.' dated November 11, 2024
3. The quantities listed above are max estimates. If the project requires less quantities to complete, the Town will only make pay for quantities used as evidenced by proper documentation.

BIDDER: _____

BY: _____
(Signature)

NAME OF SIGNER: _____
(Please Print or Type)

TITLE OF SIGNER: _____
(Please Print or Type)

DATE: _____

END OF ITEMIZED BID TAB

SECTION 00 04 12

E-VERIFY AFFIDAVIT

State of _____

County of _____

NOW COMES Affiant, first being sworn, deposes and says as follows:

1. I have submitted a bid for contract or desire to enter into a contract with the Town of Trent Woods;
2. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

   ☐ After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or

   ☐ I employ less than twenty-five (25) employees in the State of North Carolina.
3. As part of my duties and responsibilities pursuant to said bid and/or contract, I attest that to the best of my knowledge any subcontractors employed as a part of this bid and/or contract are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):

   ☐ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or

   ☐ Employ less than twenty-five (25) employees in the State of North Carolina.

Specify subcontractor _____

This the _____ day of _____ 20 _____

_____

Affiant

Sworn to and subscribed before me, this the _____ day of _____ 20 _____

[OFFICIAL SEAL]

_____ Notary Public

My Commission Expires _____

END OF SECTION

SECTION 00 04 20

BIDDERS QUALIFICATIONS FORMS

(Submit with necessary attachments along with bidding documents.)

The undersigned warrants the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

How many years has your organization been in business as a (circle one) General Contractor/Subcontractor?

_____

Describe and give the date and owner of the last project that you have completed similar in type, size, and nature as the one proposed?

_____

_____

_____

_____

_____

List any projects that you have completed similar in type, size, and nature as the one proposed.

Name of Project 1: _____

Location: _____

OWNER: _____

Telephone No.: _____

ENGINEER: _____

Date Started: _____ Date Completed: _____

Value of Contract: _____

Description of Project: _____

_____

_____

_____

Name of Project 2: _____

Location: _____

OWNER: _____

Telephone No.: _____

ENGINEER: _____

Date Started: _____ Date Completed: _____

Value of Contract: _____

Description of Project: _____

_____

_____

_____

Name of Project 3: _____

Location: _____

OWNER: _____

Telephone No.: _____

ENGINEER: _____

Date Started: _____ Date Completed: _____

Value of Contract: _____

Description of Project: _____

_____

_____

_____

Have you ever failed to complete work awarded to you? If so, where and why?

Name three individuals or corporations for which you have performed work and to which you refer: (Attach additional sheets if necessary)

Have you personally inspected the site of the proposed work? Describe any anticipated problems with the site and your proposed solutions: (Attach additional sheets if necessary)

Will you Subcontract any part of this Work? If so, please list the names and addresses of the subcontractors to be used for the portions of the work listed below. Additional information will be required in accordance with the Instructions to Bidders, Article 12.

Subcontractor Name	Service Provided

Please list the names and addresses of the suppliers to be used for the Project. Additional information will be required in accordance with the Instructions to Bidders, Article 12.

Supplier Name	Product(s) Provided

List your organization's Insurance Interstate Experience Modification Rate (EMR) for the three most recent years.

_____ _____ _____

State the true and exact, correct, and complete name under which you do business.

Bidder Is:

_____

(Bidder Name)

_____

(Individual's Signature)

_____

(Individual's Name)

END OF SECTION

SECTION 00 04 30

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)*:

Town of Trent Woods

898 Chelsea Road

Trent Woods, NC 28652

BID

Bid Due Date: **December 17, 2024**

Description *(Project Name— Include Location)*: **Trent Woods Stormwater** Improvement Project - Coquina Cir. & Carteret Dr. – This project is located along Coquina Circle & Carteret Drive in Trent Woods, NC.

The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

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.

SECTION 00 05 10

NOTICE OF AWARD

Date of Issuance:

Owner:	Town of Trent Woods	Owner's Contract No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.	Contract Name:	

Bidder: _____

Bidder's Address: _____

_____

_____

TO BIDDER:

You are notified that Owner has accepted your Bid dated December 17, 2024 for the above Contract, and that you are the Successful Bidder and are awarded a Contract for: Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr. project.

The Contract Price of the awarded Contract is: _____

three copies of the proposed Performance Bond, Payment Bond, and Agreement accompany this Notice of Award.

three sets of the fully executed Contract Documents and Drawings will be delivered separately or otherwise made available to you immediately after execution. You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner three 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.

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:	Town of Trent Woods	Contractor:	
	Authorized Signature		Authorized Signature
By:		By:	
Title:		Title:	
Date:		Date:	

Copy: Engineer

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

THIS AGREEMENT is by and between Town of Trent Woods ("Owner") and

_____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

ARTICLE 2 – THE PROJECT

The Project, of which the Work under the Contract Documents is a part, is known as the Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr. project.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by WithersRavenel.

3.02 The Owner has retained WithersRavenel ("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 90 consecutive calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 120 consecutive calendar days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the 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 arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner $500.00 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 Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $500.00 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.

ARTICLE 5 – CONTRACT PRICE

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

A. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item) as shown on the 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.

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 25th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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

    a. 95% of Work completed (with the balance being retainage); and

    b. 95% of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. When 50% of the Work of the original Contract has been completed and in the opinion of the Owner the Contractor continues to perform satisfactorily and nonconforming work identified in writing prior to that time by the Engineer or OWNER has been corrected by the Contractor and accepted by the Owner, the Owner with written consent of surety will adjust future partial payments so that 2½% of the original Contract Price is retained.

3. The project shall be deemed 50% complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equals or exceeds 50% of the original value of the contract, except the value of materials stored on-site shall not exceed 20% of the Contractor's gross invoices for the purpose of determining whether the project is 50% complete.

4. If the Owner determines it is appropriate to reduce retainage, the method used for such adjustment shall be to fix retainage at 2½% of the original Contract amount (when the work is 50% complete) and to pay all subsequent Partial Payment Requests to the full approved amount. The intent of such an adjustment is to gradually reduce retainage to 2½% of the original Contract amount when the work is 100% complete. Following 50% completion of the project, the Owner may also withhold additional retainage from any subsequent periodic payment, not to exceed 5%, in order to allow the Owner to retain 2½% total retainage through the completion of the project.

5. If the Owner determines the Contractor's performance is unsatisfactory, the Owner may reinstate retainage for each subsequent periodic payment application up to a maximum amount of 5% of the original Contract amount.

6. Within 60 days after the submission of a final pay application, the Owner with written consent of the surety shall release to the Contractor all retainage on payments held by the Owner if (1) the Owner receives a certificate of substantial completion from the Engineer, or (2) the Owner receives beneficial occupancy or use of the project. However, the Owner may retain sufficient funds to secure completion of the project or corrections on any work. If the Owner retains funds, the amount retained shall not be more than 2½ times the Engineer's estimated value of the work to be completed or corrected. Any reduction in the amount of the retainage on payments shall be with the written consent of the Contractor's surety.

7. Retainer provisions contained in Contractor's subcontracts may not exceed the terms and conditions for retainage provided herein. Contractors are further required to satisfy the retainage provisions of N.C.G.S. 143-134.1(b2) with regard to subcontracts for early finishing trades (structural steel, piling, caisson, and demolition) and to coordinate the release of retainage for such trades from the retainage held by the Owner from the Contractor pursuant to statute.

8. Nothing shall prevent the Owner from the withholding payment to the Contractor in addition to the amounts identified herein for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the Owner or reasonable evidence that a third-party claim will be filed.

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 All amounts not paid when due shall bear interest at the rate of 8 percent per annum.

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
2. Performance bond
3. Payment bond
4. General Conditions
5. Supplementary Conditions
6. Specifications as listed in the table of contents of the Project Manual
7. Construction Drawings dated November 11, 2024.
8. Addenda (numbers to , inclusive)
9. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.

d. Field Orders.

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 any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

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

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

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

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.

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:
Town of Trent Woods	
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: 898 Chelsea Road	Address for giving notices:
Trent Woods, NC 28652	
	License No.: *(where applicable)*
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	*NOTE TO USER: Use in those states or other jurisdictions where applicable or required.*

SECTION 00 05 30

CERTIFICATE OF OWNER'S FINANCE OFFICER

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.

By: _____

Signature of Owner's Finance Officer

_____

(Print Name & Title)

_____

Date

END OF SECTION

SECTION 00 05 40

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, hereby certify that I have examined the foregoing instrument and bond and approve the same as to their form.

By: _____

Signature of Owner's Attorney

_____

(Print Name & Title)

_____

Date

END OF SECTION

SECTION 00 05 50

NOTICE TO PROCEED

Owner:	Town of Trent Woods	Owner's Contract No.:	
Contractor:	_____	Contractor's Project No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.	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 (Notice to Proceed Date).

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 number of days to achieve Substantial Completion is 90 consecutive calendar days, and the number of days to achieve readiness for final payment is 120 consecutive calendar days.

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

Paragraph 2.01 of the General Conditions provides that you must deliver the required bonds and evidence of insurance (with copies to Engineer and other identified additional insureds and loss payees) in accordance with the Contract Documents.

Owner:	*Town of Trent Woods*	Contractor:	
	Authorized Signature		Authorized Signature
By:	Charles Tyson	By:	
Title:		Title:	
Date:		Date:	

Copy: Engineer

SECTION 00 06 10

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

_____

_____

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

OWNER *(name and address)*:

Town of Trent Woods

898 Chelsea Road

Trent Woods, NC 28652

CONSTRUCTION CONTRACT

Effective Date Of Agreement:	(Effective Date of Agreement)
Amount:	(Contract Amount $)
Description *(name and location)*:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr. - This project is located along Coquina Circle & Carteret Drive in Trent Woods, NC. The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

BOND

Bond Number:

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

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL	**SURETY**
(Seal)	(Seal)
Contractor'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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of

action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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

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

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

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

14. Definitions

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

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

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

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

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

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

16. Modifications to this Bond are as follows:

SECTION 00 06 15

PAYMENT BOND

CONTRACTOR *(name and address)*:

_____

TBD

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

OWNER *(name and address)*:

Town of Trent Woods

898 Chelsea Road

Trent Woods, NC 28652

CONSTRUCTION CONTRACT

Effective Date of Agreement:	(Effective Date of Agreement)
Amount:	(Contract Amount $)
Description *(name and location)*:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr. - This project is located along Coquina Circle & Carteret Drive in Trent Woods, NC. The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

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 Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
(Seal)	(Seal)
Contractor'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

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

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

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

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

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

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

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

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

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

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

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

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

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

    7.2 Pay or arrange for payment of any undisputed amounts.

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

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

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

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

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

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

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

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

16. **Definitions**

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

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

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

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

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

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

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

18. Modifications to this Bond are as follows:

SECTION 00 06 16

CERTIFICATES OF INSURANCE

(Attach Certificates of Insurance to this Section)

END OF SECTION

SECTION 00 06 20

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner): (Owner)	From (Contractor):	Via (Engineer): WithersRavenel
Project: (Project Name)	Contract: (Contractor)	Funding Project No.: (Funding Project Number)
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: (Engineer Project Number)

Application For Payment

Change Order Summary

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

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)		**$**

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:

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)

Progress Estimate - Lump Sum Work

Contractor's Application

For (Contract): (Contractor)	Application Number:
Application Period:	Application Date:

			Work Completed		E	F		G
A		B	C	D				
Specification Section No.	Description	Scheduled Value ($)	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F / B)	Balance to Finish (B - F)
	Totals							

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract): (Contractor)								Application Number:			
Application Period:								Application Date:			
A					B	C	D	E	F		
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	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	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Totals										

Stored Material Summary

Contractor's Application

For (Contract): (Contractor)								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E	F			G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously: Date Placed into Storage (Month/Year)	Stored Previously: Amount ($)	Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work: Date (Month/ Year)	Incorporated in Work: Amount ($)	Materials Remaining in Storage ($) (D + E - F)
				Totals							

CONTRACTOR'S SALES TAX REPORT
North Carolina State and Local Sales Tax and Use Tax

OWNER:	Town of Trent Woods	CONTRACTOR:	TBD
ADDRESS:	898 Chelsea Road Trent Woods, NC 28652	ADDRESS:	TBD
PROJECT:		PERIOD:	

VENDOR	ADDRESS	INVOICE NUMBER	DATE	INVOICE AMOUNT	NORTH CAROLINA TAX	COUNTY TAX	COUNTY

CONTRACTOR'S SALES TAX REPORT
North Carolina State and Local Sales Tax and Use Tax

OWNER:	Town of Trent Woods	CONTRACTOR:	TBD
ADDRESS:	898 Chelsea Road	ADDRESS:	TBD
	Trent Woods, NC 28652		
PROJECT:		PERIOD:	

VENDOR	ADDRESS	INVOICE NUMBER	DATE	INVOICE AMOUNT	NORTH CAROLINA TAX	COUNTY TAX	COUNTY
TOTAL							

*Complete one sheet for each County in which Purchases were made.

SIGNATURE: _____

_____

Title _____

Subscribed and sworn to me this _____ day of _____

Notary Public _____

My Commission Expires _____

SECTION 00 06 22

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

SCO Project ID: _____

Pay Application #: _____ Period: _____

The following is a list of payments made to Minority Business Enterprises on this project for the above-mentioned period.

MBE FIRM NAME	* TYPE OF MBE	AMOUNT PAID THIS MONTH (With This Pay App)	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

*Minority categories: Black (B), Hispanic (H), Asian American (AA), American Indian (AI), White Female (WF), Socially and Economically Disadvantaged (SED)

Approved/Certified By:

_____ _____
Name Title

_____ _____
Date Signature

SUBMIT WITH EACH PAY REQUEST - FINAL PAYMENT - FINAL REPORT

SECTION 00 06 25

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Town of Trent Woods	Owner's Contract No.:	
Contractor:	TBD	Contractor's Project No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.	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: _____	By: _____	By: _____
(Authorized signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

SECTION 00 06 30

CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

Town of Trent Woods

To: Owner

Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.

Project:

(Effective Date of Agreement)

Contract Date:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

Exceptions:

Supporting Documents Attached Hereto:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

(CONTRACTOR)

TBD

Address:

By:

Notary:

State Of:

County Of:

Subscribed and sworn to before me this _____ Day of

Printed Name:

My commission expires:

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

SECTION 00 07 00
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®

These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives*:

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

C. *Day*:

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

D. *Defective*:

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

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

2.02 *Copies of Documents*

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

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

2.03 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.05 *Initial Acceptance of Schedules*

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

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

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

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

2.06 *Electronic Transmittals*

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

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

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

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

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

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

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

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

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

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

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

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

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

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

B. *Resolving Discrepancies*:

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

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

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

3.04 *Requirements of the Contract Documents*

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

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

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

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

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

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

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

4.05 *Delays in Contractor's Progress*

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

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

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

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

2. abnormal weather conditions;

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

4. acts of war or terrorism.

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

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

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

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

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

5.01 *Availability of Lands*

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

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

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

5.02 *Use of Site and Other Areas*

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

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

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

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

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

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

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

5.03 *Subsurface and Physical Conditions*

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

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

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

3. Technical Data contained in such reports and drawings.

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

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

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

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

5.04 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

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

D. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

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

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

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

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

5.05 *Underground Facilities*

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

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

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

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

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

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

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

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

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

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

E. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

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

5.06 *Hazardous Environmental Conditions at Site*

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

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

2. Technical Data contained in such reports and drawings.

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

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

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

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

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

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

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

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

6.02 *Insurance—General Provisions*

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

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

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

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

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

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

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

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

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

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

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

6.03 *Contractor's Insurance*

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

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

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

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

4. Foreign voluntary worker compensation (if applicable).

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

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

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

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

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

1. Products and completed operations coverage:

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

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

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

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

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

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

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

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

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

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

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

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

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

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

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

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

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 *Labor; Working Hours*

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

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

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer 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

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

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

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

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

7.09 *Taxes*

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

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

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

7.11 *Record Documents*

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

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

   a. Contractor shall submit the number of Samples required in the Specifications.

   b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

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

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, 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.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

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

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

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

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

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

SECTION 00 08 00

SUPPLEMENTARY CONDITIONS

PART 1 CONTENTS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract NSPE-ASCE-ACEC Document EJCDC C-700, 2013 Edition and other provisions of the Contract Documents as indicated below. All provisions not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the same meanings indicated in the Standard General Conditions of the Construction Contract. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC 1.01.A.3 INSERT AT THE END OF THE PARAGRAPH TO READ AS FOLLOWS:

The Application for Payment form to be used on this Project is EJCDC No. C-620. Contractor may use their standard computerized forms for providing detail payment breakdown as an attachment to summary sheet. Agency must approve all Applications for Payment before payment is made.

SC 1.01.A.8 INSERT AT THE END OF THE PARAGRAPH TO READ AS FOLLOWS:

The Change Order form to be used on this Project is EJCDC No. C-941. Agency approval is required before Change Orders are effective.

SC 1.01.A.48 ADD NEW DEFINITIONS AFTER DEFINITION 1.01.A.48. OF THE GENERAL CONDITIONS TO READ AS FOLLOWS:

A.49. The term "minority business" means a business:

a. In which at least fifty-one percent (51%) is owned by one or more minority persons or socially and economically disadvantaged individuals, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and

b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.

A.50. The term "minority person" means a person who is a citizen or lawful permanent resident of the United States and who is:

a. Black, that is, a person having origins in any of the black racial groups in Africa;

b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;

c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, or the Pacific Islands;

d. American Indian, that is, a person having origins in any of the original Indian peoples of North America; or

e. Female.

A.51. The term "socially and economically disadvantaged individual" means the

same as defined in 15 U.S.C. 637; "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged."

A.52. Notice of Violation - A written notification from a governmental agency that the Owner has violated a law or regulation that the agency has jurisdiction over. Notice will take the form used by the agency and may outline action to be taken by the Owner to correct the violation and may include a monetary fine.

A.53. Regular Working Hours - Regular working hours for the project are defined as 8:00 am to 5:00 pm, Eastern Standard Time.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC 4.05.C.2 Add a new paragraph after paragraph 4.05.C.2. of the General Conditions to read as follows:

(a) **Abnormal weather is defined as precipitation that is greater than the 5-year average. The 5-year average shall be based on the Local Climatological Data provided by the National Oceanic and Atmospheric Administration for the time in question and station closest to the project area.**

(i) **As a precondition to CONTRACTOR making a claim for a delay arising out of abnormal weather conditions, CONTRACTOR shall submit data from the National Oceanic Atmospheric Administration (NOAA) showing the number of days where precipitation or other inclement weather occurred during the period for which the claim is made along with daily weather logs which must be kept at the job site and which must indicate that adverse or abnormal weather or site conditions precluded at least four-hours of Work at the site during daylight hours. CONTRACTOR agrees that a comparison of: (1) the number of days of precipitation for the month or months in question during the Project; and (2) the average number of days where precipitation for the month or months in question during the previous five years is a proper comparison by which to determine CONTRACTOR's entitlement for extension of time for weather delays. CONTRACTOR acknowledges that it has taken weather conditions into account in agreeing to perform the Work within the Contract Times, and that CONTRACTOR shall only be allowed an extension of time based upon the comparison set forth in this Article. Notwithstanding anything else contained in this Article or this Agreement, CONTRACTOR shall not be entitled to an extension of time unless it can show that the abnormal weather or site conditions specifically affected the critical**

path, and it meets all of the requirements for such a claim under this Agreement.

(ii) **Notwithstanding anything else to the contrary, in the event that CONTRACTOR believes that it has been delayed in the completion of the Work for reasons over which it has no reasonable control, then CONTRACTOR shall inform OWNER in writing of the reason for such delay and the estimated amount of such delay within five-days after the commencement of the event giving rise to the delay. Unless CONTRACTOR complies with the requirements of this Article, it shall not be entitled to any claim for delay, extension of the Contract Times, or additional compensation for its claim. If CONTRACTOR makes any claim for delay, CONTRACTOR shall specifically set forth how and why the delay in question affected the critical path, including a diagram showing such effect.**

(iii) **The CONTRACTOR shall not be entitled to additional compensation as a result of time extensions.**

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

SC 5.03 Delete Paragraphs 5.03.A and 5.03.B in their entirety and insert the following:

A. No reports of explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

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

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

ARTICLE 6 – BONDS AND INSURANCE

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

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

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

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

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

State:	**Statutory**

Federal, if applicable (e.g., Longshoreman's):		**Statutory**
Jones Act coverage, if applicable:		
Bodily injury by accident, each accident	**$**	
Bodily injury by disease, aggregate	**$**	
Employer's Liability:		
Bodily injury, each accident	**$**	**500,000**
Bodily injury by disease, each employee	**$**	**500,000**
Bodily injury/disease aggregate	**$**	**500,000**
For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	**$**	**500,000**
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	**$**	
General Aggregate	**$**	

☒ **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: [Additional Insured]**

SC 6.05.A. Delete Paragraph 6.05.A of the General Conditions and substitute the following in its place:

Contractor shall provide and maintain installation floater insurance for property under the care, custody, or control of Contractor. The installation floater insurance shall be a broad form or "all risk" policy providing coverage for all materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work. Coverage under the Contractor's installation floater will include:

1. **any loss to property while in transit,**
2. **any loss at the Site, and**
3. **any loss while in storage, both on-site and off-site.**

Coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment that will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

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

1. **Regular working hours will be Monday –Friday 8am-5 pm.**
2. **Owner's legal holidays are New Years Day, Martin Luther King Day, Good Friday, Memorial Day, July 4th, Labor Day, Veterans Day, Thanksgiving, Christmas Eve, Christmas Day.**

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

Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services,

occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

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

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as $210.00 per hour for Engineer and $130.00 per hour for Resident Project Representative.

D. Limitation on Value of Subcontracts – The policy of the OWNER requires that the total value of all subcontracted work shall not exceed 50 percent of the total value of the Contract. The intent of this policy is to require that the CONTRACTOR perform at least 50 percent of the work with its own forces and equipment. *Specifier Note: Project Manager to determine if this limitation on value of subcontracts language is needed or not. If not required, then delete.*

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The responsibilities of the Resident Project Representative (RPR) are detailed in Specification Section 01 05 50 – Responsibilities of Resident Project Representative.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; 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 _25_ 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 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC 15.01.C Add the following new paragraph immediately after Paragraph 15.01.C.6.e

7. The Owner will, within ten (10) days of presentation of an approved Application for Payment, review, approve, and submit the Application for Payment to the funding agency.

SC 15.01.D Delete Paragraph 15.01.D in its entirety and insert the following in its place:

D. *Payment Becomes Due*:

1. Within three (3) workdays of the receipt of funds the Owner will pay the Contractor a progress payment on the basis of the approved Application for Payment less the retainage.

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

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, 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.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

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

SC-17.02 Mediation

A. All matters subject to final resolution under this Article will be decided by mediation in accordance with the rules set forth in Section 000810 – Dispute Resolution.

SECTION 00 08 10

DISPUTE RESOLUTION

RULES IMPLEMENTING MEDIATED

SETTLEMENT CONFERENCES IN

NORTH CAROLINA PUBLIC CONSTRUCTION PROJECTS

ADOPTED

FEBRUARY 26, 2002

TABLE OF RULES

5. Authority and Duties of Mediators
    a. Authority of Mediator
    b. Duties of Mediator
6. Compensation of the Mediator
    a. By Agreement
    b. By Appointment
7. Mediator Certification
8. Rule Making
9. Definitions
10. Time Limits

1. RULE 1. INITIATING MEDIATED SETTLEMENT CONFERENCES

   a. Purpose of Mandatory Settlement Conferences. Pursuant to G.S. 143-128(f1) 143-135.26(11), 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 public construction contract governed by Article 8. Ch. 143 of the General Statutes and identified in G.S. 143-128(f1) 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 the public owner for mediation of the dispute.

      2) Prior to submission of a written request for mediation to the public owner, the parties requesting mediation,

         a) If a prime contractor, must have first submitted its claim to the Project Designer for review as set forth in Exhibit A. If the dispute is not resolved through the Project Designer's instructions, then the dispute becomes ripe for mediation in the Formal Dispute Resolution Process, and the party may submit his written request for mediation to the public owner.

         b) If the party requesting mediation is a subcontractor, it must first have submitted its claim for mediation to the prime contractor with whom it has a contract. If the dispute is not resolved through the Prime Contractor's involvement, then the dispute becomes ripe for mediation in the Formal Dispute Resolution Process, and the party may submit its written request for mediation to the public owner.

         c) If the party requesting mediation is the Project Designer, then it must first submit its claim to the public owner to resolve. If the dispute is not resolved with the public owner's involvement, then the Project Designers' dispute is ripe for mediation in the Formal Dispute Resolution Process, and the Project Designer may submit its written request to the public owner for mediation.

2. RULE 2. SELECTION OF MEDIATOR

   a. Selection of Certified Mediator by Agreement of the Parties. The parties may select a mediator certified pursuant to the Rules by agreement within 21 days of requesting mediation. The requesting party shall file with the State Construction Office (hereinafter collectively referred to as the "SCO") or public owner if a non-State project a Notice of Selection of Mediator by Agreement within 10 days of the request; however, any party may file the notice. Such notice shall state the name, address and telephone number of the mediator selected; state the rate of compensation of the mediator; state that the mediator and

opposing counsel have agreed upon the selection and rate of compensation; and state that the mediator is certified pursuant to these Rules.

b. Nomination and Public Owner Approval of a Non-Certified Mediator. The parties may select a mediator who does not meet the certification requirements of these rules but who, in the opinion of the parties and the SCO or public owner, is otherwise qualified by training or experience to mediate the action.

c. If the parties select a non-certified mediator, the requesting party shall file with the SCO a Nomination of Non-Certified Mediator within 10 days of the request. Such

d. nomination shall state the name, address and telephone number of the mediator; state the training, experience or other qualifications of the mediator; state the rate of compensation of the mediator; and state that the mediator and opposing counsel have agreed upon the selection and rate of compensation.

e. The SCO or public owner shall rule on said nomination, shall approve or disapprove of the parties' nomination and shall notify the parties of its decision.

f. Appointment of Mediator by the SCO. If the parties cannot agree upon the selection of a mediator, the party or party's attorney shall so notify the SCO or public owner and request, on behalf of the parties, that the SCO or public owner appoint a mediator. The request for appointment must be filed within 10 days after request to mediate and shall state that the parties have had a full and frank discussion concerning the selection of a mediator and have been unable to agree. The request shall state whether any party prefers a certified attorney mediator, and if so, the SCO or public owner shall appoint a certified attorney mediator. If no preference is expressed, the SCO or public owner may appoint a certified attorney mediator or a certified non- attorney mediator.

g. Mediator Information Directory. To assist the parties in the selection of a mediator by agreement, the parties are free to utilize the list of certified mediators maintained in any county participating in the Superior Court Mediation Settlement Conference Program.

h. Disqualification of Mediator. Any party may request replacement of the mediator by the SCO or public owner for good cause. Nothing in this provision shall preclude mediators from disqualifying themselves.

3. RULE 3. THE MEDIATED SETTLEMENT CONFERENCE

a. Where Conference is to be Held. Unless all parties and the mediator otherwise agree, the mediated settlement conference shall be held in the county where the project is located. 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 Conference is to be Held. The deadline for completion of the mediation shall be not less than 30 days nor more than 60 days after the naming of the mediator.

c. Request to Extend Deadline for Completion. A party, or the mediator, may request the SCO or public owner to extend the deadline for completion of the 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 to the SCO or public owner.

d. The SCO or public owner may grant the request by setting a new deadline for completion of the conference.

e. Recesses. The mediator may recess the 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.

f. The mediated settlement conference shall not be cause for the delay of the construction project which is the focus of the dispute.

4. RULE 4. DUTIES OF PARTIES AND OTHER PARTICIPANTS IN FORMAL DISPUTE RESOLUTION PROCESS

a. Attendance

1) All parties to the dispute originally presented to the Designer or Prime Contractor for initial resolution must attend the mediation. Failure of a party

2) to a construction contract to attend the mediation will result in the public owner's withholding of monthly payment to that party until such party attends the mediation.

3) Attendance shall constitute physical attendance, not by telephone or other electronic means. Any attendee on behalf of a party must have authority from that party to bind it to any agreement reached as a result of the mediation.

4) Attorneys on behalf of parties may attend the mediation but are not required to do so.

5) Sureties or insurance company representatives are not required to attend the mediation 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 Agreement. If an agreement is reached in the conference, parties to the agreement shall reduce its terms to writing and sign it along with their counsel.

c. The mediation fee shall be paid in accordance with G.S. 143-128{g).

d. Failure to compensate mediator. Any party's failure to compensate the mediators in accordance with G.S. 143-128(f1) shall subject that party to a withholding of said amount of money from the party's monthly payment by the public owner.

e. Should the public owner fail to compensate the mediator, it shall hereby be subject to a civil cause of action from the mediator for the 1/3 portion of the mediator's total fee as required by G.S. 143-128(f1).

5. RULE 5. AUTHORITY AND DUTIES OF MEDIATORS

a. Authority of Mediator

1) Control of Conference. The mediator shall at all times be in control of the 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 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 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 conference.

b. Duties of Mediator

1) The mediator shall define and describe the following at the beginning of the 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;

d) 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;

e) 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 G.S. 7A-38.1(1);

h) The duties and responsibilities of the mediator and the participants; and

i) That 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 Impasse. It is the duty of the mediator timely to determine that an impasse exists and that the conference should end.

4) Reporting Results of Conference. The mediator shall report to the SCO or public owner within 10 days of the 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 the SCO or public owner of the absence of any party known to the mediator to have been absent from the mediated settlement conference without permission. The SCO or public owner may 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 conference and conduct it prior to the deadline of completion set by the rules. Deadlines for completion of the conference shall be strictly observed by the mediator unless said time limit is changed by a written order of the SCO or public owner.

6. RULE 6. COMPENSATION OF THE MEDIATOR

   a. By Agreement. When the mediator is stipulated by the parties, compensation shall be as agreed upon between the parties and the mediator provided that the provision of G.S. 143-128(f1) are observed.

   b. By Appointment. When the mediator is appointed by the SCO or public owner, the parties shall compensate the mediator for mediation services 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 administrative rate in accordance with the rate charged for Superior Court mediation, which is due upon appointment.

7. RULE 7. MEDIATOR CERTIFICATION

   All mediators certified in the Formal Dispute Resolution Program shall be properly certified in accordance with the rules certifying mediators in Superior Court in North Carolina. *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 Implementing Scheduled Mediated Settlement Conference in Superior Court or must gain the consent of the SCO or public owner to mediate any dispute in accordance with these rules.

   *Except when otherwise allowed by the SCO or public owner upon the request of the parties to the mediation.

8. RULE 8. RULE MAKING

   These Rules are subject to amendment by rule making by the State Building Commission.

   These Rules are mandated for State projects when the contracting state entity has not otherwise adopted its own dispute resolution provision. These rules are optional for all other projects subject to Article 8, Ch. 143 of the General Statutes.

9. RULE 9. DEFINITIONS

When the phrase "SCO or public owner" is used in these rules, "SCO" shall apply to state projects, "public owner" shall apply to non-state public projects.

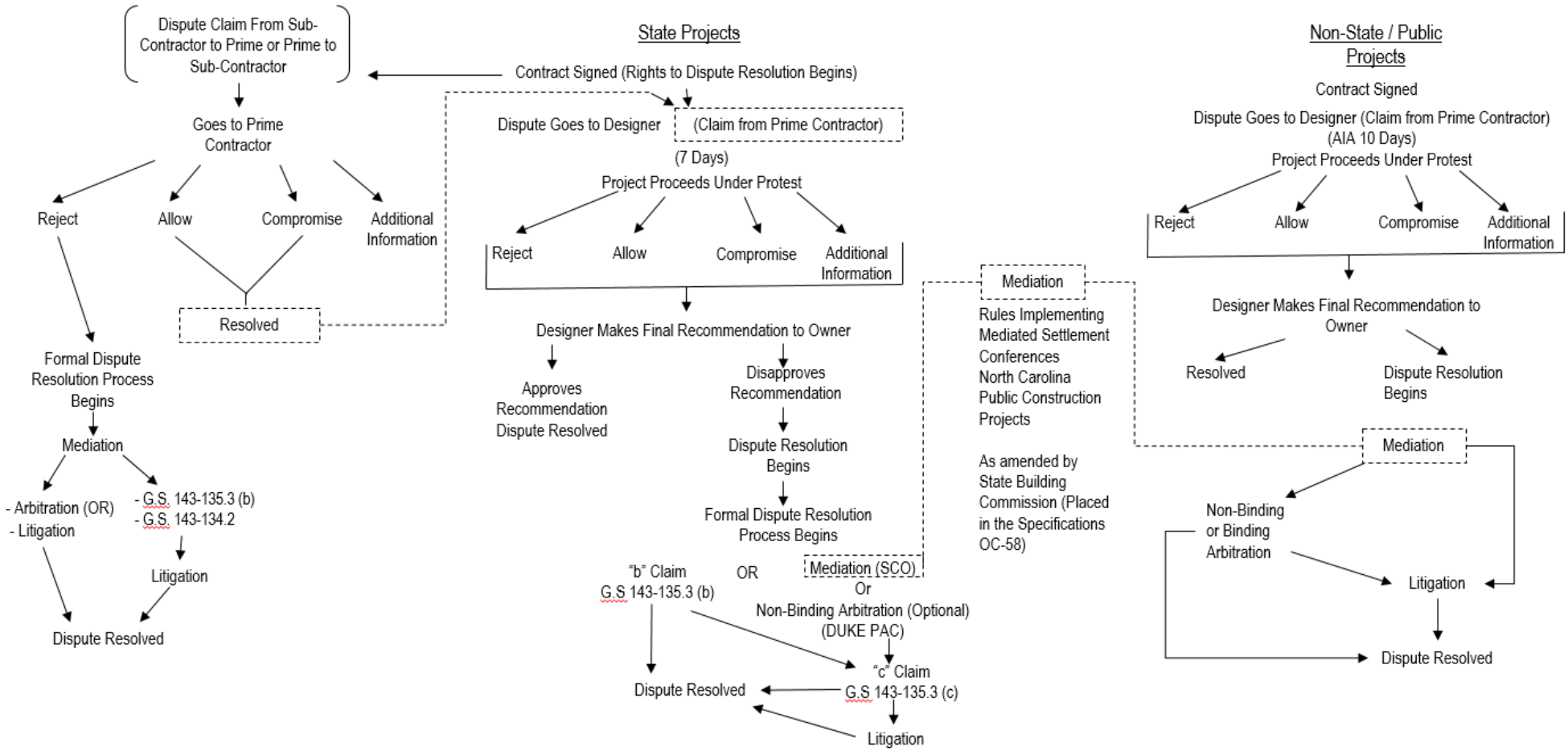
10. RULE 10. TIME LIMITS

On state contracts, any time limit provided for by these Rules may be waived or extended by the SCO for good cause shown.

On non-state contracts, any time limit provided for by these Rules may be waived or extended by the mediator it appoints for good cause shown. If the mediator has not yet been appointed, the designer of record shall decide all waivers or extensions of time for good cause shown.

Exhibit A

Dispute Resolution



SECTION 00 09 00

ADDENDA

(Attach Addenda to this Section)

END OF SECTION

Work Change Directive No.

Date of Issuance:		Effective Date:	
Owner:	Town of Trent Woods	Owner's Contract No.:	
Contractor:	TBD	Contractor's Project No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement	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:

Change Order No. 1

Date of Issuance:		Effective Date:	
Owner:	Town of Trent Woods	Owner's Contract No.:	
Contractor:	TBD	Contractor's Project No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.	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. 0 to No. 1: $_____	[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:
Contract Price incorporating this Change Order:	Contract Times with all approved Change Orders:
	Substantial Completion:
$_____	Ready for Final Payment:

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: _____

Field Order No. _____

Date of Issuance:		Effective Date:	
Owner:	Town of Trent Woods	Owner's Contract No.:	
Contractor:	TBD	Contractor's Project No.:	
Engineer:	WithersRavenel	Engineer's Project No.:	24-0504
Project:	Trent Woods Stormwater Improvement Project - Coquina Cir. & Carteret Dr.	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

SECTION 01 – GENERAL REQUIREMENTS

SECTION 01 01 00

SUMMARY OF WORK

PART 1 DEFINITIONS

1.01. "OWNER"

A. The individual or entity with which the 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.

1.02. "ENGINEER"

A. The individual or entity named as such in the Agreement.

1.03. "CONTRACTOR"

A. The individual or entity with which OWNER has contracted for performance of the Work.

1.04. "SUBCONTRACTOR"

A. An individual or entity having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the Work.

PART 1 GENERAL

1.01. LOCATION OF WORK

A. This project is located along Coquina Circle & Carteret Drive in Trent Woods, NC.

1.02. WORK TO BE DONE

A. The Trent Woods Stormwater Improvement Project includes improvements to the storm sewer system along Carteret Dr starting at Coquina Cir within a residential neighborhood. Improvements include the removal or abandonment of approximately 335 linear feet of storm drain pipe and 5 inlet structures to be replaced and expanded upon with the installation of approximately 755 linear feet of storm drain pipe, 12 inlet structures, and 1 headwall. Additional improvements include the restoration of existing roadside ditches and armoring of the outfall channel.

B. Provide all labor, materials, equipment, tools, services and incidentals necessary to complete all work required by the Contract Documents to furnish and install all work as shown on the Drawings and specified herein.

C. Complete the Work, in place, tested, and ready for continuous service. Perform or provide repairs, replacements, and restoration required as a result of damages resulting from construction operations.

D. Furnish and install all materials, equipment, and incidentals, which are reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Contract Documents, or not.

1.03. DRAWINGS AND SPECIFICATIONS FURNISHED TO THE CONTRACTOR FOR CONSTRUCTION

A. A total of **three** sets of Drawings and **three** sets of Specifications shall be furnished to the CONTRACTOR for construction at no charge. Additional sets may be purchased at the cost of reproduction.

1.04. ABBREVIATIONS AND REFERENCES

A. Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for bids, even if reference has been made to an earlier standard. Where standards, specifications or codes of the various technical societies, organizations or bodies have been referred to throughout the Specifications, the referenced standard, specification or code is hereby made a part of the Contract the same as if herein repeated in full.

B. In the event of any conflict between any of these specifications, standards, codes or tentative specifications, and the Specifications, the latter shall govern.

C. Reference to a technical society, organization, or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASME	American Society at Mechanical Engineers
ASTM	American Society of Testing Materials
AWS	American Welding Society
AWWA	American Water Works Association
DIPRA	Ductile Iron Pipe Research Association
EPA	Environmental Protection Agency
FED.SPEC.	Federal Specifications
IEEE	Institute of Electrical and Electronic Engineers
NCDOT	North Carolina Department of Transportation
NCDENR	North Carolina Department of Environment and Natural Resources
NEMA	National Electrical Manufacturers Association
OSHA	Occupational Safety and Health Administration

D. When no reference is made to a code, standard, or specification, the standard specifications of the ASTM, the ANSI, the ASME, the IEEE, or the NEMA shall govern.

1.05. LOCATION OF UNDERGROUND FACILITIES

A. CONTRACTOR is responsible for the location of all underground utilities. Known existing utilities have been located from the information available. It is the CONTRACTOR's responsibility to accurately locate both horizontally and vertically all existing utilities prior to start of construction. CONTRACTOR is responsible for contacting the NC One Call Center at **800.632.4949**. All costs associated with any damage to known or unknown existing utilities resulting from the CONTRACTOR's failure to adequately protect the existing utilities during construction shall be borne solely by the CONTRACTOR.

1.06. CONSTRUCTION SEQUENCE

A. Notify the OWNER and ENGINEER at least one week prior to starting construction activities.

B. Notify the OWNER and ENGINEER at least 48 hours prior to starting excavation work.

C. Install all erosion control measures prior to beginning land disturbing activities.

END OF SECTION

SECTION 01 02 50

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01. THE REQUIREMENT

A. All contract prices shall be full compensation for all labor, materials, tools, equipment, and incidentals necessary to complete the Work as shown on the Drawings and specified in the Contract Documents to be performed under this Contract.

B. The items listed below refer to and are the same pay items listed in the Bid Form. They constitute all the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory work, services, job signs, sanitary requirements, testing, safety devices, surveying, field engineering, record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, and all other requirements of the Contract Documents.

C. Each lump sum and unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for the Project.

D. Excavation, trenching, backfill, and compaction are not separate bid items but are an integral part of the work under the contract, unless otherwise noted in the measurement and payment and bid schedule line items, and the Contract Bid Price shall include this work. Excavating and trenching shall include, but are not limited to, removal of any and all material necessary to satisfactorily install the storm pipe network and realign the water and sewer service lines and other utilities. Rock excavation removal and disposal, unsuitable soils excavation and disposal and select backfill replacement are considered UNCLASSIFIED EXCAVATION; and to be included in the Contract Bid Price unless otherwise noted in the measurement and payment and the bid schedule line items.

E. Progress Payment for any item for which certifying surveys are required shall be made based on estimated quantities verified by the ENGINEER.

F. Certifying surveys will be required for payment greater than 75% of the estimated total amount of that bid item.

G. No Final Payment will be made for any item for which required certifying surveys have not been submitted and approved by the ENGINEER.

H. Pay Items

1. Mobilization

a. Measurement

1) There shall be no measurement for Mobilization.

b. Payment

1) The lump sum price bid for Mobilization to be paid for shall be full compensation related to preparing for work and associated operations, including but not limited to the necessary movement of personnel, equipment, supplies, and incidentals to or near the project site; for

establishing offices and facilities as may be required for the work; and the subsequent removal of personnel, equipment, supplies, and incidentals from the work site at the completion of the work; and all other costs which the CONTRACTOR may incur for the work which are excluded from other bid items (See **Specification: 03 00 00 – Special Construction – General**).

2) Payment for Mobilization shall be evenly distributed over the first three monthly pay requests, provided the lump sum bid for Mobilization is equal to or less than 5% of the total contract price. When the lump sum bid for Mobilization exceeds 5% of the total contract price, any and all amount in excess of 5% of the total contract price shall be payable on the final monthly pay request. Retainage shall be applied in all instances as provided in the Contract Documents

2. Construction Surveying

   a. Measurement

      1) There shall be no measurement for Construction Surveying. CONTRACTOR shall provide Construction Surveying per **Specification – 01 04 00 – Construction Surveying**.

   b. Payment

      1) Payment for "Construction Surveying" will be made under the contract lump sum based upon a percentage complete of the project.

3. Temporary Traffic Control

   a. Measurement

      1) There shall be no measurement for Temporary Traffic Control. CONTRACTOR shall provide Temporary Traffic Control per **Specification: 03 00 00 – Special Construction - Temporary Traffic Control**.

   b. Payment

      1) Temporary Traffic Control shall be lump sump payment.

4. Furnish, Install and Maintain Inlet Protection

   a. Measurement

      1) The number of inlet protection devices to be paid for under this Item will be the actual number of structures installed, as shown on the Drawings and accepted by the ENGINEER. For more details, reference **Specification: 02 00 10 – Erosion and Sedimentation Controls.**

   b. Payment

      1) The unit price shall include all items required for complete installation of the materials required to adequately prevent sediment from entering inlet, and removal upon disturbed areas having been reestablished.

5. Furnish, Install and Maintain Temporary Stone Check Dams

   a. Measurement

1) The quantity of Rock to be paid for will be the actual number of tons of Rock. The number of tons will be based upon the trip delivery tickets of each and every truck delivering Rock to the project. The contractor will collect a copy of each trip ticket from the driver of each truck prior to placing the Rock. Each ticket shall clearly show the tare weight in tons and be identified as "Trent Woods Stormwater Improvement Project – Coquina Cir. & Carteret Dr.".

b. Payment

1) The unit price for Temporary Stone Check Dams shall include full compensation for all labor, equipment, and materials, including the cost of purchasing, transporting, placing, and maintaining the Temporary Stone Check Dams.

6. Furnish, Install and Maintain Temporary Wattles

a. Measurement

1) The number of Temporary Wattles to be paid for under this Item will be the actual number of devices installed, as shown on the Drawings and accepted by the ENGINEER.

b. Payment

1) The unit price for Temporary Wattles shall include full compensation for all labor, equipment, and materials, including the cost of purchasing, transporting, placing, and maintaining the Temporary Wattles.

7. Furnish and Install NCDOT Approved Geotextile Fabric (Permanent)

a. Measurement

1) The quantity of permanent turf reinforcement matting to be paid for will be the actual square yards of matting installed onsite. The installation square footage will be based on field measurements. No allowance will be made for material in overlaps and seams.

b. Payment

1) The contract unit price and payment shall constitute full compensation for furnishing all labor, material, equipment, and performing all operations in connection with placing the engineering fabric as shown on the contract plans or as directed by the Engineer.

8. Furnish and Install Stream Bank with Class "B" Rip-Rap

a. Measurement

1) The quantity of Rip-Rap to be paid for will be the actual number of tons of Rip-Rap. The number of tons will be based upon the trip delivery tickets of each and every truck delivering Rip-Rap to the project. The contractor will collect a copy of each trip ticket from the driver of each truck prior to placing the Rip-Rap. Each ticket shall clearly show the tare weight in tons and be identified as "Trent Woods Stormwater Improvement Project – Coquina Cir. & Carteret Dr.".

b. Payment

1) The unit price for Rip-Rap shall include full compensation for all labor, equipment, and materials, including the cost of purchasing, transporting, and placing Rip-Rap.

9. Temporary Seeding & Mulching
    a. Measurement
        1) The area for temporary seeding & mulching shall be measured in acres. In general, the quantity of the area consists of the limits of disturbance minus all impervious areas where indicated.
    b. Payment
        1) The unit price shall include all temporary seeding and mulching of the disturbed area within limits of construction, and shall compensation for all labor, materials, and equipment required to the site as shown on the Drawings and as described in the Specifications and accepted by NCDOT, local erosion control officer, OWNER, the ENGINEER.
10. Site Clearing (Includes Tree Removal Along Outfall Ditch)
    a. Measurement
        1) There shall be no measurement for Site Clearing. This task includes the removal of forested vegetation (trees, shrubs, etc.) only as necessary to install the armored Outfall Ditch as shown on the Drawings. Areas absent of forested vegetation shall be considered incidental to the Work with no direct payment for the associated incidental clearing.
    b. Payment
        1) The lump sum price for Clearing shall include full compensation for all labor, equipment, and materials required to perform Clearing and any incidental grubbing as outlined in **Specification Section 02 00 00 - Site Clearing**. No payment will be made for clearing beyond specified limits of construction.
11. Remove and Dispose of Asphalt (Roadway & Driveways)
    a. Measurement
        1) The quantity of existing asphalt to removed shall be per square yard. Total quantities shall be verified by field measurements.
    b. Payment
        1) The unit prices bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals, including the cost of removal, haul off and disposal, required to remove all asphalt as shown on the Drawings and specified herein.
12. Remove and Dispose Concrete (Driveways)
    a. Measurement
        1) The quantity of existing concrete to removed shall be per square yard. Total quantities shall be verified by field measurements.

b. Payment

1) The unit prices bid for this Item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals, including the cost of removal, haul off and disposal, required to remove all concrete as shown on the Drawings and specified herein.

13. Remove and Dispose Existing 4" PVC

a. Measurement

1) The quantity of 4-inch Diameter PVC to be paid for will be the actual linear feet of pipe removed.

b. Payment

1) The unit price 4-inch Diameter PVC shall include full compensation for all labor, equipment, and materials for the removal, haul off, and disposal of PVC in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.

14. Remove and Dispose Existing 15" RCP

a. Measurement

1) The quantity of 15-inch Diameter RCP to be paid for will be the actual linear feet of pipe removed.

b. Payment

1) The unit price 15-inch Diameter RCP shall include full compensation for all labor, equipment, and materials for the removal, haul off, and disposal of RCP in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.

15. Abandon in Place Existing 15" RCP

a. Measurement

1) The quantity of 15-inch Diameter RCP to be paid for will be the actual linear feet of pipe abandoned.

b. Payment

1) The unit price 15-inch Diameter RCP shall include full compensation for all labor, equipment, and materials for the abandonment of RCP in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.

16. Remove and Dispose Existing 24" RCP

a. Measurement

1) The quantity of 24-inch Diameter RCP to be paid for will be the actual linear feet of pipe removed.

b. Payment

1) The unit price 24-inch Diameter RCP shall include full compensation for all labor, equipment, and materials for the removal, haul off, and disposal of RCP

in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.

17. Remove and Dispose Existing 18" CMP
    a. Measurement
        1) The quantity of 18-inch Diameter CMP to be paid for will be the actual linear feet of pipe removed.
    b. Payment
        1) The unit price 18-inch Diameter CMP shall include full compensation for all labor, equipment, and materials for the removal, haul off, and disposal of RCP in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.
18. Remove and Dispose Existing Catch Basins
    a. Measurement
        1) The number of Catch Basins to be removed is to be paid per actual number of existing Catch Basin structures removed.
    b. Payment
        1) The unit price for removing each Catch Basin structure shall include the labor, equipment, and materials necessary for the removal, haul off, and disposal of each item in accordance with **Specification 03 00 00 – DEMOLITION/REMOVAL OF STRUCTURES**.
19. Earthwork
    a. Measurement
        1) The Earthwork will be paid at the contract lump sum price, regardless of the quantity needed to build the project to design. Partial payments will be equal to the percentage of such item that is completed as estimated by the engineer.
    b. Payment
        1) The price and payment will be full compensation for all work covered by this section, the construction drawings, Specification and all other applicable specifications, including but not limited to:
            a) Unclassified Excavation;
            b) Embankment;
            c) Drainage Ditch Excavation;
            d) Fine Grading Subgrade, Site;
            e) Spreading and Placement of Topsoil;
            f) Final Grading;
            g) Incidental Grading

2) No additional Payments will be made for:

a) Extra handling or hauling of material onsite or offsite.

b) Moisture adjustment of material.

c) Construction, maintenance and restoration of Haul roads.

d) Watering for dust control.

e) Blasting of rock, or the associated permitting, fees, and offsite disposal of unsuitable blasted material.

f) Excavation, handling, hauling, and disposal of any material uncovered during the project excavation deemed hazardous or unsuitable by the contract, Owner, Inspector, or the Owner's Representatives.

g) Undercut excavation as required due to actions by the Contractor and his sub-contractors, or necessary due to weather.

h) Any other aspect of the work or incidental measures, whether or not specifically mentioned in the contract that are necessary and/or ancillary components to the Earthwork.

20. Furnish and Install Asphalt Pavement Patch

a. Measurement

1) The cubic yards of asphalt furnished and installed which will be paid for under this item be the square yards of asphalt, as shown on the Drawings and accepted by the ENGINEER.

b. Payment

1) The unit prices bid for this item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required, including but not limited to, bedding, compaction, backfill, tack/bond coat, painted markings, and all other work items necessary to repair all asphalt as shown on the Drawings and in accordance with **Specification 02 00 45 – ASPHALT CONCRETE**

21. Furnish and Install Concrete Driveway Aprons

a. Measurement

1) The quantity of concrete to be paid for will be the actual number of square yards of concrete per plan and details.

b. Payment

1) The unit price of concrete shall include full compensation for all labor, equipment and materials, including the cost of purchasing, transporting, and installing the concrete, including foundation preparation, rebar supply and installation, formwork, associated excavation and backfilling, and all other incidentals associated with construction of the driveway apron repairs.

22. Furnish and Install SOD

a. Measurement

1) Sod shall be measured in square yards as indicated on drawings.

b. Payment

1) The unit price for this item will be for full compensation of labor, equipment, materials, installation, and watering of sod per plans and in accordance with **Specification 02 01 00 – LANDSCAPING AND PLANTING**.

23. Furnish and Install Replacement Landscaping

a. The following measurement and payment instruction applies to the following categories:

1) SHRUB (1 GAL)

2) DÉCOR TREE (10 GAL)

b. Measurement

1) The quantity of trees and shrubs to be paid for will be the actual number installed where expressly called for on the Drawings.

c. Payment

1) The unit price for this item will be for full compensation of labor, equipment, materials, excavation and proper disposal of soil, installation, and watering of the trees and shrubs per plan and in accordance with **Specification 02 01 00 – LANDSCAPING AND PLANTING**.

24. Furnish and Install 24" RCP

a. Measurement

1) The quantity of 24” RCP installation to be paid for will be the actual linear feet of 24” RCP installed.

b. Payment

1) The unit price for this item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and install the drainage pipe as shown on the Drawings and specified herein including excavation, backfill, bedding, the installation of the drainage pipe, fittings, and all other incidentals required to install the pipe.

25. Furnish and Install 3’x3’ I.D. Drop Inlet Structure (NCDOT 840.14)

a. Measurement

1) The number of Drop Inlets/Catch Basins to be paid for under this Item will be the actual number of Drop Inlets/Catch Basins installed.

b. Payment

1) The unit price for this item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and install the catch basin as shown on the Drawings and specified herein including excavation and undercut at the direction of the geotechnical engineer, protection of utilities, backfill, bedding the installation of the catch basin,

fittings, connection to the storm drainage pipes, fine grading, and all other incidentals required to install the catch basin.

26. Furnish and Install 5’x3’ I.D. Drop Inlet Structure (NCDOT 840.14)
    a. Measurement
        1) The number of Drop Inlets/Catch Basins to be paid for under this Item will be the actual number of Drop Inlets/Catch Basins installed.
    b. Payment
        1) The unit price for this item will be full compensation for all labor, materials, tools, equipment, supervision, and incidentals required to furnish and install the catch basin as shown on the Drawings and specified herein including excavation and undercut at the direction of the geotechnical engineer, protection of utilities, backfill, bedding the installation of the catch basin, fittings, connection to the storm drainage pipes, fine grading, and all other incidentals required to install the catch basin.
27. Furnish and Install 24" FES
    a. Measurement
        1) The number of 24” FES to be paid for under this Item will be the actual number of FES installed.
    b. Payment
        1) The unit price shall include full compensation for all labor, equipment, and materials, including the cost of transporting, stockpiling, and installing the 24” FES.
28. Furnish and Install Headwall (NCDOT 838.80)
    a. Measurement
        1) The quantity of the Headwall to be paid for will be the actual number of each Headwall being installed onsite.
    b. Payment
        1) The unit price shall include full compensation for all labor, equipment, and materials, including the cost of transporting, stockpiling, and installing the Headwall.
29. Relocate Water Service Line (1”-1.5” PVC)
    a. Measurement
        1) The number of connections to existing water mains which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.
    b. Payment
        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to connect the water service lines to the existing water main including closing valve,

removing concrete blocking, removing cap, joining the pipe, and cutting and capping existing galvanized water line with **Specification 04 00 30 – PUBLIC WATER UTILITY DISTRIBUTION PIPING**.

30. Relocate Water Meter
    a. Measurement
        1) The number of water meters relocated which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.
    b. Payment
        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to relocate water meters with **Specification 04 00 30 – PUBLIC WATER UTILITY DISTRIBUTION PIPING**.
31. Relocate Water Service Line to Fire Hydrant (6” PVC)
    a. Measurement
        1) The number of connections to existing water service lines which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.
    b. Payment
        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to connect fire hydrants to water service lines with **Specification 04 00 30 – PUBLIC WATER UTILITY DISTRIBUTION PIPING**.
32. Relocate Water Main (2” PVC)
    a. Measurement
        1) The number of existing water mains that need to be relocated which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.
    b. Payment
        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to connect the water main lines including closing valve, removing concrete blocking, removing cap, joining the pipe, and cutting and capping existing galvanized water line with **Specification 04 00 30 – PUBLIC WATER UTILITY DISTRIBUTION PIPING**.
33. Furnish and Install 20 LF of 4” 401 DI at Each Sewer Service Line Conflict
    a. Measurement
        1) The quantity of 4” 401 DI installation to be paid for will be the number of sewer service line conflicts in place, tested, and accepted by the ENGINEER.
    b. Payment

1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to furnish and install the sewer service lines as shown on the Drawings and specified herein including excavation, backfill, bedding, coring of the conflict box, the installation of the sewer service pipe, the specified fittings, and all other incidentals required to install the pipe and to connect to the existing sewer line with **Specification 04 00 35 – PUBLIC SANITARY SEWERAGE GRAVITY PIPING**.

34. Relocate Water Valve (To Fire Hydrant)

    a. Measurement

        1) The number of connections to existing fire hydrants and/or water main lines which will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

    b. Payment

        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, and incidentals required to connect water valves to the existing fire hydrant and water main line with **Specification 04 00 30 – PUBLIC WATER UTILITY DISTRIBUTION PIPING**.

35. Coordinate Relocation of Gas Service Lines with Utility Owner

    a. Measurement

        1) The number of crossing gas service lines over or under the proposed Work to be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

    b. Payment

        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, incidentals, and coordination with utility company required to relocate the gas service line.

36. Coordinate Relocation of Fiber Optics Service Lines with Utility Owner

    a. Measurement

        1) The number of crossing fiber optics service lines over or under the proposed Work will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

    b. Payment

        1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, incidentals, and coordination with utility company required to relocate the fiber optics service line.

37. Coordinate Relocation of Underground Electric Lines with Utility Owner

    a. Measurement

1) The number of crossing underground electric lines over or under the proposed Work will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

b. Payment

1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, incidentals, and coordination with utility company required to relocate the underground electric line.

38. Coordinate Relocation of Television Service Lines with Utility Owner

a. Measurement

1) The number of crossing television service lines over or under the proposed Work will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

b. Payment

1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, incidentals, and coordination with utility company required to relocate the television service line.

39. Coordinate Relocation of Telephone Service Lines with Utility Owner

a. Measurement

1) The number of crossing telephone service lines over or under the proposed Work will be paid for under this item will be the number in place, tested, and accepted by the ENGINEER.

b. Payment

1) The unit price bid for this item shall be full compensation for all labor, material, tools, equipment, supervision, incidentals, and coordination with utility company required to relocate the telephone service line.

40. Chlorinate, Flush, and Line Test (Water Line Post-Construction)

a. Measurement

1) The quantity of Chlorinate and Line Test that will be done post-construction to be to be paid for will be the actual linear feet of the waterline pipe installed or relocated.

b. Payment

1) The unit price to Chlorinate and Line Test shall include full compensation for all labor, equipment, and materials for the disinfection and testing of the newly installed water line in accordance with **Specification 04 00 10 – DISINFECTION OF WATER UTILITY PIPING SYSTEM**.

END OF SECTION

SECTION 01 04 00

CONSTRUCTION SURVEYING

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Provide construction surveying required in execution of the Project.

B. Provide surveying to be used for documenting construction and for the preparation of Record Drawings.

C. The CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of North Carolina to perform all surveying.

1.02. SUBMITTALS

A. Submit name and address of registered land surveyor to be used on this project to the ENGINEER within 5 days of the Notice to Proceed.

B. On request of the ENGINEER, submit documentation to verify accuracy of surveying work.

C. Hard Copy of Construction Record

1. Submit construction record of items required to be surveyed. The Drawing must be sealed by a registered land surveyor.

D. Electronic Documents

1. An electronic file, compatible with the DXF (Drawing Exchange Format) format, containing survey points of both horizontal (X, Y) and vertical (tops and inverts, or Z) information shall be provided on a CD.

1.03. DATUM

A. The CONTRACTOR shall be responsible for correctly locating all lines and grades and for performing all measuring as required for the construction and completion of the Work from established reference points and information is shown on the Contract Drawings.

B. All horizontal data shall be tied to North Carolina State Plane Coordinate System, **NAD 83**. These drawings shall constitute the project record documents.

C. All vertical data shall be tied to North Carolina State Plane Coordinate System, **NAVD 88** coordinates.

1.04. SURVEY REFERENCE POINTS

A. Only such primary control lines, monuments, and bench marks (if any) will be set by the OWNER as the OWNER determines to be necessary to control establishment of the lines and grades required for completion of the Work. In general, these will consist of the primary horizontal and vertical control points indicated on the Contract Drawings. All other stakes or markers required to establish the lines and grades required for the completion of the Work shall be the responsibility of the CONTRACTOR.

B. Primary control monuments set by the OWNER shall be carefully preserved by the CONTRACTOR. In case such monuments are destroyed or damaged, they will be replaced at the CONTRACTOR's expense.

1.05. SURVEYS FOR LAYOUT AND PERFORMANCE

A. Surveying Requirements

1. Perform all surveys for layout and performance of the Work, reduce the field notes, and make all calculations and drawings necessary to carry out such work. The CONTRACTOR shall check the relative positions of all monuments and benchmarks to be used and shall report any damaged or out-of-position monuments to the ENGINEER at once. The CONTRACTOR shall check such relative positions each time the CONTRACTOR uses such monument or benchmark.

B. Equipment and Personnel

1. The CONTRACTOR's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times. Perform all surveys under the direct supervision of a professional land surveyor or ENGINEER currently licensed or registered in the State of North Carolina.

C. Field Notes and Records

1. Furnish the original pages of all survey records to the ENGINEER at intervals required by the ENGINEER. Furnish each field notebook to the ENGINEER when filled or completed.

D. Use by the ENGINEER

1. The ENGINEER may at any time use line and grade points and markers established by the CONTRACTOR. The CONTRACTOR's surveys are a part of the work and may be checked by the ENGINEER at any time. The CONTRACTOR shall be responsible for any lines, grades, or measurements which do not comply with specified or proper tolerances, or which are otherwise defective, and for any resultant defects in the work. The CONTRACTOR shall conduct resurveys or check surveys to correct errors indicated by review of the field notebooks or by check surveys performed by the ENGINEER.

1.06. SURVEYING FOR PREPARATION OF RECORD DRAWINGS

A. The following items are required to be surveyed by a registered land surveyor to be used in the preparation of Record Drawings.

1. Valves
2. Hydrants
3. Blow-offs
4. Meters
5. Pipe Fittings
6. Air Release Valves
7. Sewer Service Cleanouts
8. Structures Including Rim, Pipe Inverts, and Vent Elevations
9. Equipment Foundation Pads

10. Final Grade

1.07. SURVEYING ACCURACY AND TOLERANCES IN SETTING SURVEY STAKES

A. Surveying Accuracy

1. Control

a. Control traverse field surveys and computations, including surveys of main control lines to determine horizontal and vertical alignment of major structure components, shall meet the accuracy requirements for Second Order, Class I Surveys as specified by the National Oceanic and Atmospheric Administration (NOAA).

2. Staking

a. Staking for construction or equipment installations shall meet the accuracy requirements for Second Order, Class II Surveys as specified by NOAA.

3. Record Drawing Documentation

a. Surveying to be used for the preparation of Record Documents shall meet the accuracy requirements for Second Order, Class I Surveys as specified by the National Oceanic and Atmospheric Administration (NOAA).

B. Tolerances

1. The tolerances generally applicable in setting survey stakes shall be as set forth above. Such tolerances shall not supersede stricter tolerances required by the Contract Drawings or Specifications, and shall not otherwise relieve the CONTRACTOR of responsibility for measurements in compliance therewith.

END OF SECTION

SECTION 01 05 50

RESPONSIBILITIES OF RESIDENT PROJECT REPRESENTATIVE

PART 1 GENERAL

1.01. THE REQUIREMENT

A. 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.

1.02. DUTIES AND RESPONSIBILITIES

A. General

1. 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.

B. Schedules

1. Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.

C. Conferences and Meetings

1. Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.

D. Liaison

1. 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.

2. Assist ENGINEER in serving as OWNER’s liaison with CONTRACTOR when CONTRACTOR’s operations affect OWNER’s onsite operations.

3. Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.

E. Interpretation of Contract Documents

1. Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to CONTRACTOR clarifications and interpretations as issued by ENGINEER.

F. Shop Drawings and Samples

1. Record date of receipt of Samples and CONTRACTOR-approved Shop Drawings.

2. Receive Samples which are furnished at the Site by CONTRACTOR and notify ENGINEER of availability of Samples for examination.

3. 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.

G. Modifications

1. 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.

H. Review of Work and Rejection of Defective Work

1. 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.

2. 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.

I. Inspections, Tests, and System Start-ups

1. 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.

2. Observe, record, and report to ENGINEER appropriate details relative to the test procedures and systems start-ups.

J. Records

1. Prepare a daily report or keep a diary or log book, recording CONTRACTOR's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to ENGINEER.

2. 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.

3. Maintain records for use in preparing Project documentation.

K. Reports

1. 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.

2. Draft and recommend to ENGINEER proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from CONTRACTOR.

3. 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.

L. Payment Requests

1. 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.

M. Certificates, Operation and Maintenance Manuals

1. 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.

N. Completion

1. 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.

2. 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.

3. 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.

1.03. LIMITATIONS OF AUTHORITY

A. 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.

END OF SECTION

SECTION 01 20 00

PROJECT MEETINGS

PART 1 GENERAL

1.01. THE REQUIREMENT

A. The ENGINEER shall schedule and administer a pre-construction meeting, periodic progress meetings, and specially called meetings throughout progress of the work. The ENGINEER shall:

1. Prepare agenda for meetings
2. Make physical arrangements for meetings
3. Preside at meetings
4. Keep a record of the meeting, to include significant proceedings and decisions
5. Reproduce and distribute copies of the record within five working days after each meeting
    a. To participants in the meeting
    b. To parties affected by decisions made at the meeting

B. Representatives of the CONTRACTOR, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. The CONTRACTOR shall provide an updated schedule at each Project meeting.

D. The CONTRACTOR shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02. PRE-CONSTRUCTION MEETING

A. The ENGINEER will schedule a pre-construction meeting in accordance with the General Conditions.

1. Location
    a. A central site, convenient for all parties, designated by the OWNER
2. Attendance
    a. ENGINEER
    b. OWNER’s Representative
    c. CONTRACTOR's Superintendent
    d. Major Subcontractors
    e. Major suppliers
    f. Utilities
    g. Others as appropriate
3. Agenda
    a. Distribution and discussion of

1) List of major subcontractors and suppliers
2) Projected Construction Schedules

b. Critical work sequencing

c. Major equipment deliveries and priorities

d. Project Coordination

1) Designation of responsible personnel

e. Procedures and processing of

1) Field decisions
2) Proposal requests
3) Submittals
4) Change Orders
5) Applications for Payment (monthly date of Payment to be determined)

f. Adequacy of distribution of Contract Documents

g. Procedures for maintaining Record Documents

h. Use of premises

1) Office, work and storage areas
2) OWNER's requirements
3) Construction facilities, controls and construction aids
4) Temporary utilities
5) Housekeeping procedures
6) Safety

1.03. PROGRESS MEETINGS

A. The ENGINEER will schedule regular progress meetings.

1. The progress meetings will be held approximately every 30 days with the first meeting approximately 30 days after the date of Notice to Proceed.

B. ENGINEER, OWNER, or CONTRACTOR may hold or call meetings as required by progress of the work.

C. Location of the meetings

1. TBD at a location in proximity to the project. Project field office of CONTRACTOR, ENGINEER or OWNER may be utilized.

D. Attendance

1. OWNER's Representative
2. Engineer
3. RPR

4. CONTRACTOR's Superintendent
5. Subcontractors as appropriate to the agenda
6. Suppliers as appropriate to the agenda
7. Others as appropriate

E. Agenda

1. Review, approval of minutes of previous meeting
2. Review of work progress since previous meeting
3. Field observations, problems, conflicts
4. Problems which impede Construction Schedule
5. Review of off-site fabrication, delivery schedules
6. Measures and procedures to maintain projected schedule
7. Revisions to Construction Schedule
8. Progress, schedule, during succeeding work period
9. Coordination of schedules
10. Review submittal schedules; expedite as required
11. Maintenance of quality standards
12. Pending changes and substitutions
13. Review proposed changes for
    a. Effect on Construction Schedule and on completion date
    b. Effect on other contracts of the project
14. Construction Schedule
15. Critical/long lead items
16. Other business

F. The CONTRACTOR is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.

G. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with Specification Section 01 30 00 - Submittals.

END OF SECTION

SECTION 01 30 00

SUBMITTALS

PART 1 GENERAL

1.01. THE REQUIREMENT

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. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

C. Submittal Format

1. Except for samples, only electronic submittals shall be allowed. Manufacturer's original electronic files or legible, clear scans of printed material may be accepted. If the information is originally provided in color, the electronic copy shall reproduce such colors in sufficient detail to convey the original meaning of the information. For submittals where a color choice is to be made, the submittal shall faithfully reproduce the original colors. If a color choice is revised by the OWNER, on the basis that colors were not faithfully reproduced in the submittal, the CONTRACTOR shall bear all costs associated with the color change. Such color changes, even if they are required after the equipment is delivered, shall be in full accordance with the manufacturer's recommendations.

2. All electronic files shall be provided in pdf format unless otherwise approved or requested by the ENGINEER.

3. Naming convention for electronic submittals shall be YYMMDD – PROJECT NUMBER - TRADE – SPECIFICATION SECTION – SUBMITTAL NAME – REVISION NUMBER.pdf (for example, 140526 – 061345 – Mechanical – 02510 – Water Distribution System, Ductile Iron Pipe – Revision 0).

D. Progress Schedule

1. Within fifteen days after issuance of the Notice to Proceed, the CONTRACTOR shall prepare and submit an electronic copy of his proposed progress schedule to the ENGINEER for review and approval.

2. If so required, the schedule shall be revised until it is approved by the ENGINEER.

3. Schedule shall be updated monthly, depicting progress to the last day of the month.

4. An electronic copy of the updated schedule shall be submitted to the ENGINEER not later than the fifth day of the month with the application for progress payment.

5. The application for progress payment shall be considered incomplete until the updated schedule is received.

6. Schedule shall be prepared in the form of a horizontal bar chart showing the proposed sequence of the work in sufficient detail and identifying construction activities consistent with the CONTRACTOR's schedule of values in the application for progress payment.
7. Schedule shall be time scaled, identifying the first day of each week, with the estimated start and complete date of each stage of the work in order to complete the Project within the Contract time.
8. Updated schedule shall show all changes since the previous schedule.
9. All revisions to the schedule must have the prior approval of the ENGINEER.

E. Submittal Register

1. CONTRACTOR shall prepare and submit an electronic copy of his schedule of submittals or submittal register to the ENGINEER for review and approval. The submittal register shall include all items and information that the CONTRACTOR is required to submit for the ENGINEER to review throughout the course of the project. This shall include all equipment and materials for the project, required CONTRACTOR, subcontractor, or manufacturer qualifications, warranty submittals, etc.
2. If so required, the schedule shall be revised until it is approved by the ENGINEER.
3. Schedule shall be updated monthly.
4. CONTRACTOR shall prepare and submit an electronic copy of the updated schedule to the ENGINEER not later than the fifth day of every month with the application for progress payment.
5. The application for progress payment shall be considered incomplete until the updated schedule is received.
6. The updated schedule shall be based on the Progress Schedule developed under the requirements of Paragraph 1.01(B) of this Section.
7. Schedule shall be in tabular form with appropriate spaces to insert the following information for principal items of equipment and materials:
    a. Dates on which Shop Drawings and other information are requested and received from the manufacturer or other appropriate source
    b. Dates on which certification/information is received from the manufacturer or other appropriate source and transmitted to the ENGINEER
    c. Dates on which Shop Drawings and other information are submitted to the ENGINEER and returned by the ENGINEER for revision
    d. Dates on which Shop Drawings and other information are revised by manufacturer and resubmitted to the ENGINEER
    e. Date on which Shop Drawings and other information are returned by ENGINEER annotated either "No Exceptions Taken" or "Correct as Noted"
    f. Date on which accepted Shop Drawings and other information are transmitted to manufacturer or other appropriate recipient
    g. Date of manufacturer's scheduled delivery

h. Date on which delivery is actually made

F. Working Drawings

1. Within thirty days after the Notice to Proceed, the CONTRACTOR shall prepare and submit an electronic copy of his preliminary schedule of Working Drawing submittals to the ENGINEER for review and approval.
2. If so required, the schedule shall be revised until it is approved by the ENGINEER.
3. Working Drawings include, but are not limited to, Shop Drawings, layout drawings in plan and elevation, installation drawings, elementary wiring diagrams, interconnecting wiring diagrams, manufacturer's data, etc.
4. CONTRACTOR shall be responsible for securing all of the information, details, dimensions, Drawings, etc., necessary to prepare the Working Drawings required and necessary under this Contract and to fulfill all other requirements of his Contract.
5. CONTRACTOR shall secure such information, details, Drawings, etc., from all possible sources including the Drawings, Working Drawings prepared by subcontractors, Engineer's, suppliers, etc.
6. Working Drawings shall accurately and clearly present the following:
   a. All working and installation dimensions
   b. Arrangement and sectional views
   c. Units of equipment in the proposed positions for installation, details of required attachments and connections, and dimensioned locations between units and in relation to the structures.
   d. Necessary details and information for making connections between the various trades including, but not limited to, power supplies and interconnecting wiring between units, accessories, appurtenances, etc.
7. In the event that the ENGINEER is required to provide additional engineering services as a result of a substitution of materials or equipment proposed by the CONTRACTOR, the additional engineering services will be provided in accordance with Section 00 07 00 – General Conditions.
8. All changes indicated necessary to accommodate the equipment and appurtenances shall be incorporated into the Working Drawings submitted to the ENGINEER.
9. Working Drawings specifically prepared for this Project shall be submitted electronically and prepared on sheets of the same size as the Drawings.
10. Working Drawings shall conform to recognized drafting standards and be neat, legible, and drawn to a large enough scale to show in detail the required information.
11. The Contract Drawings are used for engineering and general arrangement purposes only and are not to be used for Working Drawings.
12. Professionally Sealed Drawings
    a. Submittals involving engineering design services shall bear the signature and seal of a professional ENGINEER currently licensed in the State of North Carolina for the discipline involved.

13. Shop Drawings
    a. CONTRACTOR shall submit Shop Drawings for review by the ENGINEER.
    b. Shop Drawings shall be furnished for all fabricated work and for all manufactured items required to be furnished by the Contract Documents.
    c. Structural and all other layout Drawings prepared specifically for the Project shall have a plan scale of not less than ¼-inch = 1 foot.
    d. Where manufacturer's publications in the form of catalogs, brochures, illustrations or other data sheets are submitted in lieu of prepared Shop Drawings, such submittals shall specifically indicate the item for which approval is requested.
    e. Identification of items shall be made in ink, and submittals showing only general information are not acceptable.
    f. Only manufacturer’s original literature shall be accepted as submittals.
14. Layout and Installation Drawings
    a. CONTRACTOR shall prepare and submit for review by the ENGINEER layout and installation drawings for all pipes, valves, fittings, sewers, drains, heating and ventilation ducts, all electrical, heating, ventilating and other conduits, plumbing lines, electrical cable trays, lighting fixture layouts and circuiting, instrumentation, interconnection wiring diagrams, communications, power supply, alarm circuits, etc., under this Contract.
    b. The final dimensions, elevation, location, etc., of pipe, valves, fittings, sewers, ducts, conduits, electrical cable trays, equipment, etc., may depend upon the dimensions of equipment and valves to be furnished by the CONTRACTOR.
    c. Layout and installation drawings are required for both interior and exterior piping, valves, fittings, sewers, drains, heating and ventilation ducts, conduits, plumbing lines, electrical cable trays, etc.
    d. Layout and installation Drawings shall show connections to structures, equipment, sleeves, valves, fittings, etc.
    e. Drawings shall show the location and type of all supports, hangers, foundations, etc., and the required clearances to operate valves, equipment, etc.
    f. The Drawings for pipes, ducts, conduits, etc., shall show all 3-inch and larger electrical conduits and pressure piping, electrical cable trays, heating and ventilation ducts or pipes, structure, manholes or any other feature within four feet (measured as the clear dimension) from the pipe duct, conduit, etc., for which the profile is drawn.
15. CONTRACTOR Responsibilities
    a. All submittals from subcontractors, manufacturers or suppliers shall be sent directly to the CONTRACTOR for checking. CONTRACTOR shall thoroughly check all Drawings for accuracy and conformance to the intent of the Contract Documents.

b. Drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors, manufacturers, or suppliers by the CONTRACTOR for correction before submitting to the ENGINEER.

c. All submittals shall be organized, dated, properly labeled, and consecutively numbered.

d. Information on the label shall indicate Specification Section; Drawing number; subcontractor's, manufacturer's, or supplier's name; and the name or type of item the submittal covers.

e. Each part of a submittal shall be marked and tabulated.

f. Working Drawings shall be submitted as a single complete package including all associated drawings relating to a complete assembly of the various parts necessary for a complete unit or system.

g. Shop Drawings shall be submitted as a single complete package for any operating system and shall include all items of equipment and any mechanical units involved or necessary for the functioning of such system.

h. Where applicable, the submittal shall include elementary wiring diagrams showing circuit functioning and necessary interconnection wiring diagrams for construction.

i. All submittals shall be checked by the CONTRACTOR for accuracy and conformance to the intent of the contract documents before submitting to the ENGINEER.

j. Each submittal shall bear the CONTRACTOR's stamp of approval certifying that they have been so checked.

k. Submittals without the CONTRACTOR's stamp of approval will not be reviewed by the ENGINEER and will be returned to the CONTRACTOR.

l. If the submittals contain any departures from the Contract Documents, specific mention thereof shall be made in the CONTRACTOR's letter of transmittal and depicted within the submittal.

m. Otherwise, the review of such submittals shall not constitute approval of the departure.

n. No materials or equipment shall be ordered, fabricated, or shipped or any work performed until the ENGINEER returns to the CONTRACTOR the submittals, herein required and annotated either "No Exceptions Taken" or "Correct as Noted."

o. Where errors, deviations, and/or omissions are discovered at a later date in any of the submittals, the ENGINEER's prior review of the submittals does not relieve the CONTRACTOR of the responsibility for correcting all errors, deviations, and/or omissions.

16. Procedure for Review

a. Submittals shall be transmitted in sufficient time to allow the ENGINEER at least fifteen (15) working days for review and processing.

b. Illegible copies or copies with colors not conforming to 1.01.A.1. will not be accepted as submittals. They will be returned stamped **"Revise and Resubmit"**.

c. Submittal shall be accompanied by a letter of transmittal, in duplicate, containing date, project title, CONTRACTOR's name, number, and titles of submittals, notification of departures, and any other pertinent data to facilitate review.

d. Submittals will be annotated by the ENGINEER in one of the following ways:

1) "No Exceptions Taken"

2) **"Correct as Noted/Resubmittal Not Required"** - minor corrections are noted and shall be made.

3) **"Revise and Resubmit"** - major corrections are noted and a resubmittal is required or based on the information submitted, the submission is not in conformance with the Contract Documents. The deviations from the Contract Documents are too numerous to list and a completely revised submission of the proposed equipment or a submission of other equipment is required.

e. If a submittal is satisfactory to the ENGINEER, the ENGINEER will annotate the submittal **"No Exceptions Taken"** or **"Correct as Noted"** and return an electronic copy to the CONTRACTOR.

f. If a resubmittal is required, the ENGINEER will annotate the submittal **"Revise and Resubmit"** and transmit an electronic copy to the CONTRACTOR for appropriate action.

g. If reproducible, transparencies are submitted, the ENGINEER will retain the copies and return the reproducible transparencies to the CONTRACTOR.

h. CONTRACTOR shall revise and resubmit submittals as required by the ENGINEER until submittals are acceptable to the ENGINEER.

i. It is understood by the CONTRACTOR that the OWNER may charge the CONTRACTOR for the ENGINEER's charges for review in the event a submittal is not approved (**"Revise and Resubmit"**) by the third submittal for a system or piece of equipment.

j. These charges shall be for all costs associated with engineering review, meetings with the CONTRACTOR or manufacturer, etc., commencing with the fourth submittal of a system or type of equipment submitted for a particular Specification Section.

k. Acceptance of a Working Drawing by the ENGINEER will constitute acceptance of the subject matter for which the Drawing was submitted and not for any other structure, material, equipment, or appurtenances indicated or shown.

17. ENGINEER's Review

a. ENGINEER's review of the CONTRACTOR's submittals shall in no way relieve the CONTRACTOR of any of his responsibilities under the Contract.

b. An acceptance of a submittal shall be interpreted to mean that the ENGINEER has no specific objections to the submitted material, subject to conformance with the Contract Drawings and Specifications.

c. ENGINEER's review will be confined to general arrangement and compliance with the Contract Drawings and Specifications only, and will not be for the purpose of checking dimensions, weights, clearances, fittings, tolerances, interferences, coordination of trades, etc.

18. Record Working Drawings

a. Prior to final payment, the CONTRACTOR shall furnish the ENGINEER one complete electronic set of all accepted Working Drawings.

b. Manufacturer's publications, submitted in lieu of prepared Shop Drawings, will not be required in reproducible form.

c. Original manufacturer’s publications, in color, shall be provided in place of black and white copies.

d. Working Drawings furnished shall be corrected to include any departures from previously accepted Drawings.

G. Operation and Maintenance Manuals

1. The CONTRACTOR shall submit an electronic copy of Operation and Maintenance Manuals prepared specifically for this Project for each item of equipment furnished under this Contract at the time it is installed.

a.

2. Manuals shall contain complete information in connection with assembly, operation, lubrication, adjustment, wiring diagrams and schematics, maintenance, and repair, including detailed parts lists with drawings or photographs identifying the parts.

3. Once approved, three printed copies of the approved manuals shall be assembled and bound in separate volumes by major equipment items or trades and properly indexed to facilitate locating required information. All parts, sections, drawings, and other information in the approved, final Operation and Maintenance Manuals shall also be supplied in digital format on a compact disk. All O&M Manuals may be provided on one disk, size permitting.

4. ENGINEER and the OWNER shall be the sole judge of the acceptability and completeness of the manuals and may reject any submittal for insufficient information including incorrect references and/or the manner in which the material is assembled.

5. For pumps, the Operation and Maintenance manual cover sheets shall include the following:

a. Manufacturer

b. Manufacturer’s local representative with address and telephone number

c. Source of spare parts with address and telephone number

d. Operating conditions, i.e., rated capacity and TDH

e. Model number, serial number, and impeller diameter

6. The approved sets of operation and maintenance manuals shall be furnished prior to final acceptance.

H. Certified Shop Test Reports

1. Each piece of equipment for which pressure, head, capacity, rating, efficiency, performance, function, or special requirements are specified or implied shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and applicable test codes and standards.
2. The CONTRACTOR shall secure from the manufacturers legible electronic copies of the actual test data, the interpreted results and a complete description of the testing facilities and testing setup, all accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and notarized.
3. These reports shall be forwarded to the ENGINEER for review.
4. In the event any equipment fails to meet the test requirements, the manufacturer shall make all necessary changes, adjustments or replacements and the tests shall be repeated, at no additional cost to the OWNER or ENGINEER, until the equipment test requirements are acceptable to the ENGINEER.
5. No equipment shall be shipped to the Project until the ENGINEER notifies the CONTRACTOR, in writing, that the shop test reports are acceptable.
6. Copies of certified test data shall be incorporated into the Record Working Drawings.

I. Samples

1. CONTRACTOR shall furnish for review all samples as required by the Contract Documents or requested by the ENGINEER.
2. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, and range of color, finish, or texture.
3. Samples shall be properly labeled to show the nature of the material, trade name of manufacturer and location of the work where the material represented by the sample will be used.
4. Samples shall be checked by the CONTRACTOR for conformance to the Contract Documents before submitting to the ENGINEER.
5. Samples, or CONTRACTOR’s letter of transmittal accompanying the samples, shall bear the CONTRACTOR's stamp of approval certifying that they have been so checked.
6. Transportation charges on samples submitted to the ENGINEER shall be prepaid by the CONTRACTOR.
7. ENGINEER's review will be for compliance with the Contract Documents, and his comments will be transmitted to the CONTRACTOR with reasonable promptness.
8. Accepted samples will establish the standards by which the completed work will be judged.

END OF SECTION

SECTION 01 39 00
PRE-CONSTRUCTION VIDEO

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to video all construction areas within the project area, as shown in the Drawings and as specified herein.

1.02 QUALIFICATIONS

A. The video shall be done by a competent person who is experienced and qualified with the specified equipment.

1.03 COSTS OF VIDEO

A. The CONTRACTOR shall pay costs for specified video.

1.04 PRECONSTRUCTION AUDIOVISUAL RECORDING

A. Recordings shall not be made more than 60 days prior to construction. No construction shall begin prior to review and approval of the video covering the construction area by the ENGINEER. The ENGINEER shall have the authority to reject all or any portion of a video not conforming to specifications and require that it be redone at no additional charge. The CONTRACTOR shall reschedule unacceptable coverage within five days after being notified. The ENGINEER shall designate those areas, if any, to be omitted from or added to the video coverage. All video and written records shall become the property of OWNER.

PART 2 PRODUCTS

2.01 AUDIOVISUAL RECORDING

A. The total audio-visual system and the procedures employed in its use shall be such as to produce a finished product that will fulfill the technical requirements of the project. The video portion of the recording shall produce bright, sharp, clear pictures with accurate colors and shall be free from distortion or any other form of picture imperfection. All video recordings shall be electronic means, display on the screen the time of day, the month, day and year of the recording. This time and date information must be continuously and simultaneously generated with the actual recording. The audio portion of the recording shall produce the commentary of the camera operator with proper clarity and be free from distortion.

2.02 FORMAT

A. Deliver to ENGINEER one digital copy of the audiovisual recording by flash drive or file transfer site in a suitable file type format (.mp4, etc.) as approved by ENGINEER.

PART 3 EXECUTION

3.01 AUDIOVISUAL RECORDING

A. The recordings shall contain coverage of all surface features within the construction zone of influence. These features shall include, but not be limited to, all roadways, pavement, retention ponds, railroad tracks, curbs, driveways, sidewalks, culverts, headwalls, retaining walls, front side of house, landscaping, trees, and fences. Of particular concern shall be the existence or non-existence of any faults, fractures, or defects. Coverage shall be limited to one side of the street at one time and shall include all surface conditions located within the zone of influence supported by appropriate audio description. Panning, zoom-in, and zoom-out rates shall be sufficiently controlled to maintain a clear view of the object.

B. Accompanying the video recording of each video shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator, shall assist in viewer orientation and in any needed identification, differentiation, clarification, or objective description of the features being shown in the video portion of the recording.

C. Visibility: All recording shall be performed during times of good visibility; no recording shall be done during periods of significant precipitation, mist, or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subject and to produce sharp, bright video recordings of those subjects.

D. In order to ensure the continuity of coverage, the coverage shall consist of a single continuous unedited recording which begins at one end of a particular construction area; however, where coverage is required in areas not accessible by conventional wheeled vehicles and smooth transportation of the recording system is not possible, such coverage shall consist of an organized interrelated sequence of recordings at various positions along that proposed construction area (e.g., wooded easement area). Such coverage shall be obtained by walking or by a special conveyance approved by the ENGINEER.

E. The average rate of travel during a particular segment of coverage shall be directly proportional to the number, size, and value of the surface features within that construction area's zone of influence.

END OF SECTION

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Furnish, install and maintain temporary utilities required for construction and remove on completion of work.

1.02. REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and local codes and regulations and with utility company requirements.

C. Comply with North Carolina Department of Transportation Regulations.

1.03. MATERIALS

A. Materials may be new or used but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate the requirements of applicable codes and standards.

1.04. TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used in construction and testing.

B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available as required for construction using construction-type power cords.

1.05. TEMPORARY VENTILATION

A. Provide temporary ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work to meet specified OSHA requirements.

B. Provide temporary ventilation, if necessary, to protect materials from damage due to temperature or humidity.

1.06. TEMPORARY WATER

A. Make all necessary arrangements for obtaining water for construction purposes.

1.07. TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean, and maintain facilities and enclosures.

1.08. TEMPORARY PUMPS

A. Provide temporary pumps for removal of water from the excavation when required by the Work to maintain proper conditions for construction.

1.09. EXECUTION

A. Maintain and operate systems to assure continuous service.

B. Modify and extend systems as work progress requires.

1.10. REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore permanent facilities used for temporary services to original or better condition for specified use.

END OF SECTION

SECTION 01 55 00

SITE ACCESS AND STORAGE

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Access Roads

1. The CONTRACTOR shall construct and maintain such temporary access roads required to perform the work of this Contract.

2. Access roads shall be located within the easements of the OWNER unless the CONTRACTOR independently secures easements for his use and convenience.

a. CONTRACTOR shall submit written documentation to the ENGINEER for any easements secured by the CONTRACTOR across private property.

b. The easement agreement shall specify terms and conditions of use and provisions for site restoration.

c. A written release from the property OWNER, certifying that all terms of the easement agreement have been complied with by the CONTRACTOR, shall be furnished to the ENGINEER prior to final payment.

B. Parking Areas

1. The CONTRACTOR shall provide suitable parking areas for his construction personnel on the project site where approved by the ENGINEER and the OWNER.

2. The CONTRACTOR shall not permit his construction personnel to park along public streets or roads within the project area.

C. Restoration

1. At the completion of the work, the surfaces of land used for access roads and parking areas shall be restored by the CONTRACTOR to their original condition as determined by the ENGINEER.

a. Restoration shall include establishment of a permanent ground cover, where a ground cover existed, adequate to restrain erosion for all disturbed areas.

D. Traffic Regulations

1. CONTRACTOR shall obey all traffic laws and comply with all the requirements, rules, and regulations of the OWNER, the North Carolina Department of Transportation, and other local authorities having jurisdiction to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways.

E. Storage of Equipment and Materials

1. CONTRACTOR shall arrange for and store his equipment and materials at the job site in accordance with the requirements of the General Conditions, the Supplemental Conditions, and as hereinafter specified.

a. All materials shall be stored in accordance with manufacturer's recommendations, as directed by the OWNER or ENGINEER, and in conformity to

applicable statutes, ordinances, regulations, and rulings of the public authority having jurisdiction.

2. CONTRACTOR shall enforce the instructions of OWNER and ENGINEER regarding the posting of regulatory signs for fire safety and smoking areas.
3. CONTRACTOR shall not store materials upon private property without the written consent of the owners of such property.
4. CONTRACTOR shall not store unnecessary materials or equipment on the job site and shall take care to prevent any structure from being loaded with a weight which will endanger its security or the safety of persons.
5. Materials shall not be placed within 10-feet of fire hydrants.
6. Gutters, drainage channels, and inlets shall be kept unobstructed at all times.
7. CONTRACTOR shall provide adequate temporary storage buildings/facilities, if required, to protect materials or equipment on the job site.

END OF SECTION

SECTION 01 57 50
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 DEFINITIONS

A. Sediment: Soil and other debris that has eroded and has been transported by water or wind.

B. Solid Waste: Garbage, refuse, debris, sludge, or other discharged material (except hazardous waste as defined in paragraph entitled “Hazardous Waste” or hazardous debris as defined in paragraph entitled “Hazardous Debris”), including solid, liquid, semisolid, or contained gaseous materials resulting from domestic industrial, commercial, mining, or agricultural operations. Material not regulated as solid waste are: nuclear source or by product materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

C. Green Waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.

D. Surplus Soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.

E. Inert Construction and Demolition Debris: Broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be re-enforced with or contain ferrous wire, rods, accessories and weldments.

F. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.

G. Scrap Metal: Scrap and excess ferrous and non-ferrous metals such as re-enforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.

H. Paint Cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.

I. Recyclables: Material, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint

contaminated may be included as recyclable if sold to a scrap metal company. Paint cans may be included as recyclable if sold to a scrap metal company.

J. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

K. Hazardous Debris: As defined in paragraph entitled "**Debris**" of this **section**, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

L. Chemical Wastes: This includes salts, acids, alkalis, herbicides, pesticides, and organic chemicals.

M. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of

N. Hazardous Waste: Hazardous waste as defined in 40 CFR 261 or as defined by applicable State and Local regulations.

O. Oily Waste: Petroleum products and bituminous materials.

P. Class I Ozone Depleting Substance (ODS)

1. Class I ODS is defined in Section 602(a) of the Clean Air Act and includes the following chemicals:

    a. chlorofluorocarbon-11 (CFC-11)

    b. chlorofluorocarbon-12 (CFC-12)

    c. chlorofluorocarbon-13 (CFC-13)

    d. chlorofluorocarbon-111 (CFC-111)

    e. chlorofluorocarbon-112 (CFC-112)

    f. chlorofluorocarbon-113 (CFC-113)

    g. chlorofluorocarbon-114 (CFC-114)

    h. chlorofluorocarbon-115 (CGC-115)

    i. chlorofluorocarbon-211 (CFC-211)

    j. chlorofluorocarbon-212 (CFC-212)

    k. chlorofluorocarbon-213 (CFC-213)

l. chlorofluorocarbon-214 (CFC-214)

m. chlorofluorocarbon-215 (CFC-215)

n. chlorofluorocarbon-216 (CFC-216)

o. chlorofluorocarbon-217 (CFC-217)

p. halon-1211

q. halon-1301

r. halon-2402

s. carbon tetrachloride

t. methyl chloroform

1.02 SUBMITTALS

A. CONTRACTOR Liabilities for Environmental Protection

1. The CONTRACTOR is advised that this project is subject to Federal, State, and local regulatory agency inspections to review compliance with environmental laws and regulations. The CONTRACTOR shall fully cooperate with any representative from any Federal, State or local regulatory agency who may visit the job site and shall provide immediate notification to the ENGINEER, who shall accompany them on any subsequent site inspections. The CONTRACTOR shall complete, maintain, and make available to the ENGINEER, OWNER, or regulatory agency personnel all documentation relating to environmental compliance under applicable Federal, State and local laws and regulations. The CONTRACTOR shall immediately notify the ENGINEER if a Notice of Violation (NOV) is issued to the CONTRACTOR.

2. The CONTRACTOR shall be responsible for all damages to persons or property resulting from CONTRACTOR fault or negligence as well as for the payment of any civil fines or penalties which may be assessed by any Federal, State or local regulatory agency as a result of the CONTRACTOR'S or any SUBCONTRACTOR'S violation of any applicable Federal, State or local environmental law or regulation. Should a Notice of Violation (NOV), Notice of Noncompliance (NON), Notice of Deficiency (NOD), or similar regulatory agency notice be issued to the OWNER as facility owner/operator on account of the actions or in-actions of the CONTRACTOR or one of its SUBCONTRACTORS in the performance of work under this contract, the CONTRACTOR shall fully cooperate with the OWNER in defending against regulatory assessment of any civil fines or penalties arising out of such actions or in-actions.

1.03 PROTECTION OF NATURAL RESOURCES

A. Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. Conform to the national permitting requirements of the Clean Water Act.

B. Land Resources

1. Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the ENGINEER's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the ENGINEER. Where such use of attached ropes, cables, or guys is authorized, the CONTRACTOR shall be responsible for any resultant damage.

C. Protection of Trees

1. Protect existing trees, which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed.

2. Replacement

a. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain ENGINEER's approval before replacement.

D. Water Resources

1. Stream Crossings

a. The ENGINEER's approval is required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain ENGINEER's approval prior to installation. Remove temporary culverts or bridges upon completion of work, repair the area to its original condition or as specified.

2. Oily and Hazardous Substances

a. Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. For oil, fuel oil, or other hazardous substance spills, verbally notify the ENGINEER immediately. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.

E. Fish and Wildlife Resources

1. Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

1.04 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

A. Carefully protect in-place and report immediately to the ENGINEER historical and archaeological items or human skeletal remains discovered in the course of work. Stop work in the immediate area of the discovery until directed by the ENGINEER to resume

work. The OWNER retains ownership and control over historical and archaeological resources.

1.05 EROSION AND SEDIMENTATION CONTROL MEASURES

A. See **Section 02 00 00 – Erosion and Sedimentation Control**

1.06 CONTROL AND DISPOSAL OF SOLID WASTES

A. Pick up solid wastes, and place in covered containers, which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the ENGINEER and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 242, and 40 CFR 258.

1.07 CONTROL AND DISPOSAL OF HAZARDOUS WASTES

A. Hazardous Waste/Debris Management

1. The CONTRACTOR shall identify all construction activities, which will generate hazardous waste/debris. The CONTRACTOR must provide a documented waste determination for all resultant waste streams. Hazardous waste/debris shall be identified, labeled, handled, stored, and disposed of in accordance with Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268. Hazardous waste shall also be managed in accordance with the approved Hazardous Waste management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173. Hazardous waste generated within the confines of OWNER facilities shall be identified as being generated by the OWNER. Prior to removal of any hazardous waste from property, all hazardous waste manifests must be signed by activity personnel from the OWNER. No hazardous waste shall be brought onto property. Provide to the ENGINEER a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the ENGINEER immediately.

B. Spills of Oil and Hazardous Materials

1. Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the ENGINEER. Spill response shall be in accordance with 40 CFR 300 and applicable State regulations.

1.08 DUST CONTROL

A. Keep dust down at all times, including during non-working periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for

cleaning non-particulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

1.09 NOISE

A. Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the ENGINEER, and then only during the designated times.

END OF SECTION

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 THE REQUIREMENT

A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.02 FINAL INSPECTION

A. When CONTRACTOR considers the Work is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.
2. Work has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in the presence of the OWNER's representative and are operational.
5. Work is completed and ready for final inspection.

B. The ENGINEER will inspect to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should the ENGINEER consider that the Work is incomplete or defective:

1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.
2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies and send a second written certification to the ENGINEER that the Work is complete.
3. The ENGINEER will reinspect the Work.

D. When the ENGINEER finds that the Work is acceptable under the Contract Documents, he shall request the CONTRACTOR to make closeout submittals.

1.03 REINSPECTION FEES

A. Should the ENGINEER perform reinspection due to failure of the Work to comply with the claims of status of completion made by the CONTRACTOR:

1. OWNER will compensate the ENGINEER for such additional services.
2. The OWNER will deduct the amount of such compensation from the final payment to the CONTRACTOR.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities.

B. Project Record Documents: To requirements of Specification Section 01 72 00 - Project Record Documents.

C. Contractor to provide electronic copies of all shop drawings, O&M manuals, RFIs, Change Orders, etc. prior to final payment through either a file share site or continued full access to Contractor's construction management software.

D. Warranties and Bonds: To requirements of Specification Section 01 74 00 - Warranties and Bonds.

E. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

1.05 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the ENGINEER.

B. Statement shall reflect the following:

1. All adjustments to the Contract Sum
2. The original Contract Sum
3. Additions and deductions resulting from the following:
    a. Previous Change Orders
    b. Allowances
    c. Unit Prices
    d. Deductions for uncorrected Work
    e. Deductions for liquidated damages
    f. Deductions for reinspection payments
    g. Other adjustments
4. Total Contract Sum, as adjusted
5. Previous payments
6. Sum remaining due

C. The ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

A. CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the General Conditions of the Contract.

END OF SECTION

SECTION 01 72 00

PROJECT RECORD DOCUMENTS

Part 1 General

1.01. The requirement

A. Maintain at the site for the OWNER one record copy of the following:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other Modifications to the Contract
5. Engineer's Field Orders or written instructions
6. Approved Shop Drawings, Working Drawings, and Samples
7. Field Test records
8. Construction photographs
9. All other construction related permits

1.02. Maintenance of Documents and Samples

A. Store documents and samples in CONTRACTOR'S field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the ENGINEER.

E. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the currently updated "Project Record Documents" and survey data in accordance with Specification Section 01 30 00 – Submittals for review by the ENGINEER and OWNER.

1.03. Marking Devices

A. Provide felt tip marking pens for recording information in the color code designated by the ENGINEER.

1.04. Recording

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.

C. Record Drawings

1. Surveying Requirements

a. Provide surveying in accordance with Specification Section 01 04 00 – Construction Surveying.

2. Provide the following information on the Record Drawings.

a. Location of pipes and conduits with changes from the approved design noted
b. Location of valves
c. Location of hydrants
d. Location of blow-offs
e. Location of meters
f. Location of pipe fittings
g. Location of air release valves
h. Location of sewer service cleanouts
i. Location and elevation of structures including rim, pipe inverts, and vent elevations
j. Location and elevation of equipment foundation pads
k. Final grade including contours at one foot intervals

3. Maintain Record Drawings of all work and subcontracts, continuously as the job progresses. A separate set of prints, for this purpose only, shall be kept at the CONTRACTOR's field office at all times.
4. These drawings shall be kept up-to-date and are required to be so certified by the ENGINEER at the time invoices are submitted for progress payments. The ENGINEER may withhold progress payments if Record Drawings are not kept current.
5. The OWNER will furnish the CONTRACTOR a complete set of full-size copies of the Contract Drawings for the purpose of making prints for Record Drawings.
6. Deviations from the drawings, utilities and services, mechanical and electrical lines, details, and other work shall be incorporated on the Record Drawing prints in red ink; neat and clearly legible.
7. No work shall be permanently concealed until the required information has been recorded.
8. Where the Contract Drawings are not of sufficient size, scale, or detail, the CONTRACTOR shall furnish its own drawings for incorporation of details and dimensions.
9. Change Orders
    a. Changes to the Contract Drawings as the result of Change Orders shall be incorporated on the prints, and these changes shall be identified by Change Order number and effective date.
    b. When revised Contract Drawings are issued as the basis of, or along with, Change Orders, these revised drawings shall be incorporated into the Record Drawing set with appropriate annotation. Drawings deleted by Change Order will not be part of the Record Drawing set. The OWNER will furnish the CONTRACTOR with reproductions of such revised OWNER-furnished Contract Drawings.
    c. The final submittal of Record Drawings shall be stamped "Project Record ", signed and dated in blue ink by the CONTRACTOR, and shall be delivered to the ENGINEER prior to the final inspection as specified in Specification Section 01 70 00 - Contract Closeout.

D. Specifications and Addenda; legibly mark each Section to record the following
    1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed

2. Changes made by Work Change Directive, Field Order or Change Order

E. Shop Drawings (after final review and approval)

1. CONTRACTOR shall submit three sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05. Submittals

A. At Contract close-out, deliver Record Documents to the ENGINEER for the OWNER.

B. Contractor to provide electronic copies of all shop drawings, O&M manuals, RFIs, Change Orders, etc. prior to final payment through either a file share site or continued full access to Contractor's construction management software.

C. Final payment will not be released without delivery of the Record Documents to the ENGINEER.

D. Accompany submittal with transmittal letter in duplicate, containing:

1. Date
2. PROJECT title and number
3. CONTRACTOR's name and address
4. Title and number of each Record Document
5. Signature of CONTRACTOR or his authorized representative

END OF SECTION

SECTION 01 73 00

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01. SCOPE OF WORK

A. This section includes procedural requirements for compiling and submitting operation and maintenance data require to complete the project.

1.02. SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. Equipment, when furnished, shall include the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment, and testing of the equipment and to instruct the OWNER's operating personnel on operation and maintenance.

B. This supervision may be divided into two or more time periods as required by the installation program or as directed by the ENGINEER.

C. See the detailed Specifications for additional requirements for furnishing the services of manufacturer's representatives.

D. A certificate in the form attached to this Section, from the manufacturer and signed by Owner's representative stating that the installation of the equipment is satisfactory, that the unit has been satisfactorily tested, is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication, and care of the unit shall be submitted for each piece of equipment indicated above.

E. For equipment furnished under other Divisions, the CONTRACTOR shall furnish the services of accredited representatives of the manufacturer only when some evident malfunction or over-heating makes such services necessary in the opinion of the ENGINEER.

1.03. OPERATING MANUALS

A. The CONTRACTOR shall submit an electronic copy of Operation and Maintenance Manuals prepared specifically for this Project prior to Substantial Completion.

B. Once approved CONTRACTOR shall submit **three** complete sets of operation and maintenance instructions covering all equipment furnished to the ENGINEER prior to Final Completion.

1. The manual for each piece of equipment shall be a separate document with the following specific requirements:

a. Contents

1) Table of contents and index

2) Brief description of each system and components

3) Starting and stopping procedures

4) Special operating instructions

5) Routine maintenance procedures

6) Manufacturer's printed operating and maintenance instructions, parts list, illustrations, and diagrams

7) One copy of each wiring diagram

8) One copy of each approved shop drawing and each Contractor's coordination and layout drawing

9) List of spare parts, manufacturer's price, and recommended quantity

10) Name, address, and telephone numbers of local service representatives

b. Material

1) Loose leaf on 60 pound, punched paper

2) Holes reinforced with plastic cloth or metal

3) Page size, 8-1/2-in by 11-in

4) Diagrams, illustrations, and attached foldouts as required, of original quality, reproduced by dry copy method

5) Covers: oil, moisture and wear resistant 9 x 12 size

1.04. CONTENTS

A. Table of Contents

1. Provide title of Project, names, addresses, and telephone numbers of ENGINEER, subconsultants, and CONTRACTOR with name of responsible parties; schedule of products and systems, indexed to content of the volume.

B. For Each Product or System

1. List names, addresses and telephone numbers of Subcontractors and suppliers; including local source of supplies and replacement parts.

C. Product Data

1. Mark each sheet to clearly identify specific products and component parts, and data applicable to installation.

2. Delete inapplicable information.

D. Drawings

1. Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

2. Do not use Project Record Documents as maintenance drawings.

E. Type Text

1. As required to supplement product data.

2. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.

F. Warranties and Bonds are as specified in Section 01 74 00 - Warranties and Bonds.

1.05. MANUAL FOR EQUIPMENT AND SYSTEMS

A. For each Item of Equipment and Each System provide the following:

1. Overview of System and description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.
4. Panelboard Circuit Directories including electrical service characteristics, controls and communications, and color-coded wiring diagrams as installed.
5. Operating Procedures
    a. Include start-up, break-in, and routine normal operating instructions and sequences; regulation, control, stopping, shut-down, and emergency instructions; and summer, winter, and any special operating instructions.
6. Maintenance Requirements
    a. Routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
    b. Servicing and lubrication schedule, and list of lubricants required.
    c. Manufacturer's printed operation and maintenance instructions.
    d. Sequence of operation by controls manufacturer.
    e. Original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
7. Control diagrams by controls manufacturer as installed.
8. CONTRACTOR's coordination drawings, with color coded piping diagrams as installed.
9. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
10. List of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
11. Test and balancing reports as specified.
12. Additional Requirements:
    a. As specified in individual product specification Sections.

1.06. INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, fully instruct OWNER’s designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon time.

B. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

C. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

END OF SECTION

SECTION 01 74 00

WARRANTIES AND BONDS

PART 1 GENERAL

1.01. SCOPE OF WORK

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.

1.02. DEFINITIONS

A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the OWNER.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the OWNER.

1.03. SUBMITTALS

A. Submit written warranties to the OWNER prior to the date fixed by the ENGINEER for Substantial Completion.

B. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the OWNER.

C. When a designated portion of the Work is completed and occupied or used by the OWNER, by separate agreement with the CONTRACTOR during the construction period, submit properly executed warranties to the OWNER within fifteen days of completion of that designated portion of the Work.

D. When a special warranty is required to be executed by the CONTRACTOR, or the CONTRACTOR and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties.

E. Submit a draft to the OWNER for approval prior to final execution.

F. Refer to individual Sections of Divisions 2 through 50 for specific content requirements, and particular requirements for submittal of special warranties.

1.04. WARRANTY REQUIREMENT

A. Related Damages and Losses

1. When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty

1. When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.

2. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost

1. Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents.

2. The CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether the OWNER has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse

1. Written warranties made to the OWNER are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the OWNER can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties

1. The OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.

F. The OWNER reserves the right to refuse to accept Work for the PROJECT where a special warranty, certification, or similar commitment is required on such Work or part of the Work until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Disclaimers and Limitations

1. Manufacturer's disclaimers and limitations on product warranties do not relieve the CONTRACTOR of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the CONTRACTOR.

H. Separate Prime Contracts

1. Each Prime CONTRACTOR is responsible for warranties related to its own Contract.

END OF SECTION

SECTION 02 – SITE WORK SPECIFICATIONS

SECTION 02 00 00

SITE CLEARING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete clearing site of incidental paving and curbs, debris, grass, trees, and other plant life in accordance with the plans. All materials and procedures shall be of the type specified herein.

B. Section Includes:

1. Removing surface debris.
2. Removing designated paving, curbs, and other above- and below-grade site improvements.
3. Removing designated trees, shrubs, and other plant life.
4. Removing abandoned utilities.
5. Protecting existing vegetation to remain.
6. Excavating and stockpiling topsoil.

1.02. SUBMITTALS

A. **Section 01 30 00 – Submittals/Electronic Submittals**.

B. Product Data: Submit data for herbicide and tree wound paint. Indicate compliance with applicable codes for environmental protection.

C. Existing Conditions: Submit documentation of existing trees and plantings, adjoining construction, and site improvements that establish preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

D. Record Drawings: Identify and accurately show locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.03. DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil. Includes the zone where plant roots grow.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, as indicated on Drawings or as designated by the ENGINEER.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04. QUALITY ASSURANCE

A. Conform to applicable codes for environmental requirements, disposal of debris, burning debris on site, and use of herbicides.

B. Perform all work and provide materials in accordance with the requirements of federal, state, and local authorities having jurisdiction.

1. Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on CONTRACTOR's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work.

PART 2 PRODUCTS

2.01. MATERIALS

A. Herbicide: Approved by authority having jurisdiction.

B. Tree wound paint: Bituminous based paint of standard manufacture specially formulated for tree wounds.

C. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb./ft. remaining flexible from minus 60 to plus 200 degree F inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.

a. Height: 4 feet.

b. Color: High-visibility orange, nonfading.

PART 3 EXECUTION

3.01. EXAMINATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.

B. Identify waste area and salvage area for placing removed materials.

C. Work on adjoining property will not be permitted without the written consent of the property OWNER and the ENGINEER. This includes, but is not limited to, temporary access to the Work, storage of materials, and any ground disturbing activities.

3.02. PREPARATION

A. Call NC811 utility locating service not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.

B. The ENGINEER will designate all areas of growth or individual trees which are to be preserved due to their desirability for landscape or erosion control purposes.

C. Do not commence site clearing operations until temporary erosion and sedimentation control and plant/tree protection measures are in place as specified.

D. Carefully remove items indicated to be salvaged.

1. Disassemble and/or remove indicated items as necessary to permit construction, and safely store items on OWNER's premises to prevent harm to the materials.

2. Following construction, reassemble in the original location (or other onsite area designated by OWNER) in a manner that matches the assembly prior to its removal. If the salvaged item(s) are to be utilized by the OWNER offsite, the CONTRACTOR shall disassemble and store the items and coordinate with OWNER regarding the OWNER's transportation and reuse of these materials offsite.

E. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.

2. Keep roads and walks free of dirt and debris at all times unless otherwise permitted by OWNER or authorities having jurisdiction. When permitted, dirt and debris shall be cleaned, swept, and removed at the end of each work day.

3. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.

3.03. PROTECTION

A. Locate, identify, and protect utilities indicated to remain, from damage.

1. Notify the ENGINEER immediately of damage to or an encounter with an unknown existing utility line. Repair damage to existing utility lines that are indicated or made known to the CONTRACTOR prior to start of clearing and grubbing operations at no additional cost to the OWNER.

B. Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify ENGINEER not less than three (3) days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without ENGINEER's written permission.

C. Protect trees, plant growth (including root structure), and features designated to remain, as final landscaping.

1. Trim all branches of trees to remain to such heights and in such manner as may be necessary to prevent interference with construction operations. Cut smoothly and

neatly close to the whole of the tree or to main branches without splitting or crushing. Paint the cuts with an approved tree wound paint.

2. Encircle the drip line of trees or groups of trees which are to remain adjacent to the work with plastic protection-zone fencing as may be necessary to protect them from piled material, equipment, or equipment operation.

3. Chip removed tree branches and stockpile in approved areas, if approved by ENGINEER, or dispose of off-site.

4. Protect all cultivated hedges, shrubs, and plants that might be injured by project operations. Promptly heel in any trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is reestablished.

D. Remove trees, cultivated hedges, shrubs, plants and other landscape features injured by equipment operations to such a degree as to affect their growth or diminish their beauty or usefulness, and replace with equivalent, undamaged trees and landscape features.

1. Obtain ENGINEER's approval before replacement.

E. Protect bench marks, survey control points, and existing structures from damage or displacement.

F. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to OWNER.

G. The following practices are prohibited within plant protection zones:

1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

8. Heat sources, flames, ignition sources, and smoking.

H. Do not direct vehicle or equipment exhaust towards protection zones.

3.04. CLEARING

A. Clearing consists of the felling and cutting up, or the trimming of trees and the satisfactory disposal of the trees and other vegetation together with the down timber, snags, brush, and rubbish occurring within the areas to be cleared. Trees and other vegetation, except such individual trees, groups of trees, and vegetation, as indicated on the plans to be left standing, shall be cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared.

B. Perform clearing only within the limits established by the plans, specifications, or the ENGINEER.

C. Prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction. When such damages occur, repair, remove, or otherwise resolve all damaged areas, utilizing generally accepted practices at no additional cost to the OWNER.

D. Remove trees and shrubs within marked areas and where indicated. Remove stumps, main root ball, root system, logs, organic and metallic debris, brush, and refuse to depth of not less than 18 inches below the original soil surface in areas indicated to be grubbed and in areas indicated as construction areas under this contract.

1. Use only hand methods for grubbing within protection zones.

2. In embankment areas, when the depth of embankment exceeds 42 inches in height, sound stumps shall be cut off not more than 6 inches above the existing ground level and not grubbed. Unsound or decayed stumps shall be removed to a depth of approximately 2 feet below the natural ground surface.

3. Fill depressions made by grubbing with suitable material and compact as specified to make the new surface conform with the existing adjacent surface of the ground.

E. Clear undergrowth and deadwood, without disturbing subsoil.

F. Apply herbicide in accordance with the manufacturer's label to remaining stumps to inhibit growth.

3.05. REMOVAL

A. Remove debris, rock, demolished materials, extracted plant life, and waste materials, and legally dispose of them off site.

B. Remove paving, curbs, slabs, gutters and, aggregate base as indicated on Drawings.

1. Unless existing, full-depth joints coincide with line of demolition, neatly saw-cut along the line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

D. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

E. CONTRACTOR shall coordinate clearing activities or removal of any unwanted debris with property owner during the course of the project.

F. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

G. Burn or bury materials on site only when permitted by the ENGINEER. Leave site in clean condition.

1. Deposit all combustible matter at locations approved by authorities having jurisdiction. Combustible matter may be burned (with written approval of Fire Marshall or other authorities having jurisdiction) or disposed of as stated above. Adhere to all limitations and conditions set forth in the permit.

2. Burning shall be done at such time and in such a manner as to prevent fire from spreading and to prevent any damage to adjacent cover and shall further be subject to all requirements of agencies having jurisdiction pertaining to the burning. Keep burning under constant attendance until all fires have burned out or have been extinguished.

3.06. TOPSOIL EXCAVATION

A. Remove sod and grass before stripping topsoil.

B. Excavate topsoil to a depth of 6 inches from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

1. Remove subsoil and non-soil materials, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Do not excavate wet topsoil. Handle topsoil only when the topsoil is dry or slightly moist.

D. Stockpile topsoil without intermixing with subsoil in area designated on site to depth not exceeding 6 feet and protect from erosion.

1. Stockpile surplus topsoil to allow for respreading deeper topsoil.

2. Grade and shape stockpiles to drain surface water

3. Do not stockpile topsoil within protection zones.

4. Cover to prevent windblown dust and erosion by water.

5. Stockpile material until disposal.

E. Remove excess topsoil not intended for reuse and unsuitable topsoil from site.

END OF SECTION

SECTION 02 00 10

EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to implement erosion and sedimentation control methods in accordance with the plans. All materials, testing, and procedures shall be of the type specified herein.

B. Section Includes:

1. Temporary Silt Fencing
2. Diversion Channels.
3. Utility Trenches.
4. Ditch Liner Matting
5. Check Dams.
6. Sediment Basins.
7. Sediment Traps.
8. Inlet Protection.
9. Site Stabilization.

1.02. REFERENCES

A. ASTM International:

1. ASTM C33 – Standard Specification for Concrete Aggregates.

B. North Carolina Division of Energy, Mining and Land Resources (NCDEMLR)

1. Erosion and Sediment Control Planning and Design Manual, Latest Revision

C. North Carolina Department of Transportation

1. Standard Specifications for Roads and Structures, Latest Revision

D. Local Authorities Having Jurisdiction

1. Where local authorities having jurisdiction have requirements more restrictive than those referenced in this section, all sediment and erosion control measures shall be designed, constructed, and maintained in accordance with the most restrictive of these requirements.

1.03. SUBMITTALS

A. Section **01 30 00 – Submittals/Electronic Submittals**.

B. Product Data: Submit manufacturer's technical data and material samples on geotextiles.

C. Test Reports: Indicate certified tests results for precast concrete at manufacturing facility and granular backfill.

D. Manufacturer's Certificate: Submit material certificates signed by manufacturer and CONTRACTOR certifying Products including posts, filter stone, riprap, and other products (if requested) meet or exceed specified requirements.

E. Drawings: Submit scaled drawings of changes in facilities shown on Drawings and additional facilities proposed by CONTRACTOR.

1. Submit any proposed facilities or materials different from those shown on the Drawings or specified herein.

1.04. QUALITY ASSURANCE

A. All construction activities required under this project shall comply with the North Carolina Sedimentation Pollution Control Act of 1973 and the rules and regulations promulgated pursuant to the provisions of that law.

B. Install and maintain erosion control devices as required to function properly and to satisfy the representatives of the (NCDEMLR), local authorities having jurisdiction, and the ENGINEER.

1. Any time delays experienced due to a shutdown by the NCDEMLR, other authorities having jurisdiction, or due to unanticipated corrective work will not receive any time extensions on the contract.

2. The CONTRACTOR is responsible for installing all devices necessary to control runoff from the site, regardless of any conditions of the permit or design by the ENGINEER.

PART 2 PRODUCTS

2.01. STONE AND GEOTEXTILE MATERIALS

A. Stone:

1. Erosion Control Stone

a. Comply with NCDOT Standard Specifications for Roads and Structures.

2. Drainage Stone

a. Drainage stone, washed, uniformly graded mixture of crushed stone, or crushed or uncrushed gravel conforming to Coarse Aggregate No. 57 or ASTM C33 to be used as specified.

3. Check Dam

a. Class B erosion control stone shall be used.

B. Geotextile Fabric: Furnish according to state of NCDEMLR standards.

1. Separator geotextile fabric shall be a woven slit film or monofilament synthetic fabric consisting of polyester or polypropylene to be approved by ENGINEER. Geotextile shall be treated to resist degradation due to exposure to ultraviolet light.

C. Wattles: Comply with NCDEMLR Erosion and Sediment Control Planning and Design Manual, Latest Revision

D. Silt Fence: Comply with NCDEMLR Erosion and Sediment Control Planning and Design Manual, Latest Revision

1. Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or suppliers as conforming to the requirements in ASTM D 6461, shown in the following table:

Temporary Silt Fence Material Property Requirements					
	Test Material	Units	Supported Silt Fence[1]	Unsupported[1] Silt Fence	Type of Value
Grab Strength	ASTM D 4632	N (lbs)			
Machine Direction			400	550	MARV
			(90)	(90)	
X-Machine Direction			400	450	MARV
			(90)	(90)	
Permittivity	ASTM D 4491	sec-1	0.05	0.05	MARV
Apparent Opening Size[2]	ASTM D 4751	mm	.060	0.60	Max MARV[3]
		(US Sieve #)	(30)	(30)	
Ultraviolet Stability	ASTM D 4355	% Retained Strength	70% after 500h of exposure	70% after 500h of exposure	Typical
[1] Silt Fence support shall consist of 14-gauge steel wire with a mesh spacing of 150 mm (6 inches), or prefabricated polymer mesh of equivalent strength.					
[2] These default values are based on empirical evidence with a variety of sediment. For environmentally sensitive areas, a review of previous experience and/or site or regionally specific geotextile tests in accordance with Test Method D 5141 should be performed by the agency to confirm suitability of these requirements.					
[3] As measured in accordance with Test Method D 4632.					

   a. Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature of 120°F

2. Posts for sediment fences shall be steel with a minimum unit weight of 1.33 lb/linear ft with a minimum length of 5 ft or structurally equivalent. Steel posts shall have projections to facilitate fastening of the fabric.

3. For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.

B. Verify gradients and elevations of base or foundation for other work are correct.

3.02. GENERAL SCHEDULE

A. Notify the appropriate NCDEMLR officials and/or other local authorities having jurisdiction of construction commencement and schedule pre-construction conference, if required, with State officials, local authorities, and ENGINEER.

B. Install wattles, stone drains, check dams, and other measures as shown on the approved plan. Clear only as required to install these devices.

C. Once temporary erosion and sedimentation control measures are in place, begin clearing and grubbing. Delay grading in areas that would reduce the minimum dimensions of sediment control basins. Stockpile topsoil and suitable fill material. Install silt fence around stockpile areas. Dispose of unsuitable soils and all other waste materials off-site in a legal manner.

1. Seed temporary diversions, berms, and basins immediately after construction.

D. Groundcover shall be provided according to the following schedule:

Ground Stabilization Chart		
Site Area Description	Stabilization	Timeframe Exceptions
Dikes, swales, ditches, and slopes	7 Days	None
High Quality Water (HQW) zones	7 Days	None
Slopes steeper than 3:1	7 Days	If slopes are 10’ or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 or flatter	14 Days	7 days for slopes greater than 50’ in length
All other areas with slopes flatter than 4:1	14 Days	None, except for perimeters and HQW zones

3.03. TEMPORARY SILT FENCING

A. Provide silt fences where shown on the Drawings and as necessary to prevent erosion.

B. Install silt fence in accordance with the details shown on the Drawings.

C. Posts to be 1.33 lb/linear foot steel or structurally equivalent.

D. 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.

3.04. DIVERSION CHANNELS

A. Provide diversion ditches and dikes as necessary or as shown on the approved plans to prevent concentrated flow of water across disturbed areas.

B. Windrow excavated material on low side of channel.

C. Compact to 95 percent maximum density.

D. On entire channel area, apply soil supplements and sow seed as specified.

E. Mulch seeded areas with hay as specified.

3.05. UTILITY TRENCHES

A. Stockpile excavated material on the opposite side of the utility trenches from the watercourses to the extent that is permissible.

1. 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.

3.06. SEDIMENT BASINS AND TEMPORARY SEDIMENT TRAPS

A. Construct sediment basins and temporary sediment traps in accordance with NCDEMLR Erosion and Sediment Control Planning and Design Manual and requirements of local authorities having jurisdiction to indicated shape(s) and depth(s).

B. 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.

3.07. CHECK DAM

A. Construct temporary check dams in accordance with NCDEMLR Erosion and Sediment Control Planning and Design Manual and requirements of local authorities having jurisdiction.

B. Construct check dams to dimensions shown on the Drawings.

C. Rip rap shall not exceed 24" in height at center and slope shall be 2:1.

3.08. INLET PROTECTION

A. Construct all temporary inlet protection measures in accordance with NCDEMLR Erosion and Sediment Control Planning and Design Manual and requirements of local authorities having jurisdiction.

B. Each type of inlet protection required shall be as shown on the drawings.

C. Fabric Inlet Protection

1. Space 2 x 4-inch wood (or equivalent metal) stakes evenly around the perimeter of the inlet a maximum of three feet apart, and securely drive them into the ground a minimum of 24” deep.

2. To provide needed stability, frame with 2 x 4-inch wood strips around the crest of the overflow area at a maximum of 1.5 feet above the drop inlet crest.

3. Place the bottom 12 inches of fabric in a trench and backfill the trench with at least four inches of crushed stone or 12 inches of compacted soil.

4. Fasten fabric securely to the stakes and frame so that joints overlap to the next stake.

5. It may be required to build a dike on the down slope side of the inlet in order to prevent bypass flow.

D. Curb Inlet Protection

1. Lay concrete blocks on pavement 6” from curb inlet. Place blocks against the drain inlet for lateral support.

2. Place at least one concrete block on its side in each bottom row of blocks.

3. Place wire mesh with ½” openings over all block openings used for drainage.

3.09. SITE STABILIZATION

A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time to minimize soil erosion, siltation, and water and air pollution to adjacent properties and walkways caused by operations. Comply with the applicable regulations of all authorities having jurisdiction relating to pollution prevention and control. In the event of conflict between such regulations and the requirements of the Specifications, the more restrictive requirements shall apply.

B. Exercise every reasonable precaution throughout the life of the project to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces, or other property.

C. Construct, stabilize, and activate erosion controls before site disturbance within tributary areas of those controls.

1. Maintain diversions, inlet protection, and sediment basins until site is completely stabilized.

D. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2: 1 or flatter.

E. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.

1. During non-germinating periods, apply mulch at recommended rates.

2. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year as specified.

F. All areas to be paved shall be stabilized with stone as soon as they are brought to final grade.

G. Pipe Outlet Stabilization

1. Ensure that the subgrade for the riprap and filter fabric follows the required lines and grades as shown on the drawings. Compact any fill required in the subgrade to the density of the surrounding undisturbed soil. Low areas in the subgrade on undisturbed soil shall be filled by increasing the thickness for the riprap.

2. The riprap and filter fabric shall conform to the specified grade and dimension as shown on the drawings.

3. Riprap may be placed by machine, but take care to avoid damaging the filter fabric.

4. Protect the filter fabric from puncturing and tearing during installation. Repair damaged fabric by removing the riprap and placing a new piece of fabric over the damaged area. All connecting joints shall overlap a minimum of 12-inches in all directions. Replace the entire filter fabric as directed by the OWNER or ENGINEER.
5. The minimum thickness of the riprap shall be 1.5 times the maximum stone diameter.
6. Construct the apron on zero grade with no over fall at the end. The top of the riprap at the downstream end shall be level with the receiving area.
7. Construct the apron so it is properly aligned with the receiving stream.
8. Immediately after construction, stabilize all disturbed area with the proper vegetate cover

3.10. FIELD QUALITY CONTROL

A. Inspect erosion control devices on a weekly basis and after each runoff event until permanent vegetation has been established. Required corrective/maintenance measures shall be implemented immediately.

B. Structures and measures that shall be inspected include:

1. Inlet Protection: Replace any fabric that collapses, tears, decomposes, or become ineffective will be replaced immediately. Remove sediment deposits behind fence when sediment accumulates to six inches.
2. Construction Entrance & Exit: Inspect construction entrances and exits for condition of surface. Top-dress with new stone when needed.
3. Silt Fence: Any fabric that collapses, tears, decomposes, or becomes ineffective, will be replaced immediately.
4. Rock Check Dams and Stone Drains: Inspect for significant erosion around the edges and between dams. Install protective riprap 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. Pipe Outlet Stabilization: Inspect riprap structure after heavy rains to see if any erosion around or below the structure or if stones have been dislodged. Immediately make all necessary repairs to prevent future damage.

3.11. CLEANING

A. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment and restore the structure to its original constructed conditions.

1. Replace the contaminated part of the gravel.
2. Check the structure for damage and maintain the spillway at a minimum of 1.5-feet below the low point of the embankment.
3. Repair damage immediately. When settlement of the embankment occurs, place fill 6-inches above the design grade. Replace riprap when displaced from the spillway.

B. Remove sediment deposits behind silt fence when sediment accumulates to 12” or best management practices, whichever is more stringent.

C. Clean channels when depth of sediment reaches approximately one-half channel depth.

D. Do not damage structures or devices during cleaning operations.

E. Do not permit sediment to erode into construction or site areas or natural waterways during cleaning procedures.

F. 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.

3.12. CLOSEOUT ACTIVITIES

A. When construction is complete and all areas are stabilized, call for an inspection by an environmental inspector.

B. If site is approved, removed any temporary diversion channels, re-grade to natural grade or as shown on plans and seed or stabilize any resulting bare areas.

C. When vegetation has become established, call for a final site inspection by an environmental inspector. Obtain certificate of completion and remove all erosion control measures within 30 days. Restore and stabilize areas disturbed during removal.

END OF SECTION

SECTION 02 00 20

EXCAVATION, BACKFILL, AND COMPACTION

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, compaction, and grading required completing the work shown on the Drawings and specified herein.

B. The work shall include, but not necessarily be limited to excavation, backfilling, grading, compaction, disposal of waste and surplus materials, placing crushed stone, construction of berms, and all related work such as sheeting, bracing and dewatering.

1. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards 29 CFR Part 1926.650 Subpart P and State requirements.

    a. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.

2. Excavated topsoil and excess cut material will be stockpiled in locations approved by the ENGINEER.

1.02. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the Specifications, all work herein shall conform to the applicable requirements of the following documents.

1. North Carolina Department of Transportation Standard Specifications for Roads and Structures.
2. ASTM C 127 - Test for Specific Gravity and Absorption of Coarse Aggregate
3. ASTM C 136 -Test for Sieve Analysis of Fine and Coarse Aggregates
4. ASTM D 422 - Particle Size Analysis of Soils
5. ASTM D 423 - Test for Liquid Limit of Soils
6. ASTM D 424 - Test for Plastic Limit and Plasticity Index of Soils
7. ASTM C 535 - Test for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
8. ASTM D 698 - Standard Method of Test for the Moisture - Density Relations of Soils Using a 5.5 lb. (2.5 kg) Rammer and a 12-inch (305 mm) Drop
9. ASTM D1556 - Test for Density of Soil in Place by the Sand-Cone Method
10. ASTM D1557 - Test for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lbs. (4.5 kg) Rammer and 18-inch (457 mm) Drop
11. ASTM D2049 - Test Method for Relative Density of Cohesionless Soils
12. ASTM D2167 - Test for Density of Soil in Place by the Rubber-Balloon Method

13. ASTM D2216 - Test for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures
14. ASTM D2487 - Test for Classification of Soils for Engineering Purposes
15. ASTM D2922 - Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.03. SUBMITTALS

A. Excavation support designs shall be prepared by a licensed professional engineer, registered in the State of North Carolina, having a minimum of five years of professional experience in the design and construction of excavation support systems.

B. Submit a sealed copy of the required Engineering Certification Form in accordance with **Section 01 30 00 – Electronic Submittals** prior to beginning work.

1.04. QUALITY ASSURANCE

A. Codes and Standards

1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing and Inspection Services

1. Provide access for testing agency to perform soil testing and inspection services for quality control during earthwork operations.
2. A testing laboratory approved by the ENGINEER will be employed by the CONTRACTOR and paid by the CONTRACTOR. If included in the PROJECT BID SCHEDULE these costs shall be reimbursable from the Bid Allowance line item established for testing; otherwise these costs should be included in the price of the work to be completed.
3. Allow testing agency to inspect and approve subgrades and fill layers before construction work is performed.

C. Compaction Testing

1. The testing agency shall be NCDOT certified.
2. Tests will be performed in accordance with applicable NC DOT, ASTM, or AASHTO standard methods, unless otherwise specified.
    a. The optimum moisture content and the maximum density of each type of material used for structural fill and backfill will be determined in accordance with ASTM D698 or AASHTO T-99.
    b. The field moisture content of materials being compacted will be determined by ASTM D2216 - Laboratory Determination of Moisture Content of Soil.
    c. The field density of compacted material will be determined by ASTM D1556 - Test for Density of Soil in Place by the Sand-Cone Method, or by other acceptable in-place density testing method.
3. Testing Frequency

a. Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. Frequency and location will be chosen by ENGINEER.

b. Fill improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the OWNER.

1.05. JOB CONDITIONS

A. Carefully maintain all reference points, property markers, right-of-way markers, benchmarks, etc., and accurately restore if disturbed.

B. The presence of groundwater in the soil will not constitute a condition for which an increase in the contract price will be made.

C. Existing Utilities

1. CONTRACTOR is responsible for locating all utilities and protecting them from damage.

2. Cooperate with OWNER and utility companies for maintaining services.

3. Do not break utility connections without notifying utility or OWNER a minimum of 48 hours in advance and providing acceptable temporary services if required.

4. CONTRACTOR shall repair damage to existing utilities as directed by utility company at no additional expense to the OWNER.

PART 2 PRODUCTS

2.01. SOIL

A. Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability for this application:

1. Class I Soil - Angular, 6 to 40 mm (1/4" to 1-1/2"), graded stone, including a number of fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.

2. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm (1-1/2"), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.

3. Class III Soil - Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM, and SC are included in this class.

4. Class IV Soil - Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.

5. Class V Soil - Includes the organic soils - types OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than 1-1/2 inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

2.02. FILL MATERIALS

A. Materials for use as fill shall be as described below. The CONTRACTOR shall notify the ENGINEER of the source of each material.

B. Materials shall be furnished as required from approved off-site sources and hauled to the site.

C. Common Fill

1. Common Fill shall consist of mineral soil free from organic materials, loam, wood, trash, and other objectionable materials which may be compressible or which cannot be properly compacted.

2. Common fill shall not contain stones larger than 4 inches in largest dimension and shall have at least 60% passing the No. 4 sieve, a maximum of 60% passing the No. 200 Sieve, a maximum liquid limit of 60, and a maximum plasticity index of 25.

3. Common Fill shall not contain granite blocks, broken concrete, masonry rubble, or other similar materials.

a. It shall have physical properties such that it can be readily spread and compacted during filling.

b. Snow, ice and frozen soil will not be permitted.

D. Select Fill

1. Select Fill shall be as specified above for Common Fill except that the material shall contain no stones larger than two inches in largest dimension, a maximum of 50% passing the No. 200 Sieve, a maximum liquid limit of 50 and a maximum plasticity index of 15.

E. Structural Fill

1. Structural Fill shall be as specified above for Select Fill except that the material shall have a maximum liquid limit of 40% and a maximum plasticity index of 10 percent.

2. Structural Fill shall be used for roadway shoulder construction as indicated on the Drawings.

F. The soils shall be wetted or dried as necessary so that the moisture content during compaction is within 3% of the optimum moisture content as determined by ASTM D698.

G. Highly micaceous and elastic silts shall not be used for Common, Select Fill, or Structural Fill.

2.03. STONE FOR STABILIZATION OF FOUNDATION

A. Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67 as contained the Standard Specifications for Roads & Structures as published by the NC Department of Transportation, latest edition.

2.04. CRUSHED STONE

A. All crushed stone shall be silica material that is sound, hard, durable, resistant to weathering, as defined by ASTM D2488 and shall be free of overburden, spoil, shale, limestone, and organic material.

B. The stone shall be free of deleterious materials such as flat, elongated, friable, decomposed, or micaceous pieces.

1. Broken pieces of concrete, asphalt, or brick are not acceptable.

C. Crushed stone shall be of the size and type shown on the drawings.

2.05. RIP-RAP

A. Provide NCDOT, Class A, B, I or II Rip Rap as shown on the drawings.

B. Rip Rap shall comply with **NCDOT Standard Specifications Section 1042 - Riprap**.

PART 3 EXECUTION

3.01. GENERAL EXCAVATION

A. General excavation is expected to consist of removing unsuitable soils identified during proofrolling.

1. The bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the ENGINEER.

B. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils.

1. Soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures, earthen or man-made, as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced as required by the ENGINEER at the CONTRACTOR's expense.

C. Dewatering shall lower the groundwater to at least 1-foot below excavation subgrade and prevent "boiling" condition or detrimental under-seepage at the base of the excavation as specified herein.

D. Excavation equipment shall be satisfactory for carrying out the work in accordance with the Specifications.

E. Proof-roll exposed subgrades after stripping topsoil and organics with a minimum of two complete passes of a rubber tired heavy vehicle as approved by the ENGINEER.

1. All proofrolling shall be conducted in the presence of the ENGINEER.

2. The ENGINEER may require excavation and replacement or other remediation as necessary to provide a firm, stable subgrade in areas that appear to be rutting, pumping, or otherwise appear unstable while proofrolling.

3.02. TRENCH EXCAVATION

A. Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Drawings and in such a manner and to such widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting the trench sides and for pumping and drainage facilities.

1. CONTRACTOR shall render the bottom of the excavations firm and stable and in all respects acceptable to the ENGINEER.
2. The trench may be excavated by machinery to, or just below the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.
3. Where pipe is to be installed in fill, fill shall be placed and compacted to at least 2 ft. above the top of the pipe (rough grade elevation) and then trenches re-excavated for pipe installation.
4. After the trench has been excavated as required to assure the correct invert and a space has been excavated for the pipe bells, lower the pipe into the trench.
5. The pipe shall be placed as near to the center of the trench allowing ample room for compaction on each side.

B. PVC Pipe

1. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade. Excavated native material may be used if material conforms to this specification.
2. After the joint has been made backfill to spring line of pipe with Class I, Class II, or No. 67 stone material.
3. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.
4. Pipe 3’ to 14’ of depth
    a. Continue Class I, Class II, or No. 67 stone material to top of pipe in 8”-12” layers and compact.
5. Pipe 14’ to 20’ of depth
    a. Continue Class I, Class II, or No. 67 stone material to 6” above the top of pipe in 8”-12” layers and compact.
6. Pipe greater than 20’ of depth
    a. Continue Class I backfill to 12” above the top of pipe in 8”-12” layers and compact.
7. Backfilling to Grade
    a. Backfill and compact from the top of embedment material to finished grade with satisfactory soil material, compacting to the density required for the area classification.
    b. Place backfill in even 8" layers and compact to the density required for the area classification.
    c. The finished grade shall conform to elevations, slopes, and contours as indicated on the drawings.
    d. The CONTRACTOR shall be held responsible for settlement over all trenches, and he shall be required to add material and compact as directed if such settlements occur.

C. Ductile Iron Pipe

1. Pipe 3’ to 14’ of depth

a. After excavation and the joint has been made, bed with 4" of Class I, II, III, or IV bedding material. This may be the native trench bottom if material conforms to this specification.

b. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.

2. Pipe 14’ to 20’ of Depth

a. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade.

b. After the joint has been made backfill to spring line of pipe with Class I, Class II, or No. 67 stone material.

c. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.

3. Pipe greater than 20’ of depth

a. After excavation is completed, place 6" of Class I bedding material.

b. After the joint has been made, backfill with 4" to 6" of Class I bedding material.

c. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface.

d. Continue Class I backfill to 6” above the top of pipe in 8”-12” layers and compact.

4. Backfilling to Grade

a. Backfill and compact from the top of embedment material to finished grade with satisfactory soil material, compacting to the density required for the area classification.

b. Place backfill in even 8" layers and compact to the density required for the area classification.

c. The finished grade shall conform to elevations, slopes, and contours as indicated on the drawings.

d. The CONTRACTOR shall be held responsible for settlement over all trenches, and he shall be required to add material and compact as directed if such settlements occur.

3.03. ROCK EXCAVATION

A. Rock Excavation consists of blasting and removal of rock material for establishing the required subgrade elevation for pipe trenches and shall include stockpiling excavated material and subsequent placement or disposal of it.

1. Trench Rock is defined as any material which cannot be practically excavated by a Caterpillar Model No. 330 hydraulic trackhoe, or equivalent, without the use of hoe-ramming or blasting. Practical excavation is defined as the ability to remove at least 10 cubic yards of material during one hour of continuous digging. This classification does not include material such as loose rock, concrete, or other materials that can be removed by means other than hoe-ramming or blasting, but which for reasons of economy in excavating, the CONTRACTOR chooses to remove by hoe-ramming or blasting.

B. CONTRACTOR shall excavate and remove rock a minimum of 4 inches below the bottom of the pipe and install appropriate bedding material as defined in these specifications.

C. If Rock is Classified:

1. It is the responsibility of the CONTRACTOR to establish the top elevation of rock by test digging with an excavator at not greater than 50-foot intervals in the presence of the ENGINEER.

2. 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.

3. 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.

3.04. BLASTING

A. Where blasting is necessary to perform the required excavations, the number and size of the charges shall be subject to the acceptance of the ENGINEER.

1. Explosives shall be of such quantity and power and used in such locations as will neither open seams nor otherwise disturb the rock outside the prescribed limits of excavation.

2. As the excavation approaches its final limits, the depth of holes for blasting and the amount of explosives used for each hole shall be reduced so that the underlying or adjacent rock will be neither disturbed nor shattered.

3. No blasting shall be permitted within 50-feet of any existing structure.

4. The CONTRACTOR shall monitor the blasting operations as necessary to ensure that the work is conducted safely and without causing excessive air or ground pressures or displacements.

a. This shall include measuring air and ground pressure by the use of two (2) seismographs.

b. When blasting, the acceptable level of vibration shall be no higher than 2 inches per second at any structure.

c. In residential and commercial areas, one seismograph shall be located near the closest existing structure on the same side of the street as the blast, while the second seismograph shall be located near the closest existing residential structure on the opposite side of the street.

5. A blasting permit shall be obtained from the proper authorities.

6. Permit shall be obtained not less than 24-hours prior to transporting any explosive material or blasting agent.
7. The Fire Department may fix the hours of blasting.
8. Galvanometer shall be employed to check cap circuits.
9. CONTRACTOR shall maintain a blasting log for each and every shot containing not less than the following minimum information:
    a. Date of shot
    b. Time of shot
    c. Crew Supervisor
    d. Number and depth of holes
    e. Approximate depth of overburden
    f. Amount and type of explosive used in each hole
    g. Type of caps used, i.e., instant or delay
    h. Weather conditions
10. CONTRACTOR shall furnish ENGINEER with a copy of each blasting log.

3.05. MISCELLANEOUS EXCAVATION

A. The CONTRACTOR shall perform all excavations necessary for the placing of seeding and plants, for constructing roadways, and any other miscellaneous earth excavation required under this Contract.

3.06. PROTECTION

A. Sheeting and Bracing (if required)

1. Furnish, put in place, and maintain such sheeting and bracing as may be required by Federal, State and local safety requirements to support the sides of excavations; to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction; and to protect adjacent structures from undermining or other damage.
2. If the ENGINEER is of the opinion that at any location sufficient or proper supports have not been provided, he/she may order additional supports put in, and compliance with such order shall not relieve or release the CONTRACTOR from his/her responsibility for the sufficiency of such supports.
3. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
4. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill.
5. All voids shall be filled to the satisfaction of the ENGINEER. Sheeting and Bracing shall be installed and maintained in accordance with latest OSHA requirements and regulations.

6. Construct the sheeting outside the neat lines of the foundation, unless indicated otherwise, to the extent deemed desirable for the method of operation.
7. Sheeting shall be plumb and securely braced and tied in position.
8. Sheeting and bracing shall be adequate to withstand all pressures to which the structure or trench will be subjected.
9. Any movement or bulging that may occur shall be corrected to provide the necessary clearances and dimensions.
10. All sheeting and bracing shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property.
11. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand, which must be approved by the ENGINEER, by ramming with tools especially adapted to that purpose, or otherwise as may be directed.
12. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating any obligation on his/her part to issue such orders and his/her failure to exercise his/her right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
13. No sheeting is to be withdrawn if driven below mid-diameter of any pipe and under no circumstances shall any sheeting be cut off at a level lower than 1-ft above the top of any pipe.

B. Drainage and Dewatering

1. At all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water into the excavated areas.
    a. Groundwater shall be lowered to at least 1 foot below the bottom of excavations.
2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
    a. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.
3. Surface runoff shall be collected, drained to sumps, and pumped from the disposal unit to maintain an excavation bottom free from standing water.
4. Take all additional precautions to prevent uplift of any structure during construction.
5. Drainage shall be disposed of so that flow or seepage back into the excavated area will be prevented.
6. Flotation shall be prevented by maintaining a positive and continuous operation of the dewatering system. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure of this system.

7. Remove the dewatering equipment after the system is no longer required.
8. Take all necessary precautions to preclude the accidental discharge of fuel, oil, etc in order to prevent adverse effects on groundwater or surface water quality.

C. Slope Stability

1. The CONTRACTOR shall be solely responsible for the stability of embankments, unbalanced fills, stockpiles, and all other construction operations.

3.07. GENERAL BACKFILL

A. Materials placed in fill areas shall be placed to the lines and grades shown on the Drawings.

1. Unless otherwise specified, Common Fill shall be used for backfill.

B. Fill shall be placed in accordance with the Contract Document.

C. Material conforming to the requirements of Common Fill shall be placed in layers having a maximum compacted thickness of 8-inches measured before compaction and shall be compacted to at least 95%of its maximum density.

D. Select Fill shall be used where specified. Select Fill shall be placed in layers having a maximum compacted thickness of 8-inches measured before compaction and shall be compacted to at least 98% of the maximum density.

E. Structural Fill shall be used where specified and shown on the Drawings.

1. Structural fill shall be placed in maximum compacted lift thickness of 6 inches and shall be compacted to at least 100%of its maximum density.

F. The surfaces of filled areas shall be graded to smooth true lines, conforming to grades indicated on the grading plan and no soft spots or uncompacted areas will be allowed in the work.

G. No compacting shall be done when the material is covered with frost or is frozen or is too wet either from rain or from excess application of water.

1. At such times, work shall be suspended until the previously placed and new materials have thawed and/or dried sufficiently to permit proper compaction.

H. All backfill shall be placed at a moisture content within 3% of Standard Proctor (ASTM D698) optimum moisture content

3.08. COMPACTION

A. General

1. Control soil compaction during construction providing minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements

1. Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with these specifications.

a. Structures

1) Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum dry density.

b. Pipes and Related Structures

1) Pipe bedding and embedment material to 90% maximum dry density.

2) Backfill and compact trenches in uniform layers from top of bedding and embedment material to finish grade to 95% maximum dry density.

c. Unpaved Areas

1) Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum dry density.

d. Pavements

1) Compact top 12" of subbase and each layer of backfill or fill material at 98% maximum dry density.

e. Crushed Aggregate Base Course

1) Compact top 12" of subgrade and each 6" layer of crushed aggregate base course material to 100% maximum dry density.

f. Embankment

1) Compact to a density not less than 95% maximum dry density at moisture contents ranging from -3% to +4% of optimum.

g. 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, taking care to prevent free water 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.

3) Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry.

4) Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by the soils testing agency.

5) Payment for replacement of material that is too wet to compact will not be considered unless the material is still unsuitable after air-drying.

6) The soils testing agency shall declare which materials are suitable or unsuitable.

3.09. ROAD SUBGRADE

A. The road subgrade for bituminous, concrete, and crushed stone pavement areas in fill sections shall consist of a two-foot thick layer of Select Fill. The Select Fill shall be placed and compacted in accordance with the contract documents.

B. The road subgrade for bituminous, concrete, and crushed stone pavement areas in cut sections shall consist of firm natural soils as approved by the ENGINEER.

C. Road subgrades shall be proof-rolled.

3.10. HANDLING OF SURPLUS MATERIAL

A. Excavated materials shall not be removed from the site except as specified by the ENGINEER.

1. Materials shall be neatly stockpiled on-site at locations directed by the OWNER.

2. Excess materials shall be compacted and stockpiled in accordance with the CONTRACTOR's fill placement plan.

3. CONTRACTOR shall provide erosion and sedimentation control measures as shown on the drawings and specified in the Contract Documents.

END OF SECTION

SECTION 02 00 30
EARTHWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This is an Unclassified Lump Sum Excavation Project. The Work covered by this section consists of the excavation, placement, and compaction or satisfactory disposal of all materials encountered within the limits of the Work and the import of suitable borrow material as necessary for the construction of the project in conformity with the lines, grades, and cross sections shown on the plans or established by the ENGINEER.

B. Use care not to cause instability or displacement of the underlying or adjacent materials during construction. The ENGINEER reserves the right to affect the removal from the grading operation of any equipment that is causing instability or displacement of underlying or adjacent materials to the detriment of the section being constructed.

C. The CONTRACTOR shall fill areas that settle unevenly during the course of construction at no additional cost to the OWNER.

D. Any areas set aside for materials storage shall be an area that is previously approved by the ENGINEER. No material storage shall occur within the Public Right-of-Way, sight triangles, or public easements without the written approval of the OWNER.

E. Definitions:

1. SUBGRADE: That portion of the embankment, wetland, greenway trail, or landscaped areas, prepared as a foundation for the pavement structure, outlet structure, or hardscape as required per the plans or specifications.

2. SUBSOIL: The layer of soil under the topsoil on the surface of the ground. It is composed of a variable mixture of small particles such as sand, silt and/or clay, but it lacks the organic matter and humus content of topsoil.

3. TOPSOIL: “Non-Structural Fill” organic, screened, free of rocks and debris, able to support plant life. Refer to **Section 02 01 00 – Landscape and Planting** for specifications.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 UNCLASSIFIED EXCAVATION

A. All material excavated from the project limits in order to achieve the site lines, grades, and cross sections shown on the plans. This includes but not limited to concrete, asphalt, debris, abandoned utilities, and soil.

B. During excavation, the site's topsoil shall be stripped, screened, and stored for reuse in final grading and/or landscape repair. During backfilling, subsoil shall be placed and compacted as required to a depth ranging from 6 to 12 inches below grade. The set aside topsoil shall be used to backfill the remainder except under pavement, areas identified for

potential future pathway, hardscape, or other structural areas without OWNER'S written approval. If prior work has mixed the native topsoil into the subsoil, the loamier portions of excavated soil shall be used to backfill the remainder. This soil should be compacted only to the point necessary to meet acceptable temporary rough grade and to meet safety requirements. Topsoil removal shall include but not be limited to excavation, hauling or re-hauling anywhere along the project, storing anywhere along the project, removal and disposal of undesirable and excess material offsite, any backfilling required, and maintaining the Work. The areas designated by the CONTRACTOR to be set aside for materials storage shall be an area that's previously approved by the ENGINEER.

C. For this project, clay liner installation shall be considered as part of the Earthwork. Pond clay liner shall be constructed as per the plans. It is assumed that suitable material for liner construction will be available as part of site excavation, however no additional payment will be made should suitable material not be found on site and has to be imported by the CONTRACTOR.

D. Should hard rock be encountered requiring blasting for removal, a written PERMIT FOR BLASTING must be obtained first from the Owner's Representative and then from the Town of Trent Woods Fire Department or the appropriate jurisdiction for a fee a MINIMUM of 24 hours before any explosive material or blasting agents are transported into the Corporate Limits of Trent Woods. CONTRACTOR shall work with town staff to notify all adjacent residents. Monitoring is required, CONTRACTOR should install and evaluate all seismic monitoring and respond with 24 hour to complaints and copy the Town with response and all coordination. This work shall be included in the lump sum of "Earthwork."

E. Whenever encountered during work, remove any trash and non-natural debris. Remove all roots and pieces of wood or debris larger than three (3) inches in diameter.

F. All suitable material removed in the excavation shall be used as far as practicable used in the formation of embankments, subgrades, and shoulders, and at such other places as may be indicated on the plans or directed by the ENGINEER. Unsuitable material and excess excavated material shall be properly disposed of offsite at no additional cost to the OWNER.

G. The intersection of slopes with natural ground surfaces, including the beginning and ending of cut slopes, shall be uniformly rounded as shown on the plans or as may be directed by the ENGINEER. Concurrent with the excavation of cuts, the CONTRACTOR shall construct intercepting berm ditches or earth berms along and on top of the cut slopes at locations shown on the plans or designated by the ENGINEER. All slopes shall be finished to reasonably uniform surfaces acceptable for seeding and mulching operations. All protruding roots and other objectionable vegetation shall be removed from slopes.

H. The CONTRACTOR shall, as directed by the ENGINEER, cut off and plug all private utility lines, and remove all underground tanks encountered within the right of way or construction limits during construction in accordance with State requirements. This work shall be included in "Unclassified Excavation."

I. When the CONTRACTOR'S excavation operations encounter graves, the operations shall be temporarily discontinued in the vicinity of the graves and not resumed until so directed by the ENGINEER.

J. When the CONTRACTOR'S excavation operations encounter artifacts of historical or archeological significance, the operations shall be temporarily discontinued in the vicinity of the artifacts and not resumed until so directed by the ENGINEER. Disposition of the artifacts shall be in accordance with the requirements of the State Division of Archives and History.

K. A tolerance of plus or minus 0.10 foot from the established grade will be permitted in the greenway trail after it has been graded to a uniform surface.

L. The CONTRACTOR shall be responsible during construction and until final acceptance for the maintenance of all work covered by this section.

M. During construction and until final acceptance, the CONTRACTOR shall shape the excavated surface to provide for the drainage of surface runoff along and throughout the length of the cut, shall construct temporary ditches, and use any other methods necessary to maintain the Work covered by this section so that the Work will not contribute to excessive soil erosion.

N. As much as practicable, the CONTRACTOR shall perform the Work covered by this subsection and the construction of embankments in such a manner that cut and fill slopes will be completed to final slopes and grade in a continuous operation. The operation of removing excavation material from any cut and the placement of embankment in any fill shall be a continuous operation to completion unless otherwise permitted by the ENGINEER.

O. If grading operations are suspended for any reason whatsoever, partially completed cut and fill slopes shall be brought to the required slope and the Work of seeding and mulching or other required erosion control operations shall be performed.

P. NOTE: Time period prior to stabilization cannot exceed the Ground Stabilization Schedule as listed on the approved construction drawings.

3.02 EMBANKMENT

A. The Work covered by this subsection consists of placing in embankments, backfills, and earth berms, suitable material excavated as previously described by these specifications in conformity with the lines, grades, and typical cross sections shown on the plans or established by the ENGINEER. It shall include the preparation of the areas upon which the embankment is to be constructed; the formation, compaction, stability, and maintenance of the embankment.

B. Before embankment construction is begun, all vegetation, debris, deleterious and unsuitable material shall be removed from the area within the limits of the embankment. Upon completion of clearing and stripping, the subgrade area to receive embankment shall be uniformly proofrolled under the observation of the ENGINEER. Proofrolling shall be accomplished using a loaded dump truck or similar pneumatic-tired equipment of a minimum ten (10) ton static weight making at least four (4) passes over each area. Any areas which pump or deflect under proofrolling, or are otherwise deemed unsuitable by

the ENGINEER, shall be stabilized or bridged as directed by the ENGINEER at no additional costs.

C. Embankment material and backfill material shall consist of clean, readily compactible earthen material with a maximum particle size of two (2) inches. Embankment material shall be free from debris, organic matter, frozen or deleterious material, and shall be approved for use by the OWNER.

D. The embankment material shall be deposited and spread in successive, uniform, approximately horizontal layers of not more than eight (8) inches in depth, loose measurement, for the full width of the cross section, and shall be kept approximately level by the use of effective spreading equipment. Each layer of the embankment shall be thoroughly compacted as hereinafter specified. Hauling shall be distributed over the full width of the embankment, and in no case will deep ruts be allowed to form during the construction of the embankment. The embankment shall be properly drained at all times.

E. All embankment material shall be compacted as specified herein unless otherwise provided in the contract or directed by the ENGINEER. Compaction equipment used by the CONTRACTOR shall be adequate to produce the required compaction and produce a uniformly constructed embankment with all layers uniformly bound to all preceding layers.

F. The embankment material shall be compacted to at least 95% of the maximum dry density obtained by compacting a sample of the material in accordance with ASTM T-99, except for the upper one foot of subbase below pavement base, which shall be compacted to at least 100% of the maximum dry density obtained by compacting a sample in accordance with ASTM T-99. Embankment materials shall be compacted at a moisture content satisfactory to the ENGINEER, which shall be approximately that required to produce the maximum dry density. The CONTRACTOR shall dry or add moisture to the embankment material when required to provide a uniformly compacted and stable embankment.

G. Backfill materials placed around and over pipe culverts, box culverts, and arch culverts, and embankment materials placed around other structures, shall be clean select material. The material shall be placed and compacted in a manner, which will avoid unbalanced loading and will not produce undue stress on the structure. Such embankments shall be placed in loose layers not to exceed six (6) inches in depth and each layer shall be thoroughly compacted as hereinafter specified. All pipe culverts, box culverts, and arch culverts, after being backfilled as specified in this subsection, shall be protected by a three (3) foot cover of fill at any time that heavy hauling equipment is permitted to cross during construction of the roadway. Any damage or displacement to culverts or other structures due to the CONTRACTOR's operation shall be corrected or repaired by the CONTRACTOR prior to final acceptance at no cost to the OWNER.

H. The CONTRACTOR shall be responsible during construction and until final acceptance for the maintenance of all embankments made under the contract.

I. During construction and until final acceptance, the CONTRACTOR shall construct temporary or permanent earth berms along the outer edges of the top surface of the embankment, construct temporary ditches, shape the embankment surface to provide for

the drainage of surface runoff along and throughout the length of the embankments, and use any other methods necessary to maintain the Work covered by this section so that the Work will not contribute to excessive soil erosion.

J. The CONTRACTOR shall replace, at no cost to the OWNER, any portion of embankments, which have become displaced or damaged due to carelessness or neglect on the part of the CONTRACTOR.

K. All embankments shall be brought to the grade and cross section shown on the plans, or established by the ENGINEER, prior to final inspection and acceptance by the ENGINEER.

3.03 UNDERCUT EXCAVATION

A. The Work covered by this subsection consists of the excavation, placement, and compaction and/or satisfactory disposal of materials removed from a location below the finished graded cross section.

B. When the ENGINEER determines that the natural soil materials are undesirable in their location or condition, the ENGINEER may require the CONTRACTOR to remove this undesirable material and backfill with approved material properly compacted.

C. Where undercutting is required adjacent to or beneath the location of a proposed drainage structure, undercut and backfill shall be done over a sufficient distance adjacent to the installation to prevent future operations from disturbing the completed drainage structure.

D. All materials removed in the Work of undercut excavation will be classified by the ENGINEER as either suitable for use without excessive manipulation and utilized by the CONTRACTOR elsewhere in the Work, or unsuitable for further use and disposed of by the CONTRACTOR to an offsite location with no additional compensation.

E. The CONTRACTOR shall conduct undercut operations in such a way that the ENGINEER can take the necessary measurements before any backfill is placed.

F. Backfill in undercut areas shall be placed as a continuous operation along with the undercutting operation. Backfill material shall not be placed in water unless otherwise permitted by the ENGINEER.

3.04 BORROW EXCAVATION

A. The Work covered by this subsection consists of the excavation of approved material from borrow sources and the hauling and placing of this material as required on the plans or as directed by the ENGINEER. It shall also include the satisfactory DISPOSAL OF UNSUITABLE MATERIAL OFFSITE AT NO ADDITIONAL EXPENSE TO THE OWNER OTHER THAN THE LUMP SUM AMOUNT REPRESENTED IN THIS SECTION. All work covered by this subsection shall be in accordance with Section 230 of the NCDOT, January 2012, “Standard Specifications for Roads and Structures,” Unless otherwise covered in these documents. All basis of payment for this work shall be in accordance with **Part 4 – Basis of Payment** of this specification. No separate payment shall be made for borrow excavation, refer to **Part 4 – Basis of Payment** of this specification.

3.05 DRAINAGE DITCH EXCAVATION

A. The Work covered by this subsection consists of the excavation of drainage ditches. Drainage ditches will be defined as inlet or outlet ditches for pipe culverts and structures, channel changes and parallel or lateral ditches when such ditches are separated from the roadway slope by an area of natural ground or berm. All work covered by this subsection shall be in accordance with Section 240 of the NCDOT, January 2012, "Standard Specifications for Roads and Structures." All basis of payment for this work shall be in accordance with Part 9 – Basis of Payment of this specification. No separate payment shall be made for drainage ditch excavation, refer to Part 9 – Basis of Payment of this specification.

3.06 FINE GRADING SUBGRADE, SITE, TOPSOIL

A. The Work covered by this section consists of the preparation, shaping, and compaction of either an unstabilized or stabilized greenway trail to a condition suitable for placement of base course, and pavement. It shall also include the cleaning, shaping, and maintenance of the stripping of existing vegetation; and the placement and compaction of all materials resulting from the shaping operation. Such work shall extend over those portions of the project which will be paved or receive hardscape under the contract. It shall also include the handling and placement of topsoil.

B. The embankment, wetland, greenway trail, or landscaped areas shall be shaped to conform to the lines, grades, and typical sections shown on the plans or established by the ENGINEER. All existing vegetation shall be stripped from the ground surface wherever shaping of the embankment, wetland, greenway trail, or landscaped area is to be done. All suitable surplus material shall be utilized in the construction of the project. Surplus material in excess of that needed for the project shall be disposed of as waste offsite.

C. All unsuitable material, rock, boulders, and all vegetative matter shall be removed from the project site and replaced with suitable material. Suitable material, when not available from the shaping or fine grading operation, shall be obtained from project excavation or borrow sources.

D. Site shall be cleaned, reshaped, and maintained in a satisfactory condition until final acceptance of the project.

E. The CONTRACTOR shall conduct his operations in such a manner as to avoid damage to any previously constructed structures and facilities.

F. PREPARATION OF SUBGRADE

1. The subgrade shall be shaped to the lines, grades, and typical sections shown on the plans. Where the ENGINEER directs that areas of the subgrade are to be stabilized with aggregate, the subgrade surface in such areas may, subject to the approval of the ENGINEER, be left uniformly below grade to provide for the addition of the stabilizer material.

2. Material excavated in preparing the subgrade shall be stored or stockpiled in such a manner as to not interfere with proper drainage or any subsequent operations of stabilization, or placing base or pavement.

G. COMPACTION OF SUBGRADE

1. 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. Copies of these modified testing procedures are available upon request from the Materials and Test Unit.

2. 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.

3. Where the subgrade is to be stabilized with lime, aggregate, or cement, the above density requirements will not apply prior to the incorporation of the stabilizing material but compaction shall be in accordance with the requirements of Article 501 10, 510 3, or 542 9, of the NCDOT, January 2012, "Standard Specifications for Roads and Structures" as appropriate.

H. TOPSOIL

1. All landscaped areas are to receive topsoil as specified within section 22000 Landscape Requirements of this contract and as per the construction drawings. All necessary stripping of site topsoil, temporary stockpiling, hauling, topsoil amendments, supplement of onsite material with imported topsoil, disposal offsite of excess or unsuitable topsoil, and all other work necessary to prepare the landscaped areas for their required plantings or seeding shall be covered with this work **AT NO ADDITIONAL EXPENSE TO THE OWNER OTHER THAN THE LUMP SUM AMOUNT REPRESENTED IN THIS SECTION**.

I. TOLERANCES

1. A tolerance of plus or minus 1/2 inch from the established grade will be permitted after the subgrade has been graded to a uniform surface.

2. The maximum differential between the established grade and the graded subgrade within any 100-foot section shall be 1/2 inch.

J. PROTECTION OF SUBGRADE

1. Ditches and drains shall be provided and maintained as may be necessary to satisfactory drain the subgrade. Where previously approved subgrade is damaged by natural causes, by hauling equipment, or by other traffic, the CONTRACTOR shall restore the subgrade to the required lines, grades, and typical sections and to the required density at no additional cost to the OWNER.

3.07 INCIDENTAL GRADING

A. The Work covered by this subsection consists of any additional earthwork beyond the scope of the original contract due to OWNER or ENGINEER directed revisions in the field

that cumulatively does not exceed 500 cu yd of excavation/borrow and place/disposal offsite.

B. All work covered by this subsection shall be in accordance with Parts 2 to Part 7 of this Section as appropriate.

C. The quantity of earthwork covered under this section for will be the actual number of cubic yards of excavation as computed by the Average End Area Method, by the ENGINEER, based upon the plan cross-sections. Shrinkage or swell factors shall not be used in calculating excavation quantities.

PART 4 BASIS OF PAYMENT

A. Earthwork will be paid at the contract lump sum price, regardless of the quantity needed to build the project to design. Partial payments will be equal to the percentage of such item that is completed as estimated by the ENGINEER.

B. This price and payment will be full compensation for all work covered by this section, the construction drawings, and all other applicable specifications, including but not limited to:

1. Unclassified Excavation;
2. Embankment;
3. Undercut Excavation;
4. Borrow Excavation;
5. Drainage Ditch Excavation;
6. Fine Grading Subgrade, Site, Topsoil;
7. Final Grading;
8. Incidental Grading

C. No additional Payments will be made for:

1. Extra Handling or hauling of material onsite or offsite.
2. Moisture adjustment of material.
3. Construction, maintenance and restoration of Haul roads.
4. Watering for dust control.
5. Blasting of rock, or the associated permitting, fees, and offsite disposal of unsuitable blasted material.
6. Excavation, handling, hauling, and disposal of any material uncovered during the project excavation deemed hazardous or unsuitable by the contract, OWNER, Inspector, or the OWNER's Representatives.

7. Undercut excavation as required by this contract, OWNER, Inspector, or the OWNER's Representatives due to existing site conditions, necessary due to actions by the CONTRACTOR and his SUBCONTRACTORS, or necessary due to weather.

8. Any other aspect of the work or incidental measures, whether or not specifically mentioned in the contract that are necessary and/or ancillary components to the Earthwork.

END OF SECTION

SECTION 02 00 40

SURFACE RESTORATION

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Provide all labor, equipment, and materials necessary for final grading, topsoil placement, and miscellaneous site work not included under other Sections but required to complete the work as shown on the Drawings and specified herein.

PART 2 MATERIALS

2.01. TOPSOIL

A. Topsoil shall be as specified.

PART 3 EXECUTION

3.01. FINAL GRADING

A. Following approval of rough grading the subgrade shall be prepared as follows:

1. For riprap, bare soil 18-inches below finish grade or as directed by ENGINEER.
2. Where burning has been performed, distribute ashes evenly over the area to receive topsoil.
3. For topsoil, scarify 2-inches deep prior to placing.

3.02. TOPSOIL PLACEMENT

A. Topsoil shall be placed over all areas disturbed during construction under any contract except those areas that will be paved, graveled or rip rapped.

B. Topsoil shall be spread in place for lawn and road shoulder seed areas at a 4-inch consolidated depth and at a sufficient quantity for plant beds and backfill for shrubs and trees.

C. Topsoil shall not be placed in a frozen or muddy condition.

D. Final surface shall be hand or mechanically raked to an even finished surface to finish grade as shown on Drawings.

E. All stones and roots over 4-inches and rubbish and other deleterious materials shall be removed and disposed of.

END OF SECTION

SECTION 05 00 00
ASPHALT CONCRETE

PART 1 - GENERAL

A. The work covered by this section consists of the installation and/or removal of aggregate base course, asphalt concrete surface course, asphalt concrete intermediate course, asphalt concrete base course, asphalt tack coat, asphalt prime coat, Geotextile Interlayer, Asphalt Surface Treatments, and utility adjustments.

B. No base material shall be placed on a roadway until the storm sewer, subgrade, utilities and all appurtenances have been inspected and approved by the Inspector.

C. The latest revision of the "Standard Specifications for Roads and Structures" of the North Carolina Department of Transportation (NCDOT) shall apply to this project unless otherwise specified herein.

D. Before the asphalt surface course is placed on the road, the aggregate base course shall be inspected and approved by the Inspector.

PART 2 - MATERIALS

A. Aggregate Base Course:

i. This base course shall consist of an approved coarse aggregate produced in accordance with Section 520 in the NCDOT "Standard Specifications for Roads and Structures." All materials, construction requirements and other provisions in Section 520 shall apply. The subgrade for the coarse aggregate base course shall be constructed in accordance with the requirements of these Specifications.

ii. The subgrade shall be thoroughly compacted and constructed to the line, grade, and cross section on the plans or as directed by the ENGINEER. Before placing the base course, the subgrade shall be inspected and approved by the Inspector, and backfilling behind the curb shall be complete.

iii. The base course material shall be placed in lifts not to exceed eight (8) inches. Each layer shall be graded to the required section and compacted to at least one hundred percent (100%) of the density as determined by AASHTO T180. The base material shall be compacted at a moisture content which is approximately that required to produce the maximum density.

iv. After final shaping and compacting, the Inspector will check the surface of the base for conformance to grade and typical section. The thickness of the base shall be within a tolerance of plus or minus 1/2 inch of the base thickness required by the plans.

B. Superpave - Asphalt Concrete Surface Course: Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, & S 12.5 D:

i. The Superpave surface course shall be Asphalt Concrete Surface Course, Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, or S 12.5 D shall be produced, delivered, placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

ii. Sections of the newly finished pavement shall be protected from traffic until they have become properly hardened. Finished surfaces of the base shall be checked with a 10-foot straightedge, applied parallel to the center of the pavement, and any places that vary more than one-eighth (1/8) of an inch as measured from the bottom of the straightedge to the finished course shall be corrected.

C. Superpave - Asphalt Concrete Intermediate Course: Type I 19.0 B, I 19.0 C, & I 19.0 D:

i. The Superpave intermediate course shall be Asphalt Concrete Intermediate Course, Type I 19.0 B, I 19.0 C, or I 19.0 D shall be produced, delivered, placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

D. Superpave - Asphalt Concrete Base Course: Type B 25.0 B, B 25.0 C, & B 37.5C:

i. The Superpave base course shall be Asphalt Concrete Base Course, Type B 25.0 B, B 25.0 C, or B 37.5C shall be produced, delivered, placed, tested, compacted, and accepted in accordance with Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures."

E. Pavement Repair Patch

i. Where it is necessary to open cut along or across streets with asphalt surfaces, the pavement shall be replaced with seven (7) inches of Superpave - Asphalt Concrete Intermediate Course: Type I 19.0 B, I 19.0 C, or I 19.0 D and two (2) inches of Superpave - Asphalt Concrete Surface Course: Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, or S 12.5 D, as directed by the ENGINEER. The replacement surface and/or base shall extend a minimum of 1 foot on each side of the excavated opening. The thickness of the replacement material shall be sufficient to provide a base and surface of equivalent strength to the undisturbed base and surface. The replaced pavement shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

F. Asphalt Tack Coat:

i. The tack coat shall be asphalt or asphalt cement and shall meet the general, material, and construction specifications as specified in Section 605 of the NCDOT "Standard Specifications for Roads and Structures." The tack coat shall

be uniformly applied at a rate of three hundredths (0.03) gallons per square yard and shall be applied beneath each layer of asphalt plant mix base or pavement to be placed except where a prime coat has been applied, unless otherwise approved or specified by the ENGINEER. There will be no direct payment for the work covered by this section.

G. Asphalt Prime Coat:

i. The prime coat shall be asphalt and shall meet the general, material, and construction specifications as specified in Section 600 of the NCDOT "Standard Specifications for Roads and Structures." The prime coat shall be uniformly applied, in accordance with the referenced specifications, on existing non-asphalt base courses prior to placement of asphalt pavement, unless otherwise approved or specified by the ENGINEER. There will be no direct payment for the work covered by this section.

H. Asphalt Plant Mix:

i. The production, delivery, and placement of all types of asphalt plant mixed bases, intermediate, and surface courses shall conform to Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures." There will be no direct payment for the work covered by this section.

PART 3 - CONSTRUCTION METHODS

A. Subgrade:

i. Preparation of Subgrade: The subgrade shall be shaped to the lines, grades and typical sections established by the Owner. All unsuitable material, boulders and all vegetative matter shall be removed and replaced with suitable material. Suitable material shall come from sources approved by the Owner.

ii. Compaction of Subgrade: The top one (1) foot of subgrade and the entire base course shall be compacted to a density of 100 PERCENT maximum dry density as determined by AASHTO method T99. For that portion of fill under roadways and extending beyond the back of curb, compact to a density of NO LESS THAN 95 PERCENT maximum dry density as determined by AASHTO method T99. Backfill material shall be placed in lifts of eight (8) inches or less of compacted soil.

a) 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.

b) The CONTRACTOR shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade.

B. Proofrolling:

i. Equipment: The equipment shall consist of a loaded tandem-axle dump truck or similar pneumatic-tired equipment of a minimum ten (10) ton static weight. The CONTRACTOR is responsible for providing the equipment necessary in order to perform proofrolling at no additional cost to the Owner.

ii. Method: After the roadbed has been completed within five hundredths (0.05) feet of final grade, the roadbed shall then be compacted and tested with two (2) or more coverages unless otherwise directed by the Owner, using a heavy pneumatic-tired roller meeting the requirements listed above. A coverage is considered that stage in the rolling procedure when the entire width of the area being proofrolled has been in contact with the pneumatic tires of the roller. The roller shall be operated in a systematic manner so that the number of coverages over all areas to be proofrolled can be readily determined and recorded.

a) The equipment shall be operated at a speed between two and one-half (2-1/2) and three and one-half (3-1/2) miles per hour. All proofrolling procedures shall be followed to the satisfaction of the Inspector on site during the proofrolling.

iii. Corrective Action: If it becomes necessary to take corrective action, such as, but not limited to, underdrain installation, undercut and backfill of unsuitable materials, and aeration of excessively wet material in areas that have been proofrolled, these areas shall be proofrolled again following the completion of the necessary corrections. If the corrections are necessary due to the negligence of the CONTRACTOR or weather, the corrective work and additional proofrolling shall be performed by the CONTRACTOR at no cost to the Owner.

C. Placing Asphalt Concrete Mixture:

i. The mixture shall be spread by means of a mechanical self-contained, power-propelled paver, capable of spreading the mixtures, without segregation, to the required grade and confine the mixture to true lines without the use of stationary side forms.

ii. The term “screed” includes any “strike-off” device operated by cutting, crowding or other practical action which is effective on the mixtures at workable temperature without tearing, shoving or gouging and which produces a finished surface of the evenness and texture specified.

iii. Longitudinal and transverse joints shall be made in a careful manner. Well bonded and sealed joints are required. If necessary to obtain this result, joints shall be painted with hot asphalt cement and heated. After the base course mixture has been spread and before roller compaction is started, the surface shall be checked and all flat spots and irregular areas removed and replaced with satisfactory material. Irregularities in grade shall be corrected before compacting.

iv. Contact surfaces of headers, curbing, gutters, manholes, etc. shall be painted with an approved asphalt cement just before the base mixture is placed against them. All exposed longitudinal edges of the surface course shall be “set up” by tamping

with a rake or lute at proper height and level to receive the maximum compression under rolling.

v. Asphalt mixture shall not be produced or placed during rainy weather, when the subgrade or base course shows excess moisture, or when the air temperature is less than 40° F. in the shade away from artificial heat, unless otherwise permitted by the Owner. In applications involving less than one inch of asphalt, the temperature shall be at least 50° F. Should rain begin during paving operations, the Owner assumes no responsibility for asphalt left on the trucks at the time that the paving operation is halted.

D. Protection of Material:

i. The CONTRACTOR shall provide and have ready for use at all times enough tarpaulins or covers for use in case of rain, chilly wind, or other delay, for the purpose of covering or protecting any material dumped but not spread.

E. Compacting Asphalt Concrete Mixture:

i. After placing, the mixture shall be thoroughly and uniformly compacted with tandem rollers of eight (8) or ten (10) ton model weighing not less than 250 pounds per inch width of roller tread. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition.

ii. Each roller shall be operated by a competent, experienced operator and must be kept in continuous operation as nearly as practicable. Rolling shall start longitudinally at the outer edges and proceed toward the center of the pavement, overlapping on successive trips by at least one half (1/2) the width of the roller.

iii. The speed of the roller shall be at all times slow enough to avoid displacement of the hot mixture as a result of reversing. Any displacement shall be immediately corrected. Rolling shall proceed at a rate not in excess of 500 square yards per hour per roller and shall continue until no further visible compaction is obtainable and all roller marks have been eliminated. Rolling shall compact the mixture to at least ninety-four (94) percent of the laboratory density as determined by the Marshall test method.

iv. The asphalt concrete mixture shall have a temperature at the time of delivery of between 250° F and 300° F and shall be rolled with a temperature of not less than 235° F.

v. Rolling shall be started as soon as the mixture will bear the roller without undue misplacement or hairline cracking. Delays in rolling hand raked mixture will not be tolerated.

vi. To prevent adhesion of the mixture to the roller, the wheels shall be kept moistened with water. Places not accessible to the roller shall be thoroughly compacted with hot tamps.

F. Compacted Densities:

i. Unless otherwise noted compaction and density control of Asphalt Pavements shall be in accordance with the requirements of Sections 609 and 610 of the most current version of the NCDOT "Standard Specifications for Roads and Structures." There will be no direct payment for the work covered by this section.

ii. The CONTRACTOR shall allow time for the inspections and testing of areas, as needed, by OWNER as directed by the ENGINEER.

G. Plant Tickets:

i. The number of batches and total weight of all loads of mixture shall be recorded in duplicate upon plant ticket forms. With each load delivered to the work, the truck driver shall present one copy of the plant ticket to the Inspector. The driver shall retain one copy for the CONTRACTOR. Should the ENGINEER decide to provide a plant inspector, he/she shall keep the stub copy. The weights to be included in the estimate shall be the total of the tickets delivered by the truck driver to the Inspector at the work site. At any time, for the purpose of checking the weighing equipment at the plant, the OWNER may direct the CONTRACTOR to weigh or cause to be weighed on tested and approved platform scales at the CONTRACTOR'S expense the contents of any truckload that is to be delivered to the work site.

H. Protection of Pavement:

i. When edges are not protected, planks of the same thickness shall be placed adjacent to longitudinal or transverse joints until the surface course is completed. Sections of newly finished pavements shall be protected from traffic until they have become properly hardened by temperature cooling.

PART 5 - REMOVAL OF EXISTING PAVEMENT

A. The work covered by this section consists of the removal and disposal of the portland cement concrete or bituminous components of an existing pavement structure, including paved shoulders, within the limits shown on the plans or as directed by the ENGINEER. This work shall also include the removal of any temporary roadway pavement structure placed during construction to serve as a detour. The work covered by this section shall not include the removal and disposal of sidewalks, driveways, and curb and gutter, which are covered in the "Unclassified Excavation" subsection.

B. Where concrete pavement is to be removed, the CONTRACTOR shall provide a neat edge along the pavement obtained by sawcutting the pavement at least two (2) inches deep or greater as required to provide a neat, clean break from the pavement to remain, before breaking the adjacent pavement away. The pavement shall be broken up and removed for its entire depth or milled to the specified depth as indicated in

the Contract Documents. The disposal of all materials resulting from the pavement removal shall be done as provided herein.

C. Insofar as possible, all materials shall be used in the construction of embankments, but such use shall be subject to the approval of the ENGINEER.

D. Milling asphalt pavement shall be in accordance with Section 607 of the latest version of the NCDOT "Standard Specifications for Roads and Structures."

E. All materials, which cannot be used in the work, shall be disposed of off site of the right of way in waste areas provided by the CONTRACTOR.

PART 6 - ASPHALT RESURFACING

A. General:

i. Asphalt Resurfacing shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

ii. Should construction take place near signalized intersections, the CONTRACTOR shall contact the NCDOT Division Traffic ENGINEER to schedule the field location of any traffic signal conflicts. The CONTRACTOR shall notify the ENGINEER of any potential conflict prior to construction. The CONTRACTOR shall be responsible for coordinating the conflict relocation with NCDOT during construction.

iii. The CONTRACTOR shall prepare a weekly schedule detailing the construction activities planned for the following week. This schedule shall be presented to the Inspector before Friday, 12:00 noon of the week preceding the effective date of the schedule. Weekly meetings may be required to review construction activities as directed by the ENGINEER.

iv. In the event that all vehicles are not removed from the construction area despite timely delivery of the construction notice letter, the CONTRACTOR shall attempt to contact vehicle owners by other means in an effort to find the vehicle's owner to have the vehicles relocated. If the CONTRACTOR is unsuccessful they shall contact the ENGINEER and provide the make, model, and license plate number of the vehicle as well as the vehicle location. The ENGINEER shall try contacting the vehicle owner and if unsuccessful shall contact a designated towing company to move the vehicle out of the construction area, to a neighboring street as directed by the ENGINEER, at the OWNER'S expense. The towing company shall attach a standard letter to the vehicle upon towing. The ENGINEER will provide the standard letter.

v. Construction traffic control shall be provided on each street by the CONTRACTOR in strict conformance with NCDOT "North Carolina Supplement to the MUTCD," the MUTCD, the Contract Documents, or as directed by the

ENGINEER. No work shall begin on any street without the proper traffic control measures in place.

vi. Construction traffic control shall be installed and practiced as a means to inform drivers that asphalt tack coat is being placed on the road surface.

vii. The CONTRACTOR shall be responsible for spraying or burning all weeds growing on and in the streets. The CONTRACTOR shall be responsible for removing and properly disposing of the dead weeds as carefully cleaning each street before beginning asphalt concrete construction operations.

viii. Asphalt resurfacing projects shall have a maximum acceptable elevation difference, between the top of the resurfacing layer and the gutter, of 1.0 inch. The OWNER shall not accept any newly resurfaced streets exceeding this maximum elevation difference. Should it be determined that the resurfacing layer is more than 1.0 inch higher than the gutter elevation the resurfacing shall be removed and replaced or remedied as directed by the ENGINEER at the CONTRACTOR'S expense.

ix. The CONTRACTOR shall allow time for the inspection of areas, as needed, by a qualified testing firm as directed by the ENGINEER.

x. The CONTRACTOR shall construct all improvements so as to create and/or maintain positive drainage.

xi. The above listed requirements of this sub-part are considered incidental to the cost of the asphalt concrete surface course specified in the Itemized Proposal and Contract Documents.

B. Materials:

i. Geotextile Interlayer Installation:

a) The geotextile interlayer shall be a needlepunched, nonwoven engineering fabric made of polypropylene and staple fiber; calendared on one side. It shall be resistant to ultraviolet degradation and have the following properties:

	Typical	Test
Grab Tensile Strength (lbs)	101	ASTM D 4632
Grab Elongation (%)	50	ASTM D 4632
Puncture Strength (lbs)	65	ASTM D 4833
Mullen Burst (psi)	220	ASTM D 3786
Trapezoidal Tear (lbs)	45	ASTM D 4533
Mass Per Unit Area (oz/sq yd)	4.1	ASTM D 5261
Thickness (mils)	35	ASTM D 5199
Melting Point (°F)	Greater than 150	ASTM D 276
UV Resistance (%)	70 at 500 hrs	ASTM D 4355

b) For the tack coat, uncut asphalt cements are preferred, however, cationic or anionic emulsions may be used. For asphalt cements the minimum temperature shall be 150° C, but to avoid damage to the fabric the distributor tank temperatures shall not exceed 160° C. When asphalt emulsions are used, the emulsion shall be cured prior to placing the fabric.

c) The engineering fabric shall be placed onto the asphalt sealant, calendared side up, prior to the time the asphalt has cooled and lost tackiness. Wrinkles or folds in excess of 1 inch shall be slit and laid flat. In order to maximize fabric contact with the pavement surface, blooming or pneumatic rolling will be required. The fabric joints shall be overlapped sufficiently to ensure full closure of the joint, but should not exceed 6 inches. To prevent edge pickup by the paver, transverse joints shall be lapped in the direction of paving. A second application of sealant to the fabric overlaps will be required as directed by the ENGINEER.

d) Quickly following the fabric installation, the hot-mix overlay should be placed evenly. Should the asphalt bleed through the fabric causing construction problems prior to overlay placement, the affected areas shall be blotted by spreading sand. Turning the paver and other vehicles shall be gradual and kept to a minimum to avoid movement of, or damage to the sealant saturated fabric.

ii. Asphalt Surface Treatment:

a) Chip seal shall be “straight seal” with 78M stone in accordance with Section 660 of the NCDOT “Standard Specifications for Roads and Structures.” Careful attention shall be given to surface preparation (as specified in Section 660) under chip sealing.

b) Cleanup: Excess aggregate resulting from straight seal shall be collected and removed from the construction site either before resurfacing occurs or one (1) week after the straight seal is applied, whichever occurs first.

iii. Leveling Course

a) In asphalt resurfacing projects a leveling course of Superpave - Asphalt Concrete Surface Course (Type S 4.75 A, SF 9.5 B, S 9.5 A, S 9.5 B, S 9.5 C, S 12.5 B, S 12.5 C, & S 12.5 D), as directed by the ENGINEER, shall be hand-placed in areas where the pavement is depressed, sunken or uneven, and its surface grade varies from surrounding elevation by one (1) inch or greater. Leveling asphalt shall be placed prior to chip seal applications or as designated by the ENGINEER.

PART 7 - SPEED HUMPS AND RAISED CROSSWALKS

A. General:

i. Speed hump and raised crosswalk construction shall meet all applicable material and installation specifications outlined elsewhere in the Contract Documents.

ii. In the event that all vehicles are not removed from the construction area despite timely delivery of the construction notice letter, the CONTRACTOR shall attempt to contact vehicle owners by other means in an effort to find the vehicle's owner to have the vehicles relocated. If the CONTRACTOR is unsuccessful they shall contact the ENGINEER and provide the make, model, and license plate number of the vehicle as well as the vehicle location. The ENGINEER shall try contacting the vehicle owner and if unsuccessful shall contact a designated towing company to move the vehicle out of the construction area, to a neighboring street as directed by the ENGINEER, at the OWNER'S expense. The towing company shall attach a standard letter to the vehicle upon towing. The ENGINEER will provide the standard letter.

iii. Construction traffic control shall be provided on each street by the CONTRACTOR in strict conformance with NCDOT "North Carolina Supplement to the MUTCD," the MUTCD, the Contract Documents, or as directed by the ENGINEER. No work shall begin on any street without the proper traffic control measures in place.

iv. The maximum acceptable height of speed humps and/or raised crosswalks shall be as indicated in the Contract Documents or as designated by the ENGINEER. The OWNER shall not accept any newly constructed speed humps and/or crosswalks exceeding the maximum specified elevation. Should it be determined that the height exceeds the maximum elevation, the speed humps and/or raised crosswalks shall be removed and replaced or remedied as directed by the ENGINEER at the CONTRACTOR'S expense.

v. The CONTRACTOR shall construct all improvements so as to create and/or maintain positive drainage.

PART 8 - UTILITY ADJUSTMENTS

A. General:

i. No manholes or water valve boxes shall be raised and left for a period of time greater than fourteen (14) days before the street is resurfaced. Should this period of time be exceeded, all work shall be stopped until the resurfacing of such streets has been completed. Immediately after utility adjustments take place the sides of the utility shall be painted bright orange for visibility and if directed by the ENGINEER 36" (minimum) reflective orange traffic cones or other devices shall also be added for visibility. There will be no separate compensation for this work and shall be considered incidental to the cost of the items.

ii. Cast iron risers will not be allowed for adjustment of manholes and water valve boxes.

iii. If any existing broken manholes or water valve boxes are discovered, the OWNER shall furnish new manhole rings and covers or new water valve boxes for replacement of the broken ones by the CONTRACTOR at no additional cost to the OWNER. Replacements will be the same as stocked by the OWNER or approved as acceptable alternate by the ENGINEER.

iv. Adjustment of fire hydrants shall include both horizontal and vertical adjustment to leave existing fire hydrants positioned in accordance with City standards, or as otherwise noted on plans.

END OF SECTION

SECTION 02 00 50

PAVING AND SURFACING

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Furnish all labor, equipment, and materials and perform all operations in connection with the construction of asphalt concrete pavement, asphalt concrete overlay, reinforced concrete pavement, gravel roads, concrete curb and gutter, repair and reconstruction of existing asphalt concrete pavement, repair of existing gravel roads, and pavement markings complete as specified herein and as detailed on the Drawings.

B. All new roads including the replacement of portions of the existing roads shall be to the limits, grades, thicknesses and types as shown on the Drawings.

1. Patches for pipe crossings and areas damaged during the construction work shall be asphalt and/or gravel, depending upon the material encountered, unless otherwise indicated.

C. CONTRACTOR shall be responsible for meeting all requirements stated in DOT encroachment agreements, including, but not limited to, bonding, positive shoring, etc.

1.02. STANDARD SPECIFICATIONS

A. Except as otherwise provided in the Specifications or on the plans, all work shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Roads and Structures, latest edition unless otherwise noted except that any reference to "NCDOT", "Department" or "Unit" shall mean the "OWNER".

B. When reference to these Specifications is intended, the description will be NCDOT Section _____ or NCDOT Specifications.

C. Except with the approval of the ENGINEER, the placing of concrete or asphalt concrete surface paving shall be subject to the seasonal and weather restrictions set forth in NCDOT Standard Specifications for Roads and Structures.

1.03. QUALITY CONTROL

A. CONTRACTOR will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. A testing laboratory approved by the ENGINEER will be employed by the CONTRACTOR and paid by the CONTRACTOR. If included in the PROJECT BID SCHEDULE these costs shall be reimbursable from the Bid Allowance line item established for testing; otherwise these costs should be included in the price of the work to be completed.

C. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

D. All testing shall be in accordance with NCDOT Specifications.

E. Asphalt Thickness

1. In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

F. Asphalt Surface Smoothness

1. Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances per NCDOT Specifications.

G. Asphalt In-Place Density

a. Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

b. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

c. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

d. At least 2 core samples shall be taken.

e. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

H. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements. CONTRACTOR will be responsible for all additional testing due to unacceptable tests.

1. Testing Frequency

a. Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. Frequency and location will be chosen by ENGINEER.

PART 2 MATERIALS

2.01. SELECT FILL

A. The CONTRACTOR shall place select fill as necessary to complete the shoulders, subgrade foundation, and replacement for removed unsuitable material in accordance with **NCDOT Section 200, Clearing and Grubbing** and as specified.

2.02. GRAVEL

A. All work including materials associated with gravel shall be in accordance with **NCDOT Section 545, Incidental Stone Base** unless otherwise noted.

2.03. AGGREGATE STABILIZATION

A. All work including materials associated with Aggregate Stabilization shall be in accordance with **NCDOT Section 510, Aggregate Stabilization** unless otherwise noted.

2.04. AGGREGATE BASE COURSE (ABC)

A. All work including materials associated with Aggregate Base Course shall be in accordance with **NCDOT Section 520, Aggregate Base Course** unless otherwise noted.

1. Type "A" or "B" aggregate in accordance with **NCDOT Section 1010** will be acceptable for this project.

2.05. ASPHALT TACK COAT

A. All work including materials associated with asphalt tack coat shall be in accordance with **NCDOT Section 605, Asphalt Tack Coat** unless otherwise noted.

2.06. ASPHALT CONCRETE BASE COURSE (ACBC)

A. All work including materials associated with asphalt concrete base course shall be in accordance with **NCDOT Section 610, Asphalt Concrete Plant Mix Pavements** unless otherwise noted.

1. The job mix formula CONTRACTOR proposes to use shall be delivered to the ENGINEER at least 2-weeks prior to beginning paving operations.

2.07. ASPHALT CONCRETE SURFACE COURSE (ACSC)

A. All work including materials associated with asphalt concrete surface course shall be in accordance with **NCDOT Section 610, Asphalt Concrete Plant Mix Pavements** unless otherwise noted.

1. The job mix formula CONTRACTOR proposed to use shall be delivered to the ENGINEER at least two 2-weeks prior to beginning paving operations.

2.08. RIGID PORTLAND CEMENT CONCRETE PAVEMENT

A. All work including materials associated with rigid concrete pavement shall be as specified.

1. Class A concrete shall be used.

2. Placement shall be as specified and **NCDOT Section 700, General Requirements for Portland Cement Concrete Paving** and **Section 710, Concrete Pavement** unless otherwise noted.

2.09. RIGID CONCRETE PAVEMENT REINFORCING

A. Reinforcing, when applicable, shall be as shown on the Drawings and as specified.

2.10. CONCRETE CURB AND GUTTER

A. Concrete shall be air-entrained by admixture only and proportioned and mixed for a 28-day minimum compressive strength of 3,500 psi as specified.

B. Premolded expansion joint filler for expansion joints shall conform to ASTM D 1751 and shall be ½-inch thick, minimum.

2.11. CONCRETE SIDEWALK

A. Concrete shall be air-entrained by admixture only and proportioned and mixed for a 28-day minimum compressive strength of 3,500 psi as specified.

B. Premolded expansion joint filler for expansion joints shall conform to ASTM D 1751 and shall be ½-inch thick, minimum.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that sub grade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Revise minimum weight or type of vehicle in first subparagraph below if required.

3. Proof roll with an approved piece of equipment having a single-axle weight of at least 10 tons.

4. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.02. SURFACE PREPARATION

A. Subgrade

1. The subgrade where shown on the Drawings shall be aggregate stabilized by the addition and mixing of coarse aggregate with the top 3-inches of subgrade in accordance with **NCDOT Section 500-2, Construction Methods**.

B. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared sub grade is ready to receive paving.

C. Tack Coat

1. Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal/sq yd

2. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

3. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Proof-roll prepared sub grade surface to check for unstable areas and areas requiring additional compaction. Proof-rolling of prepared sub grade will conform to the NCDOT Section 260, Proof Rolling unless otherwise noted. OWNER's Representative shall observe proof-roll.

E. Notify OWNER's Representative of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving. Allow to dry until proper condition to receive paving. Subsurface shall be free of any ice or debris.

F. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces. Asphalt shall be feathered to match the elevation of adjoining concrete or asphalt pavement.

3.03. AGGREGATE BASE COURSE

A. The base course of all paving shall be ABC.

1. ABC shall be of the thickness shown on the Drawings and formed true to crown and grade.

2. Gravel roads, including repair to existing gravel roads, shall be ABC.

3. No fill material except new ABC shall be placed on top of existing gravel.

3.04. ASPHALT CONCRETE BASE COURSE

A. Asphalt concrete base course shall be placed and compacted on the aggregate base course in layers not to exceed 4-inches and at the rate of not less than 110 pounds per square yard per inch of thickness.

1. Thicknesses shall be as shown on the Drawings.

3.05. ASPHALT CONRETE SURFACE COURSE

A. Prior to placement of the asphalt concrete surface course, the base/binder course shall be inspected for damage or defects and repaired to the satisfaction of the ENGINEER.

1. The surface of the base/binder course shall be approved by the ENGINEER.

B. An asphalt tack coat shall be applied to the surface of the approved base/binder course as described in **NCDOT Section 605**.

1. Equipment for applying the tack coat shall be power-oriented pressure spraying or distributing equipment suitable for the materials to be applied and approved by the ENGINEER.

C. The asphalt concrete surface course shall be placed and compacted on the base/binder course in layers not to exceed 1.5-inches and at the rate of not less than 110 pounds per square yard per inch of thickness.

1. Thicknesses shall be as shown on the Drawings.

3.06. JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

3.07. COMPACTION

A. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving per NCDOT Specifications.

3.08. TOLERANCES

A. Thickness

1. Compact each course to produce the thickness indicated within the following tolerances:

a. Surface Course

1) Plus 1/4 inch, no minus

b. Crowned Surfaces

1) Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is ¼ inch.

B. Surface Smoothness

1. Compact each course to produce a surface smoothness within the following tolerances as determined by using a l0-foot straight edge applied transversely or longitudinally to paved areas:
    a. Surface Course
        1) 1/8 inch
    b. Crowned Surfaces
        1) Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.09. PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply marking in accordance with drawings and NCDOT Specifications.

3.10. RIGID PORTLAND CEMENT CONCRETE

A. The subgrade and base course beneath Portland cement concrete pavement shall be prepared in accordance with the applicable Sections of these Specifications and referenced NCDOT Standard Specifications for Roads and Structures.

1. The CONTRACTOR shall use an approved automatically controlled fine grading machine to produce final subgrade and base surfaces meeting the lines, grades, and cross sections (thicknesses) shown on the Drawings or established by the ENGINEER.

B. The surface of the base shall be damp at the time the concrete is placed.

1. The CONTRACTOR shall sprinkle the base when necessary to provide a damp surface.
2. The CONTRACTOR shall satisfactorily correct all soft areas in the subgrade or base prior to placing concrete.

C. Hauling over the base course shall not be allowed except where specifically permitted by and in writing by the ENGINEER.

1. The ENGINEER may allow equipment-dumping concrete to operate on the base to the extent and under the conditions the ENGINEER deems necessary to facilitate placing and spreading the concrete.

D. Installation of the rigid concrete pavement shall be in accordance with the details shown on the Drawings and Division 3 - Concrete.

1. The rigid concrete pavement shall cure a minimum of 10 calendar days and until the concrete has attained a minimum flexural strength of 550 psi as indicated by flexural strength testing.
2. The CONTRACTOR shall coordinate and pay for all flexural strength testing with a minimum of four 6-inch by 6-inch by 20-inch beams for every 50 cubic yards of pavement concrete installed.

E. Contraction joints shall be spaced at intervals as shown on the Drawings.

1. Transverse contraction joints shall be formed by an approved joint insert.

2. Expansion joints shall be placed when the pavement abuts a structure using 1-inch expansion joint material (filler) and sealant as specified herein.

3.11. CONCRETE CURB AND GUTTER

A. The expansion joint filler for concrete curb and gutters shall be cut to conform to the cross section of the curb.

1. Expansion joints shall be spaced at intervals of not more than 25-feet.

B. Formed control joints shall be installed at intervals not exceeding 10-feet.

1. Depth of joint shall be the thickness of the curb and gutter.

C. Curved forms shall be used where radii are indicated; straight segments shall not be permitted.

D. Upon removal of the forms, exposed curb faces shall be immediately rubbed down to a smooth and uniform surface.

E. No plastering shall be permitted.

3.12. CONCRETE SIDEWALK

A. No concrete shall be placed until forms and subgrade have been approved by the OWNER.

B. Expansion joints shall be placed at intervals not greater than 50-feet and between all rigid objects.

C. Grooved construction joints shall be cut to a depth equal to but not less than the total slab thickness.

1. Construction joints shall be placed at intervals equal to but not more than the width of the sidewalk.

D. Sidewalk surface shall be finished to line and grade and cross section with a float, troweled smooth, and given a broom finish.

3.13. JUNCTION WITH OTHER PAVING

A. Where new asphalt concrete pavement abuts existing asphalt concrete pavement, the existing pavement shall be cut back to insure obtaining the specified compaction of the new pavement courses and interlocking adjoining courses.

1. Existing subbase courses shall be cut back from the subgrade level of the new pavement on a one-on-one slope into the existing pavement.

2. The asphalt courses of the existing pavement shall be removed for additional 6-inches back from the slope.

3. The edge of the existing asphalt courses shall be saw cut straight and true.

4. The faces between new and existing asphalt courses shall receive an application of tack coat.

B. Where new rigid concrete pavement abuts existing rigid concrete or asphalt concrete paving, the existing paving shall be saw cut straight and true.

1. An expansion joint of a ½-inch minimum thickness with filler material and sealant shall be placed between the new concrete pavement and the existing rigid concrete or asphalt concrete paving.

3.14. ASPHALT CONCRETE OVERLAY

A. Where asphalt concrete is to be placed over an existing asphalt or rigid concrete surface, the surfaces shall be thoroughly cleaned by power brooming.

B. A tack coat shall be applied in accordance with NCDOT Section 605, Asphalt Tack Coat, of the NCDOT Specifications prior to installing the overlay.

3.15. SIGNAGE

A. Erect signs in accordance with NCDOT Specifications.

3.16. DISPOSAL

A. Remove excavated materials from project site and legally dispose of them.

END OF SECTION

SECTION 02 00 60

MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.01. SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to do the miscellaneous work not specified in other sections but obviously necessary for the proper completion of the work as shown on the Drawings.

B. When applicable the CONTRACTOR shall perform the work in accordance with other sections of this Specification.

C. When no applicable specification exists the CONTRACTOR shall perform the work in accordance with the best modern practice and/or as directed by the ENGINEER.

D. The work of this Section includes, but is not limited to, the following:

1. Crossing and relocating existing utilities
2. Restoring of driveways and sidewalks
3. Cleaning up
4. Incidental work
5. Job photographs
6. Protection and/or removal and reinstallation of signs
7. Restoration of and replacement of curbing
8. Protection and bracing of utility poles
9. Restoring easement and right-of-ways

E. Temporary facilities

PART 2 PRODUCTS

2.01. MATERIALS

A. Materials required for this Section shall be the same quality of materials that are to be restored.

B. Where possible, the CONTRACTOR may re-use existing materials that are removed.

PART 3 EXECUTION

3.01. CROSSING AND RELOCATING EXISTING UTILITIES

A. This Item includes any extra work required in crossing culverts, water courses, including brooks and drainage ditches, storm drains, gas mains, water mains, electric, telephone, gas, and water services, and other utilities.

B. This work shall include but is not limited to the following: bracing, hand excavation and backfill (except screened gravel) and any other work required for crossing the utility or obstruction not included for payment in other items of this specification.

C. In locations where existing utilities cannot be crossed without interfering with the construction of the work as shown on the Drawings, the CONTRACTOR shall remove and relocate the utility as directed by the ENGINEER or cooperate with the Utility Companies concerned if they relocate their own utility.

D. At pipe crossings and where designated by the ENGINEER, the CONTRACTOR shall furnish and place screened gravel bedding so that the existing utility or pipe is firmly supported for its entire exposed length.

E. The bedding shall extend to the mid-diameter of the pipe crossed. Payment for screened gravel at pipe crossings shall be included as an incidental cost to the unit price for the proposed pipeline established in the Bid Form.

3.02. CLEANING UP DURING CONSTRUCTION

A. Execute periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.

B. Provide onsite containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at an approved facility.

D. Upon approval of the OWNER, selected waste may be disposed at the active construction and demolition disposal area on the site.

3.03. FINAL CLEANING

A. The CONTRACTOR shall remove all construction material, excess excavation, buildings, equipment, and other debris remaining on the job as a result of construction operations and shall restore the site of the work to a neat and orderly condition.

B. Prior to final completion, or OWNER occupancy, ENGINEER shall conduct an inspection of all work areas to verify that the entire work area is clean.

3.04. INCIDENTAL WORK

A. Do all incidental work not otherwise specified, but obviously necessary to the proper completion of the Contract as specified and as shown on the Drawings.

3.05. TEMPORARY FACILITIES

A. The CONTRACTOR shall furnish, install, maintain, and remove all temporary facilities required for construction or called for in the specifications.

END OF SECTION

SECTION 02 00 70

STORM DRAINAGE SYSTEM

PART 1 GENERAL

1.01. THE REQUIREMENT

A. Furnish and install to the required line and grade all storm utility drainage piping together with all fittings and appurtenances required for a complete and operable installation.

B. Furnish all labor, materials, equipment, tools, and services required for the furnishing and installing of all storm drainage system shown on the Drawings and required for the Work.

C. Storm utility drainage piping shall include all fittings, adapter pieces, couplings, closure pieces, harnessing rods, hardware, bolts, gaskets, and other associated appurtenances for required connections to existing pipes, valves, or structures for a complete and operable installation.

1.02. SUBMITTALS

A. Submit the following in accordance with **Section 01 30 00 – Electronic Submittals**.

1. Piping

a. Pipeline materials including joints, fittings, and couplings, etc

b. Material certificates

2. Structures

a. Complete layout and installation Drawings and schedules with clearly marked dimensions

b. Material certificates on all structure materials

3. Sealants

a. Proposed concrete section joint sealant and watertight exterior joint seal

PART 2 PRODUCTS

2.01. REINFORCED CONCRETE PIPE

A. Reinforced Concrete Pipe shall be as per ASTM C76, Table III or Table IV with a minimum 15 inch inside diameter. Joints shall be sealed with a plastic cement putty meeting Federal Specification SS-S-00210.

B. Reinforced concrete pipe shall be Class III RCP or greater as required by depth or loading or as shown on Drawings.

C. Comply with the requirements of NCDOT Section 1032-9.

2.02. PRECAST CONCRETE STRUCTURES

A. Precast concrete structures shall be designed and manufactured in accordance with ASTM C478. The manhole walls shall be a minimum of five (5) inches thick, and the base slab shall have a minimum thickness of 6 inches. The minimum compressive strength of the concrete shall be 4,000 psi. The manhole sections shall have reinforcement as required

to provide resistance to the hydrostatic and passive earth pressures to which they will be subjected, and to provide adequate resistance to temperature and shrinkage cracking.

B. Precast concrete structures shall be furnished with water stops, sleeves and openings as noted on the Drawings.

C. Precast concrete structures shall be manufactured by Concrete Pipe & Pre-cast, Oldcastle Pre-cast, Mack Industries, Tindall Corporation, or approved equal.

2.03. STRUCTURE STEPS

A. Steps shall be constructed of ½-inch diameter, Grade 60 steel reinforcing rod completely encapsulated with a wear and chemical resistant rubber.

B. Each step shall have a minimum vertical load resistance of 400 pounds and a minimum pullout resistance of 1,000 pounds.

C. The steps shall have 11-inch minimum tread width.

D. Steps shall be installed at 16-inches on center as shown on the Drawings or required in the Specifications.

2.04. CONCRETE SECTION JOINT SEALANT

A. Preformed Butyl Mastic Sealant

1. Joint sealant shall be a Preformed Flexible Compound conforming to the requirements of ASTM C990 and Federal Specifications SS-S-00210-A, “Sealing Compound Preformed Plastic for Pipe Joints”, Type 1, Rope Form.

2. Compound shall be NPC Bidco C-56 Butyl Joint Sealant, Henry Company Butyl-Nek Preformed Plastic Joint Sealant (BN109) or approved equal.

2.05. WATERTIGHT EXTERIOR JOINT SEAL

A. Watertight exterior joint seal shall be installed after joining manhole sections with asphalt sealant and butyl joint wrap.

1. Butyl joint wrap shall be minimum width 12-inches and comply with ASTM C990.

2. Asphalt sealant shall be Carboline, Bitumastic 300m; Tnemec, Tneme-Tar; or approved equal.

PART 3 EXECUTION

3.01. INSTALLATION OF PIPELINES AND APPURTENANCES

A. General Requirements for Installation of Pipelines

1. Earthwork

a. Perform earthwork operations as specified in **Section 02 00 20 – Excavation, Backfill, and Compaction**.

B. Concrete Work

1. Pre-Cast concrete shall be performed as specified in **Section 02 00 80 – Concrete Vaults and Chambers**.

3.02. CONSTRUCTION LOADS

A. For temporary construction vehicle loads an extra amount of compacted cover may be required over the top of the pipe. The height-of-cover shall meet minimum requirements shown in the table below. The use of heavy construction equipment necessitates greater protection for the pipe than finished grade cover minimums for normal highway traffic.

General Guidelines for Minimum Cover Over				
Pipe Span Inches	Axle Load (Kips)			
	18-50	50-75	75-110	110-150
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

1. These are minimum cover and appropriate cover will vary depending on local conditions. The CONTRACTOR must provide the additional cover required to avoid damage to the pipe. Minimum cover is measured from the top of the pipe to the top of the maintained construction roadway surface.

END OF SECTION

SECTION 02 00 80

CONCRETE VAULTS AND CHAMBERS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary for the installation of concrete vaults and chambers in accordance with the plans. All materials, testing, and procedures shall be of the type specified herein.

B. Section Includes:

1. Precast concrete vaults and chambers.
2. Drainage system junction boxes.
3. Drainage system sedimentation chambers.
4. Knock-out boxes.
5. End walls.
6. Pipe ends.
7. Frames and covers.
8. Access hatches.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO HB-17 - Standard Specifications for Highway Bridges.

B. American Concrete Institute:

1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
2. ACI 305R – Guide to Hot Weather Concreting
3. ACI 306R – Guide to Cold Weather Concreting
4. ACI 318 - Building Code Requirements for Structural Concrete.

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.4 - Structural Welding Code - Reinforced Steel.

D. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel
2. ASTM A48 - Standard Specification for Gray Iron Castings
3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

4. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
5. ASTM A706 -Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
6. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
7. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars
8. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
9. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
10. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
11. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
12. ASTM C33 - Standard Specification for Concrete Aggregates
13. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
14. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
15. ASTM C70 - Standard Test Method for Surface Moisture in Fine Aggregate
16. ASTM C88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
17. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
18. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
19. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete
20. ASTM C150 - Standard Specification for Portland Cement
21. ASTM C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
22. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
23. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
24. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
25. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
26. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

27. ASTM C566 - Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
28. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
29. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
30. ASTM C877 - Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections.
31. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
32. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
33. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
34. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
35. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
36. ASTM C989 - Standard Specification for Slag Cement for Use in Concrete and Mortars
37. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
38. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
39. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
40. ASTM C1227 - Standard Specification for Precast Concrete Septic Tanks
41. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures
42. ASTM C1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
43. ASTM C1433 - Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers.
44. ASTM C1478 - Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes, and Laterals
45. ASTM C1504 - Standard Specification for Manufacture of Precast Reinforced Concrete Three-Sided Structures for Culverts and Storm Drains.
46. ASTM C1582 - Standard Specification for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete
47. ASTM C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

48. ASTM C1611 - Standard Test Method for Slump Flow of Self-Consolidating Concrete
49. ASTM C1719 - Standard Test Method for Installed Precast Concrete Tanks and Accessories by the Negative Air Pressure (Vacuum) Test Prior to Backfill
50. ASTM D558 - Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures

E. National Precast Concrete Association:
   1. NPCA Plant Certification Program.
   2. NPCA Quality Control Manual for Precast and Prestressed Concrete Plants.

F. North Carolina Department of Transportation
   1. Standard Specifications for Roads and Structures, latest revision

G. The Society for Protective Coatings:
   1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

H. City of New Bern
   1. Water & Sewer Design Standards

1.03. SUBMITTALS

A. **Section 01 30 00 -Electronic Submittals**.

B. Product Data: Submit manufacturer information for frames and covers, sealants, gaskets, pipe entry connectors, steps, racks, anchors, lifting inserts, and other devices.

C. Shop Drawings:
   1. Furnish the drawings from the precast concrete producer for precast concrete units.
   2. Indicate vault or chamber locations, elevations, sections, equipment supports, piping, conduit, sizes and dimensions of all penetrations, and special embed items.
   3. Indicate design loads, construction and installation details, typical reinforcement size and placement and additional reinforcement at openings for each custom type, size, and configuration.

D. Upon request, submit concrete mix design for each strength and type of concrete that will be used. Include the quantity, type, brand, and applicable data sheets for all design constituents as well as documentation indicating conformance with applicable reference specifications.

E. Manufacturer's Certificate: The precast concrete producer shall supply submittals that certify that products meet or exceed specified requirements.
   1. At a minimum, the following shall be shown on the submittals:
      a. Live load used in design
      b. Vertical and lateral earth loads used in design
      c. Depth of soil fill on the structure
      d. Water table depth used in calculations

2. The precast concrete producer shall ensure that the structure will not float when subjected to buoyant forces during the construction stage as well as after the structure has been installed and completely backfilled. Submit the calculations used to determine the necessity of any anti-flotation method used.

F. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

G. Source Quality-Control Submittals: Upon request, indicate results of factory tests and inspections.

1. This may include: mill tests and all other test data for Portland cement, blended cement, pozzolans, ground granulated blast-furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

2. Submit copies of test reports showing that the design mix has been successfully tested to produce concrete with the properties specified and will be suitable for the project conditions. Such tests may include compressive strength, plastic air content, temperature of freshly mixed concrete, and slump of freshly mixed concrete.

3. Copies of the precast concrete producer’s in-plant QA/QC inspection reports.

H. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.

2. Submit manufacturer's approval of installer.

1.04. QUALITY ASSURANCE

A. Obtain precast concrete vaults and chambers from single source.

B. Perform structural design according to ACI 318. Design must also consider stresses induced during handling, shipping, and installation in order to avoid product cracking or other handling damage.

C. Perform Work according to NPCA Quality Control Manual for Precast and Prestressed Concrete Plants.

D. Material and Fabrication:

1. Single-Cell Box Culverts: Comply with ASTM C1433.

2. Three-Sided Structures: Comply with ASTM C1504.

3. Other Structures: Comply with ASTM C913.

E. Welding:

1. Structural Steel: Comply with AWS D1/1.

2. Reinforcing Steel: Comply with AWS D1.4.

F. Where applicable, perform Work according to State of North Carolina Department of Transportation standards and the more stringent methods specified herein.

1.05. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years' documented experience.

1. The precast producer shall maintain a permanent quality control department.
2. The precast concrete producer shall have a quality control program which is audited for compliance annually by persons outside that plant's employee structure.
3. Upon request, the precast concrete producer shall supply a copy of their quality control manual.
4. Precast concrete shall be manufactured by Concrete Pipe & Pre-cast, Oldcastle Infrastructure, Mack Industries, Tindall Corporation, or approved equal.

B. Any plant producing precast concrete units for this specification shall have a written, implemented, comprehensive safety and environmental program. Upon request, documentation shall be provided to show the safety program meets the following minimum requirements.

1. The safety program shall include the following written and documented parts as a minimum:
    a. Housekeeping
    b. Lock-Out Tag-Out
    c. Machine Guarding
    d. Risk Assessment
    e. Personal Protective Equipment
    f. CONTRACTOR and Visitor Safety
    g. Cranes and Lifting Equipment Safety
    h. Ergonomics and Handling Safety
    i. Fall Protection
2. Health and Safety Management System Requirements
    a. The health and safety management system shall be used to manage the safety program and all measurable aspects.
3. The Environmental Management System shall encompass the following:
    a. Air Pollution Control
    b. Water and Wastewater Management
4. Recordable rate
    a. The recordable rate shall be below the industry average. If the industry average is not readily available, assume a value of six recordable injuries per 200,000 hours worked as the industry average.

C. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience.

D. Welders: AWS qualified within previous 12 months for employed weld types.

E. Licensed Professional: Professional ENGINEER experienced in design of specified Work and licensed in State of North Carolina.

1.06. DELIVERY, STORAGE, AND HANDLING

A. **Section 01 55 00 – Site Access and Storage**.

B. Concrete Products: Do not deliver products until concrete has cured five days or has attained minimum 70 percent of specified 28-day compressive strength.

C. Inspection: Accept materials on Site in manufacturer's original packaging. All precast concrete units shall be inspected by the OWNER for quality and final acceptance.

D. Handling:

1. Comply with manufacturer instructions for unloading, storing, and moving vaults or chambers.

2. Lift vaults or chambers from designated lifting points as indicated on the shop drawings.

3. Lifting devices or holes shall be consistent with industry standards.

4. Upon request, the precast concrete producer shall provide documentation on acceptable handling methods for the product.

E. Storage:

1. Store materials according to manufacturer instructions in a manner that will minimize potential damage.

2. Store vaults and chambers to prevent damage to OWNER's property or other public or private property.

3. Repair property damaged from materials storage.

F. Protection:

1. Protect materials in clean location remote from construction operations areas.

2. Provide additional protection according to manufacturer instructions.

1.07. EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.

2. Indicate field measurements on Shop Drawings.

B. All underground facilities and structures such as gas, water, sewer, power, telephone cable, and so forth shall be located and identified. Location markings shall be placed by the affected utilities before construction.

C. Identify obstacles such as overhead wires, building structures that will interfere with crane operations, work progress, or create a safety hazard.

1.08. WARRANTY

A. **Section 01 74 00 – Warranties and Bonds**.

B. Furnish five-year manufacturer's warranty for concrete vaults, chambers, and appurtenances.

PART 2 PRODUCTS

2.01. PERFORMANCE AND DESIGN CRITERIA

A. Minimum Loading: Comply with ASTM C857 and ASTM C890.

B. Roof Live Load, with Impact Loading:

1. Heavy Traffic:

a. Comply with AASHTO HB-17; HS20-44.

b. Maximum Each Wheel: 16,000 lbf.

2. Medium Traffic:

a. Comply with AASHTO HB-17; HS15-44.

b. Maximum Each Wheel: 12,000 lbf.

3. Light Traffic:

a. Comply with AASHTO HB-17; HS10.

b. Maximum Each Wheel: 8,000 lbf.

4. Walkway Traffic:

a. Comply with ASTM C857; A-0.3.

b. Maximum Loading: 300 psf.

C. Box Culvert Roof Live Load:

1. Comply with AASHTO HB-17; HS20.

2. Interstate live loads and impact load.

2.02. PRECAST CONCRETE VAULTS AND CHAMBERS

A. Material of Construction: Reinforced precast concrete.

B. Foundation Slab:

1. Cast-in-place concrete of type as specified.

2. Top Surface: Leveled.

2.03. FRAMES AND COVERS

A. Description:

1. Materials of Construction:

a. Cast iron.

b. Comply with ASTM A48; minimum Class 30.

2. Lid:

a. Size: As indicated on Drawings.

b. Surface: Machined flat bearing.

c. Type: Removable.

d. Security: Lockable

3. Cover:
   a. Fabrication: Molded.
   b. Identification: Cast with “Town of Trent Woods” name and/or logo
4. Furnish sealing gasket as indicated.
5. Grate:
   a. Size: As indicated on Drawings.

2.04. ACCESS HATCHES

A. Description:

1. Materials of Construction: Aluminum; welded.
2. Size: As indicated on Drawings.
3. Cover:
   a. Fabrication: Diamond plate.
   b. Reinforce with structural stiffeners as required to support indicated loads.
4. Frame:
   a. Concrete anchors around frame perimeter.
5. Hinge Material: Stainless steel.
6. Lift Handle:
   a. Type: Flush drop; non-removable.
   b. Mounting: In cover.
7. Lifting Mechanism:
   a. Compression Springs: Stainless steel.
   b. Furnish automatic hold-open and dead stop to retain cover in open position.
   c. Cover springs to prevent contact by personnel entering vault or chamber.
8. Latch Mechanism:
   a. Lock: Stainless steel.
   b. Furnish padlock hasp.
9. Hardware: Stainless steel.
10. Finishes: Unfinished.
11. Where noted on the plans and where openings are such persons may fall access hatches shall have fall protection systems with aluminum or stainless steel “I” bar grating, T-316 SS hardware, 300 lbs/ft^2 loading, hinged and lockable, powder coating finish with safety orange finish to cover opening when hatch is opened.

2.05. MATERIALS

A. Concrete:

1. Portland Cement:

a. Comply with ASTM C150.

b. Type: I – Normal, II – Moderate, III - High Early Strength, or V - Sulfate Resistant.

2. Fine and Coarse Aggregates: Comply with ASTM C33, except that gradation requirements do not apply.

3. Water: Comply with ASTM C1602. Clean and not detrimental to concrete.

4. Silica Fume: Comply with ASTM C1240.

B. Admixtures:

1. Air Entrainment: Comply with ASTM C260.

2. Chemical Admixtures: Comply with ASTM C494.

3. Fly Ash and Calcined Pozzolan: Comply with ASTM C618.

4. Blast Furnace Slag: Comply with ASTM C989, Grade 100 or 120.

5. Corrosion inhibitors: Comply with ASTM C1582.

6. Pigments:

a. Description: Mineral oxide; nonfading; lime resistant.

b. Color: as selected.

C. Concrete Reinforcement:

1. Reinforcing Steel: Comply with ASTM A615 or ASTM A706.

2. Reinforcing Wire: Comply with ASTM A1064.

3. Welded Steel Wire Fabric: Comply with ASTM A1064.

2.06. FABRICATION

A. Comply with ACI 318 and NPCA Quality Control Manual for Precast and Prestressed Concrete Plants.

B. Fabricate vaults, chambers, knock-out panels, and openings to size and configuration as indicated on Drawings.

C. Forms:

1. Forms shall be of the type and design consistent with industry standards and practices. Construct forms so that the forces and vibrations to which the forms will be subjected cause no damage to the precast concrete unit.

2. Fabricate to provide uniform precast concrete units with consistent dimensions.

3. Form release agents shall be applied according to the manufacturer’s recommendations.

4. Clean after each use.

D. Reinforcing:

1. Install reinforcement by tying or welding to make rigid assemblies.

2. Secure reinforcement to prevent displacement while placing concrete.

E. Position and secure embedded items at locations specified in the design documents to prevent displacement while placing concrete.

F. Preplacement Check:

1. All products shall be inspected for accuracy prior to placing concrete. Checks shall include, but not be limited to, form condition and cleanliness, form dimensions, joints, release agent, blockouts, inserts and locations, lifting devices, reinforcing steel size, spacing, clearances, and proper placement.

2. Preplacement checks shall be performed by the manufacturer and documented. A drawing with verifications of the above criteria can be used as documentation.

G. Deposit concrete in forms and consolidate concrete without segregating aggregate. Keep the freefall of concrete to a minimum.

H. Cold Weather Concreting: Comply with ACI 306R.

1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing temperatures. All concrete materials, reinforcement, and forms shall be free from frost. The temperature of the concrete at the time of placement shall not be below 45 degrees F. Discard concrete that freezes before it reaches a compressive strength of 500 psi.

I. Hot Weather Concreting: Comply with ACI 305R.

1. Minimize excessive concrete temperatures and water evaporation. The temperature of concrete at the time of placing shall not exceed 95 degrees F.

J. Provide initial curing by retaining moisture using one of following methods:

1. Cover with PE sheets.

2. Cover with burlap or other absorptive material and keep continually moist.

3. Apply curing compound according to manufacturer instructions.

K. Provide final curing according to manufacturer's standard.

L. The surface finish shall be as specified on the contract documents and/or approved shop drawings.

M. Do not remove precast concrete units from the forms until the concrete reaches the compressive strength for stripping required by design. Measure stripping strengths routinely to ensure product has attained sufficient strength for safe handling.

N. Remove forms without damaging concrete. Defects that will not impair the functional use or expected life of the precast concrete unit may be repaired by any method that does not impair the product

2.07. MIXES

A. Concrete:

1. For non-machine cast products, the concrete shall be self-consolidating concrete which produces minimal bugholes and does not segregate.
2. Mixing operations shall produce batch-to-batch uniformity of strength, consistency, and appearance.
3. Batching weight and volume measurement devices shall be annually calibrated by an independent testing laboratory or more frequently if batching irregularities or concrete inconsistencies are observed.
4. Selection of proportions for concrete shall be based on current self-consolidating concrete mix design techniques. At a minimum, ACI 211.1 and 318 shall be used.
5. Concrete Criteria:
    a. Compressive Strength: 5,000 psi at 28 days.
    b. Water-Cement Ratio:
        1) Concrete Exposed to Freezing and Thawing: Maximum 0.45 percent by mass.
        2) Watertight Concrete Not Exposed to Freezing and Thawing but required to be leak resistant: Maximum 0.48 percent by mass.
        3) Concrete Exposed to Corrosive Conditions: Maximum 0.40 percent by mass.
    c. Air Content:
        1) Maximum Aggregate Size of 3/8 Inch:
            a) Severe Exposure: 6.0 to 9.0 percent.
            b) Moderate Exposure: 4.5 to 7.5 percent.
        2) Maximum Aggregate Size of 1/2 Inch:
            a) Severe Exposure: 5.5 to 8.5 percent.
            b) Moderate Exposure: 4.7 to 7.0 percent.
        3) Maximum Aggregate Size of 3/4 Inch:
            a) Severe Exposure: 4.5 to 7.5 percent.
            b) Moderate Exposure: 3.5 to 6.5 percent.
        4) Maximum Aggregate Size of 1 Inch:
            a) Severe Exposure: 4.5 to 7.5 percent.
            b) Moderate Exposure: 3.0 to 6.0 percent.
        5) Maximum Aggregate Size of 1-1/2 Inches:
            a) Severe Exposure: 4.5 to 7.0 percent.
            b) Moderate Exposure: 3.0 to 6.0 percent.
        6) For specified compressive strengths greater than 5,000 psi, air content may be reduced 1%
6. Admixtures:

a. Include admixture types and quantities indicated in concrete mix designs approved through submittal process.

b. Do not use calcium chloride.

2.08. FINISHES

A. Reinforcing Steel:

1. Galvanized Finish (where required): Comply with ASTM A767, Class I.

2. Epoxy-Coated Finish (where required): Comply with ASTM A775.

B. Wire and Wire Fabric:

1. Epoxy-Coated Finish (where required): Comply with ASTM A884, Class A.

C. Concrete:

1. Formed Surfaces Not Exposed to View: As formed.

2. Unformed Surfaces:

a. Finish with vibrating screed or hand float.

b. Items Permitted: Color variations, minor indentations, chips, and spalls.

c. Items Not Permitted: Major imperfections, honeycomb, or other such defects.

D. Steel:

1. Galvanizing:

a. Comply with ASTM A123.

b. Hot-dip galvanize after fabrication.

2.09. ACCESSORIES

A. Membrane Curing Compound: Comply with ASTM C309, Type I or I-D, Class A or B.

B. Step Rungs:

1. Material: Formed steel-reinforced polypropylene.

2. Diameter: 1/2 inch.

3. Width: Minimum 12 inches.

4. Spacing: 12 to 16 inches o.c. vertically.

C. Inserted and Embedded Items:

1. Structural-Steel Sections:

a. Comply with ASTM A36.

b. Finish: Galvanized

D. Joint Sealants and Joint Gaskets: As indicated on Shop Drawings.

1. Gasket Joints for Circular Concrete Pipe:

a. Comply with ASTM C443.

b. Gaskets: Standard rubber.

2. External Sealing Bands:

a. Comply with ASTM C877.

b. Material: Type II, plastic film, mesh-reinforced.

3. Preformed Joint Sealants for Concrete Pipe and Box Sections: Comply with ASTM C990.

4. Elastomeric Joint Sealants:

a. Comply with ASTM C920.

b. Grade NS, Class 25.

E. Pipe Entry Connectors: Comply with ASTM C923 or ASTM C1478.

F. Grout:

1. Cement Type: Portland cement, sand, and water mixture with stiff consistency to suit intended purpose.

2. Nonshrink Type:

a. Description: Premixed compound consisting of nonmetallic aggregate, cement, and water-reducing and plasticizing agents.

b. Comply with ASTM C1107.

G. Touch-Up Primer for Galvanized Surfaces:

1. SSPC Paint 20, Type II Organic.

2. Comply with ASTM A780.

2.10. SOURCE QUALITY CONTROL

A. Testing:

1. The precast concrete producer may be required to show that the following quality control tests are performed as required:

a. Slump: Comply with ASTM C143 or ASTM C1611 as applicable.

b. Compressive Strength: ASTM C31, ASTM C192, and ASTM C39.

c. Air Content: Comply with ASTM C231.

d. Unit Weight: Comply with ASTM C138.

e. Temperature: Comply with ASTM C1064.

2. Make test results available to ENGINEER upon request.

B. Inspection:

1. Visually inspect completed vaults and chambers for defects.

2. Repair defects on surfaces exposed to view to achieve uniform appearance.

3. Repair honeycomb by removing loose material, cutting back the honeycombed areas into essentially horizontal or vertical planes to a depth at which coarse aggregate

particles break under chipping rather than being dislodged, and applying a cement-sand grout or an approved bonding agent followed immediately by consolidating an appropriate repair material into the cavity to produce smooth surface flush with adjacent surface.

4. Repair major defects only if permitted by OWNER.

C. OWNER Inspection:

1. Make units covered by this specification available for inspection at manufacturer's factory prior to packaging for shipment.

2. Notify OWNER at least three days before inspection is allowed.

D. OWNER Witnessing:

1. Allow witnessing of factory inspections and tests at manufacturer's test facility.

2. Notify OWNER at least seven days before inspections and tests are scheduled.

E. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that items provided by other Sections of Work are properly sized and located.

B. Verify correct size and elevation of excavation.

C. Verify that subgrade is properly prepared, compacted to 95% of ASTM D558 density, and ready to receive Work of this Section.

1. The subgrade shall be a minimum of 6” in depth.

2. Use a granular material to create a level surface for placing the precast concrete unit.

3.02. PREPARATION

A. Provide adequate access to the site to facilitate hauling, storage, and proper handling of the precast concrete units.

B. Secure permits required to do work in accordance with the detail plans before starting the job. Retain all permits or a record of the permits on the Site for immediate reference.

C. Should it appear that a structure location will interfere with traffic, review the situation with the ENGINEER, and notify appropriate authorities.

D. Provide for access to call boxes, fire hydrants, etc.

E. Mark each vault or chamber by indentation or using waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

F. Coordinate placement of inlet and outlet pipe or duct sleeves required by other Sections.

G. Do not install vault or chamber if Site conditions induce loads exceeding weight capacity of vault or chamber.

H. Inspect vaults and chambers immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

3.03. INSTALLATION

A. According to ASTM C891.

B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface structures or utilities in immediate or adjacent areas. If any damage occurs, notify the OWNER of the damaged facility immediately.

C. While lowering vaults or chambers into excavations and joining pipe to units, take precautions to ensure that interiors of pipeline and structure remain clean.

D. Lift precast concrete units by suitable lifting devices at points provided by the precast concrete producer.

E. Install vaults and chambers to elevation and alignment as indicated on Drawings.

F. Install cast-in-place concrete foundation slab as specified, and install and anchor structure to base slab.

G. Excavating:

1. As specified and in indicated locations and depths.

2. Provide clearance around sidewalls of manhole or structure for construction operations.

3. If ground water is encountered, prevent accumulation of water in excavations; place structure in dry trench. Also verify that the design accounts for the level of groundwater encountered.

4. Inspect excavations after every rainstorm or other hazard-increasing occurrence, and increase the protection against slides and cave-ins, if necessary

5. If unforeseen facilities or obstructions are encountered, stop excavation operations immediately. Expose the obstructions and investigate them with caution. If there is any doubt as to the type of obstruction exposed, request positive identification from the OWNER of the facility and then proceed as circumstances dictate.

6. Remove large stones or other hard matter impeding consistent backfilling or compaction.

7. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation as approved by ENGINEER.

8. Correct over-excavation with coarse aggregate.

H. Base and Alignment (slabs):

1. Place foundation slab and trowel top surface level.

2. Grout base of shaft to achieve slope to drain, trowel smooth, and contoured as indicated on Drawings.

3. Place sections plumb and level, trim to correct elevations, and anchor to foundation slab.

I. Base and Alignment (vaults and chambers):

1. Install vaults and chambers supported at proper grade and alignment on compacted crushed-stone bedding.

2. Grout base of shaft to achieve slope to drain, trowel smooth, and contoured as indicated on Drawings.

J. Assembly of Multisection Structures:

1. Lower each section into excavation.

2. Clean joint surfaces.

3. Install watertight joint seals according to manufacturer instructions using gasket joints, external sealing bands, preformed joint sealants, elastomeric joint sealants, and grout.

K. Knock-out Boxes:

1. Remove knock outs or cut structure to receive piping without creating openings larger than required to fit pipe.

2. Fill annular space with grout.

L. Connections:

1. Connect pipe to structure and seal watertight.

2. Cut pipe flush with interior of structure.

M. Frame and Cover and/or Access Hatch:

1. Set level, without tipping, to elevations as indicated on Drawings.

2. Set frame and cover and/or access hatch minimum 2 inches above finished grade for structures located within unpaved areas, unless otherwise shown on Plans.

N. Backfill excavations for vaults and chambers as specified as soon as possible after the structure has been placed.

1. Backfilling shall be achieved by lifts (layers) to the required compaction.

2. Follow up inspections for settlements are required. Should settlement occur, the CONTRACTOR shall be responsible for all necessary repairs.

3.04. FIELD QUALITY CONTROL

A. Verify and document final field elevations and compaction properties.

B. Testing:

1. Vacuum Test: As specified. Comply with ASTM C1719 or ASTM C1227 as applicable if required by ENGINEER.

END OF SECTION

SECTION 02 00 90

SEEDING & MULCHING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to perform seeding in accordance with the plans. All materials, testing, and procedures shall be of the type specified herein.

B. Section Includes:

1. Fertilizing.
2. Seeding.
3. Hydroseeding.
4. Mulching.
5. Maintenance.

1.02. REFERENCES

A. ASTM International:

1. ASTM C602 - Standard Specification for Agricultural Liming Materials.
2. ASTM D977 – Standard Specification for Emulsified Asphalt.

1.03. DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Wild Onion, Crotalaria, Witchweed, Perennial Sorrel, Sandbur, and Brome Grass.

1.04. SUBMITTALS

A. **Section 01 30 00 –Electronic Submittals**.

B. Product Data: Submit data, including source, for seed mix, fertilizer, mulch, and other accessories.

C. Samples of all materials shall be submitted for inspection and acceptance upon ENGINEER's request.

D. Manufacturer's Certificate: Certify Products, including seed, limestone, and fertilizer, meet or exceed specified requirements.

1. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

E. Proposed Planting Schedule: Indicate dates for all work during normal seasons. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

1.05. CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include maintenance instructions to be established by OWNER during a calendar year, including cutting method and maximum grass height and types, application frequency, and recommended coverage of fertilizer.

1.06. QUALITY ASSURANCE

A. 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.

B. No material substitutions will be permitted without the prior written approval of the ENGINEER.

C. Apply all materials in strict accordance with manufacturer's written instructions.

1.07. QUALIFICATIONS

A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section.

1.08. DELIVERY, STORAGE, AND HANDLING

A. **Section 01 55 00 – Site Access and Storage**.

B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer. Fertilizer shall be cared for in such a manner that it will be protected against hardening, caking, or loss of plant food values. Any hardened or caked fertilizer shall be pulverized to its original conditions before being used.

D. Damaged products shall be rejected upon delivery and promptly removed from the site.

E. Products which must be stored prior to installation shall be protected from theft and damage by heat, moisture, rodents, or other causes.

F. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.09. MAINTENANCE SERVICE

A. Maintain all seeded areas in a condition approved by the ENGINEER until final acceptance of the Contract.

B. Maintenance shall include, but not be limited to, repair of seeded areas, irrigation, and weed control. Protection shall be provided for all seeded areas against trespassing and damage. Slopes shall be protected from damage due to erosion, settlement, and other causes and shall be repaired promptly.

PART 2 PRODUCTS

2.01. SEED MIXTURE

A. Grass seed shall be fresh, clean, dry, seed complying with the requirements of the North Carolina Seed Law and regulations adopted by the North Carolina Board of Agriculture.

B. Seed shall have been approved by the North Carolina Department of Agriculture or any agency approved by the ENGINEER before being sown, and no seed will be accepted with a date of test more than nine (9) months prior to the date of sowing. Such testing however, will not relieve the CONTRACTOR from responsibility for furnishing and sowing seed that meets these specifications at the time of sowing.

C. Each variety of seed shall have a percentage of germination not less than 90, a percentage of purity not less than 85, and shall have not more than one percent weed content. When a low percentage of germination causes the quality of the seed to fall below the minimum pure live seed specified, the CONTRACTOR may elect, subject to the 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.

2.02. ACCESSORIES

A. Mulching Material shall be one of the following:

1. Oat, wheat, rye, or barley straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are acceptable.

2. Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth- or germination-inhibitors, with maximum moisture content of 15%, ash content 0.6 percent (±0.2 percent), water holding capacity of 1,050 grams water/100 grams dry fiber, and a pH range of 4.5 to 6.5.

B. Fertilizer: Commercial grade; recommended for grass.

1. 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 North Carolina Board of Agriculture.

2. For all areas to be seeded which are not classified as lawns, but would be classified as open fields, fertilizer shall be free-flowing, ready mixed 10-10-10 grade fertilizer. 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.

3. For all areas to be seeded which are classified as lawns, fertilizer shall be as follows:

    a. Fertilizer tablets: Agriform Planting Tablets 20-10-5 as manufactured by Scotts-Sierra Horticultural Products, or approved equal, may be used at installer's option.

    b. Encapsulated fertilizer: Osmocote 19-6-12 as manufactured by Scotts-Miracle Gro, or approved equal, may be used at installer's option.

C. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.

D. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

E. Erosion Fabric: Jute matting, open weave.

1. Include manufacturer's recommended anchorage system for slope conditions.

F. String: Inorganic fiber.

G. Tackifier shall be one of the following:

1. Asphalt Emulsion Tackifier

    a. Asphalt emulsion, ASTM D977, Grade SS-1, nontoxic and free of plant growth- or germination-inhibitors.

2. Nonasphaltic Tackifier

    a. Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic, and free of plant growth or germination-inhibitors.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that the areas of work have been properly contoured and brought to final grade prior to beginning work.

B. Verify prepared soil base is ready to receive the Work of this section.

C. Consult record drawings and installers to determine actual underground utility and drainage system locations in the vicinity of this work. Damage to known or unrecorded utilities will be repaired at the CONTRACTOR's expense.

D. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

3. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

E. Notify the ENGINEER of any unforeseen conditions which will affect plant installation or growth.

F. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by ENGINEER and replace with new planting soil.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02. SEEDBED PREPARATION

A. Cut and satisfactorily dispose of weeds or other unacceptable growth on the areas to be seeded. Uneven and rough areas outside of the graded section, such as crop rows, farm contours, ditches and ditch spoil banks, fence line and hedgerow soil accumulations, and other minor irregularities which cannot be obliterated by normal seedbed preparation operations, shall be shaped and smoothed as directed by the ENGINEER to provide for more effective seeding and for ease of subsequent mowing operations.

B. Scarify or otherwise loosen the soil to a depth of not less than 6 inches except as otherwise provided below or otherwise directed by the ENGINEER. Break clods and work the top 2 to 3 inches of soil into an acceptable seedbed by the use of soil pulverizers, drags, or harrows; or by other methods approved by the ENGINEER. Remove all loose rock, roots, and other obstructions leaving surface reasonably smooth and uniform.

C. On cut slopes that are steeper than 2:1, the depth of preparation may be reduced as permitted by the ENGINEER, but in all cases the slope surface shall be scarified, grooved, trenched, or punctured so as to provide pockets, ridges, or trenches in which the seeding materials can lodge.

D. Do not prepare seedbeds when the soil is frozen, extremely wet, or when the ENGINEER determines that it is in an otherwise unfavorable working condition.

E. Limestone may be applied at the rate described below as a part of the seedbed preparation, provided it is immediately worked into the soil. If not so applied, limestone and fertilizer shall be applied as described below.

3.03. FERTILIZING

A. Equipment to be used for the application, covering, or compaction of limestone, fertilizer, and seed shall have been approved by the ENGINEER before being used on the project. Approval may be revoked at any time if equipment is not maintained in satisfactory working condition, or if the equipment operation damages the seed.

B. Apply limestone, fertilizer, seed, and mulch within 24 hours after completion of seedbed preparation unless otherwise permitted by the ENGINEER. No limestone or fertilizer shall be distributed and no seed shall be sown when the ENGINEER determines that weather and soil conditions are unfavorable for such operations.

C. Apply lime at application rates indicated below. Work lime into top 6 inches of soil.

1. The specified rate of limestone application may be reduced by the ENGINEER if pH tests indicate this to be desirable. It is the responsibility of the CONTRACTOR to obtain such tests and submit the results to the ENGINEER for adjustment in rates.

2. Apply lime at a rate of 4,000 pounds per acre to all areas to be seeded which are not classified as lawns, but would be classified as open fields.

3. Apply lime at a rate of 92 pounds per 1,000 square feet or all areas to be seeded which are classified as lawns.

4. When adverse seeding conditions are encountered due to steepness of slope, height of slope, or soil conditions, the ENGINEER may direct or permit that modifications be made in the above requirements which pertain to incorporating limestone into the seedbed; covering limestone, seed, and fertilizer; and compacting the seedbed. Such modifications include but are not limited to the following:

   a. The incorporation of limestone into the seedbed may be omitted on:

      1) Cut slopes steeper than 2:1;

      2) On 2:1 cut slopes when a seedbed has been prepared during the excavation of the cut and is still in an acceptable condition; or

      3) On areas of slopes where the surface of the area is too rocky to permit the incorporation of the limestone.

D. Apply fertilizer at application rates indicated below. Mix fertilizer thoroughly into upper 2 inches of topsoil.

1. The specified rate of fertilizer application may be reduced by the ENGINEER if soil tests indicate this to be desirable. It is the responsibility of the CONTRACTOR to obtain such tests and submit the results to the ENGINEER for adjustment in rates.

2. Apply fertilizer at a rate of 1,000 pounds per acre to all areas to be seeded which are not classified as lawns, but would be classified as open fields.

3. Apply fertilizer at a rate of 23 pounds per acre per 1,000 square feet to all areas to be seeded which are classified as lawns.

E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

F. When a combination seed and fertilizer drill is used, fertilizer may be drilled in with the seed after limestone has been applied and worked into the soil. If two kinds of seed are being used which require different depths of cover, the seed requiring the lighter cover may be sown broadcast or with a special attachment to the drill, or drilled lightly following the initial drilling operation.

1. The rates of application of limestone, fertilizer, and seed on slopes 2:1 or steeper or on rocky surfaces may be reduced or eliminated.

2. Compaction after seeding may be reduced or eliminated on slopes 2:1 or steeper, on rocky surfaces, or on other areas where soil conditions would make compaction undesirable.

3.04. SEEDING

A. All disturbed areas shall be seeded unless specifically indicated to receive other types of plantings or groundcovers.

B. Temporary crops must be incorporated prior to seeding of permanent mixtures.

C. Apply seed only on freshly prepared seedbed.

D. Do not apply seed against the trunk or exposed root structure of existing trees.

E. Do not seed areas in excess of that which can be mulched on same day.

F. Do not sow immediately following rain, when ground is too dry, or when winds are over 5 mph.

G. Planting Season:

1. The best seeding dates are between September 1 through September 30 and February 15 through March 20.
2. Possible seeding dates are between September 1 through October 31 and February 15 through April 30.
3. Between April 15 and August 15, add 10 lbs/acre German millet or 15 lbs/acre of Suangrass.
4. Prior to May 1 or after August 15 add 25 lbs/acre rye (grain).

H. Apply seed according to the following rates:

Temporary Non-Wetland Seeding Schedule		
Dates	Seeding Mixtures Species	Application Rate
Jan 1 – May 1	Rye Grain	120 lbs/acre
	Kobe Lespedeza	50 lbs/acre
May 1 – Aug 15	German Millet	40 lbs/acre
Aug 15 – Dec 30	Rye Grain	120 lbs/acre

Permanent Non-Wetland Seeding Schedule		
Dates	Seeding Mixtures Species	Application Rate
Sept 1 – Apr 1	Tall Fescue	120 lbs/acre
Apr 15 – June 30	Bermuda Grass	25 lbs/acre
Sept 1 – May 1	Sericea Lespedeza	15 lbs/acre
May 1 – Sept 1	Kobe Lespedeza	10 lbs/acre

I. Immediately after application, harrow, drag, rake, or otherwise work seedbed so as to cover the seed with a layer of soil. The depth of covering shall be as directed by the ENGINEER. If two kinds of seed are to be used which require different depths of covering, they shall be sown separately.

J. Lightly roll the surface and water with fine spray.

K. Immediately following seeding and compacting, apply mulch to thickness of 1/2 to 1-1/2 inches. Maintain clear of shrubs and trees. Unless directed otherwise, begin mulching at the top of the slopes and proceed downward.

1. Mulch shall be uniformly spread by hand or by approved mechanical spreaders or blowers which will provide an acceptable application as described above.
2. Before mulch is applied on cut or fill slopes which are 3:1 or flatter, and ditch slopes, remove and dispose of all exposed stones in excess of 3 inches in diameter and all roots or other debris which will prevent proper contact of the mulch with the soil.
3. Exercise care to prevent displacement of soil or seed or other damage to the seeded area during the mulching operations.
4. Take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water, or other causes and shall promptly remove any blockage to drainage facilities which may occur.
5. Anchor straw by one of the following methods:
    a. Netting
        1) Securely anchor straw or hay mulch by using ENGINEER-approved netting anchored to the ground with pegs or staples to prevent it from floating as the vegetation grows. Instead of this anchorage, the CONTRACTOR may secure mulch by heavy biodegradable twine fastened by pegs or staples to form a grid with 6 to 10 feet spacing.
    b. Tackifier
        1) Treat straw or hay with a tackifier at an application rate of 400 gal/acre unless otherwise approved by the ENGINEER. Blow from a machine, and uniformly deposit over designated areas in one operation. The CONTRACTOR may apply the tackifier as an overspray in a separate operation after placing the straw or hay.
        2) Cover/protect structures, poles, fences and other appurtenances if mulch binder is applied in such a way that it may come in contact with or discolor those structures or appurtenances.
    c. Crimping
        1) Immediately after spreading, anchor the mulch in the soil by using a mulch crimper consisting of a series of dull, flat discs with notched edges. Space the 20 inch diameter discs at about 8 inch centers. Equip the crimper with a ballast compartment to allow adjusting the weight for depth control.
        2) Impress the mulch into the soil 1 1/2 to 2 1/2 inches deep in one pass of the crimper. This process may require more than one pass of the crimper to ensure adequate anchoring of the mulch.

L. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.05. HYDROSEEDING

A. When a hydraulic seeder is used for application of seed and fertilizer, the seed shall not remain in water containing fertilizer for more than 30 minutes prior to application unless otherwise permitted by the ENGINEER.

B. Apply fertilizer, mulch and seeded slurry with hydraulic seeder evenly in one pass in accordance with the application rates described herein.

1. Mix slurry with fiber-mulch tackifier in accordance with manufacturer's recommendations.

2. Fiber mulch shall be mixed into the slurry such that the application rate of the fiber mulch is 1,500 to 2,000 pounds per acre.

C. After application, apply water with fine spray immediately after each area has been hydroseeded. Saturate to 4 inches of soil and maintain moisture levels two to four inches.

3.06. SEED PROTECTION

A. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

B. Provide wood or metal stakes 48 inches in height, set on eight (8) to 10 foot centers, connected by 2-inch minimum brightly colored flagging tape or fabric fencing to protect trees and vegetation to remain. Set perimeter of protection at the drip line of trees to remain unless approved otherwise by the ENGINEER.

C. On slopes, protect against washouts by an approved method. Any washout that occurs shall be regraded and reseeded at the CONTRACTOR'S expense until good growth is established.

D. 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.

E. Secure outside edges and overlaps at 36 inch intervals with stakes.

F. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

G. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

H. Remove nondegradable erosion-control measures after grass establishment period.

3.07. MAINTENANCE

A. Cover crops or temporary crops must be mowed at proper time to prevent seed heads from maturing. Wheat may be harvested.

B. Mow grass at regular intervals to maintain at maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at each mowing. Perform first mowing when seedlings are 40 percent higher than desired height.

C. Neatly trim edges and hand clip where necessary.

D. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.

E. Water to prevent grass and soil from drying out.

F. Apply maintenance fertilizer in the amount of 500 pounds per acre following the initial establishment of groundcover. This application shall occur when vegetation is three (3) inches in height or 45 days after initial seeding, whichever comes first.

G. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

H. Immediately reseed areas showing bare spots.

   1. If stand is less than 60% established, the entire area shall be reseeded according to specifications using the original lime, fertilizer and seeding rates.

I. Repair washouts or gullies.

J. Protect seeded areas with warning signs during maintenance period.

K. Maintenance for Temporary Non-wetland seeding

   1. Winter, Early Spring, and Summer

      a. Refertilize if growth is not fully adequate. Reseed, refertilize, and mulch immediately following erosion or other damage.

   2. Fall

      a. Repair and refertilize damaged areas immediately. Topdress with 50 lbs/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15 overseed with 50 lbs/acre Kobe Lespedeza in late February or early March.

   3. Temporary seeding must be followed up with permanent seeding as soon as practical.

END OF SECTION

SECTION 02 01 00

LANDSCAPING & PLANTING

In this section, where “Landscape Architect” or “Architect” is used, this shall be interpreted to mean “ENGINEER”, “Inspector”, or “designated Town representative”.

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

a. Trees, Shrubs, Ground covers, Plants, Sodded and Seeded Lawns, Topsoil and Soil Amendments, Fertilizers and Mulches, and Stakes and Guys.

1.03 SUBMITTALS

A. General: Submit each item in this Article for approval by the Inspector before installation of landscaping. Suppliers’ certification required that states all plants and landscape material is free from contamination by imported fire ants. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

B. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Certification of each seed mixture for sod, identifying sod source, including name and telephone number of supplier.

C. Samples of each of the following:

a. 5 lb (2 kg) of mineral mulch for each color and texture of stone (if required for Project, in labeled plastic bags.

D. Edging materials and accessories, if applicable, to verify color selected. Qualification data for firms and persons supplying and installing landscaping (see Quality Assurance section below) to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names, and address of architects and OWNERS, and other information specified. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated. Analysis of existing surface soil. Analysis of imported topsoil. Planting schedule indicating anticipated dates and locations for each type of planting.

E. Maintenance instructions recommending procedures to be established by OWNER for maintenance of landscaping during an entire year.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage only a North Carolina licensed Landscape Contractor who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.

B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

C. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock." The Town shall have an opportunity to inspect all materials prior to installation and to reject materials that do not meet specifications.

D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.

E. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches (150 mm) above ground for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

F. Preinstallation Conference: Conduct conference at Project site with Inspector prior to installation of landscape materials.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

C. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."

D. Trees and Shrubs: Deliver freshly dug trees and shrubs. Do not prune before delivery, except as approved by Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery. Immediately after digging bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Handle balled and burlapped stock by the root ball.

Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist. Heel-in bare-root stock. Soak roots in water for 2 hours if dried out. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material. Do not keep plant material stored on or in an unrefrigerated truck when temperatures exceed sixty degrees. Do not remove container-grown stock from containers before time of planting. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.06 PROJECT CONDITIONS

A. Utilities: Determine location of above-grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Architect before planting.

1.07 COORDINATION AND SCHEDULING

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

1.08 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the OWNER of other rights the OWNER may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the CONTRACTOR under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for a period of one year after date of Final Completion, against defects including death and unsatisfactory growth, as well as adequate maintenance, neglect, or abuse. CONTRACTOR shall water plant material during one year warranty period.

1. Trees.
2. Shrubs.
3. Ground covers.
4. Plants.
5. Lawns

Remove and replace dead planting materials immediately if death occurs during appropriate planting season or plant in the succeeding planting season. Replace planting materials that are more than 25 percent dead or in an unhealthy condition at end of warranty period. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

PART 2 TREE AND SHRUB MAINTENANCE

2.01 WATERING

A. **CONTRACTOR is responsible for providing water at no additional cost to the OWNER**. CONTRACTOR shall thoroughly water all plant materials and seeded lawns to supplement at least the equivalent of one inch of rainfall weekly until final acceptance or the end of maintenance period whichever is greater. Do not install any sod before irrigation system is fully operational, if applicable.

B. CONTRACTOR to provide saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings. Maintain trees and shrubs for the following period:

C. Maintenance Period: 3 months following Substantial Completion or up to Final Acceptance whichever is greater.

2.02 GROUND COVER AND PLANT MAINTENANCE

A. Maintain ground cover and plants by watering, weeding, fertilizing, and other operations as required to establish healthy, viable plantings for the following period:

B. Maintenance Period: 3 months following Substantial Completion or up to Final Acceptance whichever is greater.

2.03 LAWN MAINTENANCE

A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

B. Sodded Lawns: 60 days after date of Substantial Completion or up to Final Acceptance whichever is greater.

C. Seeded Lawns: 60 days after date of Substantial Completion or up to Final Acceptance whichever is greater.

D. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established at that time, continue maintenance during next planting season. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

E. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep seeded lawns uniformly moist to a depth of 4 inches (100 mm).

F. Water lawn at the minimum rate of 1 inch (25 mm) per week. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

G. Postfertilization: Apply fertilizer to lawn after first mowing and when grass is dry. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. (0.5 kg per 100 sq. m) of lawn area.

PART 3 PRODUCTS

3.01 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement. See Plant List for size, caliper, and root requirements.

B. Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls. Label each tree and shrub with securely attached, waterproof tag bearing legible designation of botanical and common name. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.

3.02 SHADE AND FLOWERING TREES

A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, conforming to ANSI Z60.1 for type of trees required.

B. Branching Height: 1/3 to 1/2 of tree height.

C. Small Trees: Small upright or spreading type, branched or pruned naturally according to species and type, and with relationship of caliper, height, and branching recommended by ANSI Z60.1, and stem form as follows:

D. Form: Multistem, shrub, with multiple stems.

E. Provide balled and burlapped trees. Container-grown trees will be acceptable in lieu of balled and burlapped trees subject to meeting ANSI Z60.1 limitations for container stock.

3.03 DECIDUOUS SHRUBS

A. Form and Size: Deciduous shrubs with not less than the minimum number of canes required by and measured according to ANSI Z60.1 for type, shape, and height of shrub.

B. Container-grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs subject to meeting ANSI Z60.1 limitations for container stock.

3.04 CONIFEROUS EVERGREENS

A. Form and Size: Normal-quality, well-balanced, coniferous evergreens, of type, height, spread, and shape required, conforming to ANSI Z60.1.

B. Form and Size: Specimen-quality, exceptionally heavy, tightly knit, symmetrically shaped coniferous evergreens of the following grade:

C. Heavy Grade: "XX."

D. Provide balled and burlapped coniferous evergreens. Container-grown coniferous evergreens will be acceptable in lieu of balled and burlapped coniferous evergreens subject to meeting ANSI Z60.1 limitations for container stock.

3.05 BROADLEAF EVERGREENS

A. Form and Size: Normal-quality, well-balanced, broadleaf evergreens, of type, height, spread, and shape required, conforming to ANSI Z60.1.

B. Container-grown broadleaf evergreens will be acceptable in lieu of balled and burlapped broadleaf evergreens subject to meeting ANSI Z60.1 limitations for container stock.

3.06 GROUND COVERS AND PLANTS

A. Provide ground covers and plants established and well rooted in removable containers or integral peat pots and with not less than the minimum number and length of runners required by ANSI Z60.1 for the pot size indicated.

3.07 GRASS MATERIALS

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on the landscape and grading plans.

C. Sod: Sod shall be as specified in Special Construction Section of Contract Documents

3.08 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch (25 mm) or larger in any dimension, and other extraneous materials harmful to plant growth.

B. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

C. Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

3.09 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 (2.36 mm) sieve and a minimum 75 percent passing a No. 60 (250 micrometer) sieve. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

1. For acid-tolerant trees and shrubs, provide moss peat, with a pH range of 3.2 to 4.5, coarse fibrous texture, medium-divided sphagnum moss peat or reed-sedge peat.

F. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

1. When site treated, mix with at least 0.15 lb (2.4 kg) of ammonium nitrate or 0.25 lb (4 kg) of ammonium sulfate per cu. ft. (cu. m) of loose sawdust or ground bark.

G. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

H. Herbicides: EPA registered and approved, of type recommended by manufacturer.

I. Water: Potable.

J. Soil Conditioner: Shall be roto-tilled into the existing topsoil in tree, shrub and groundcover beds. Use only pulverized pine bark mulch, shredded and decomposed leaves, or peat humus. All soil conditioners shall be free from diseases, insects, and other materials that may be hazardous to the plant material. All soil conditioners shall be thoroughly roto-tilled into the existing parent soil by passing twice at right angles over the soil. Provide at least one cu. yd. of soil conditioner per 75 sq. ft. of surface area or provide at least four inches of soil conditioner over existing parent soil, whichever is greater.

3.10 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. 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-form, phosphorous, and potassium in the following composition:

D. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

E. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

F. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency

3.11 MULCHES

A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Pine needles and organic leaf mulch. (See notes on plans for specific requirements).

B. Asphalt Emulsion Tackifier: Asphalt emulsion, ASTM D 977, Grade SS-1, nontoxic and free of plant growth- or germination-inhibitors.

C. Non-asphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic and free of plant growth- or germination-inhibitors.

3.12 STAKES AND GUYS

A. Only Stake and Guy evergreen trees and shrubs five feet and taller. Do not stake deciduous trees. Only Stake and Guy Evergreen trees and shrubs five feet and taller. Do not stake deciduous trees.

B. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches (50 by 50 mm) by length indicated, pointed at one end.

1. Guy and Tie Wire: ASTM A 641 (ASTM A 641M), Class 1, galvanized-steel wire, 2-strand, twisted, 0.106 inch (2.7 mm) in diameter.

C. Guy Cable: 5-strand, 3/16-inch (4.8-mm) diameter, galvanized-steel cable, with zinc-coated turn buckles, 3-inch- (75-mm-) long minimum, with two 3/8-inch- (10-mm-) galvanized eyebolts.

D. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch (13 mm) in diameter, black, cut to lengths required to protect tree trunks from damage.

E. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.

3.13 MISCELLANEOUS MATERIALS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's instructions.

B. Trunk-Wrap Tape: Two layers of crinkled paper cemented together with bituminous material, 4 inches (102 mm) wide minimum, with stretch factor of 33 percent.

PART 4 EXECUTION

4.01 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

4.02 PREPARATION

A. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Inspector's acceptance at Pre-installation meeting before the start of planting work. Make minor adjustments as may be required.

4.03 PLANTING SOIL PREPARATION

A. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

B. Planting Soil Amendments: See Landscape plans and Soil Amendments for specific requirements. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting. Mix lime with dry soil prior to mixing fertilizer. Prevent lime from contacting roots of acid-tolerant plants. Apply phosphoric acid fertilizer, other than that constituting a portion of complete fertilizers, directly to subgrade before applying planting soil and tilling.

4.04 LAWN PLANTING PREPARATION

A. Limit subgrade preparation to areas that will be planted in the immediate future. Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous materials. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.

B. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:

C. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns. Till surface soil to a depth of at least 6 inches (150 mm). Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100 mm) of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture. Clean surface soil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

D. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the OWNER's property. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches (38 mm) in any dimension, and other objects that may interfere with planting or maintenance operations. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

4.05 GROUND COVER, PLANT BED AND TREE PLANTING PREPARATION

A. Loosen subgrade of planting bed areas to a minimum depth of 6 inches (150 mm). Remove stones larger than 1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous materials. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture and repeat tilling at right angle to first pass and complete fine grading. Till soil in

beds to a minimum depth of 8 inches (200 mm) and mix with specified soil amendments and fertilizers.

4.06 EXCAVATION FOR TREES AND SHRUBS

A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation for containerized plant material only.

B. Balled and Burlapped Trees and Shrubs: Excavate 1-1/2 to 2 times as wide as ball diameter and equal to ball depth, plus the following setting layer depth:

C. Setting Layer: Allow 3 inches (75 mm) of planting soil.

D. Container-Grown Trees and Shrubs: Excavate1-1/2 to 2 times as wide as plant ball diameter, plus the following setting-layer depth:

E. Setting Layer: Allow 3 inches (75 mm) of planting soil.

F. Where drain tile is shown or required under planted areas, excavate to top of porous backfill over tile. Dispose of excess subsoil removed from landscape excavations. Mix subsoil with soil conditioner and backfill.

G. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

H. Hardpan Layer: Drill 6-inch- (150-mm-) diameter holes into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material if hard pan is encountered.

I. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

J. Fill excavations with water and allow to percolate out, before placing setting layer and positioning trees and shrubs.

4.07 PLANTING TREES AND SHRUBS

A. Set balled and burlapped stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated on planting details. Place stock on undisturbed soil layer. Remove burlap and wire baskets from tops of balls and partially from sides, but do not remove from under balls. Remove pallets, if any, before setting. Do not use planting stock if ball is cracked or broken before or during planting operation. Do not roll down or place removed burlap in hole.

B. Place backfill around ball in layers, lightly tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated on planting details. Carefully remove containers and thoroughly scarify roots to promote outward and downward growth. Root-bound plants shall not be planted. Place stock on setting layer of compacted planting soil.

C. Place backfill around ball in layers, lightly tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before

placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill. Dish and tamp top of backfill to form a 3-inch- (75-mm-) high mound around the rim of the pit. Do not cover top of root ball with backfill.

D. Wrap trees of 2-inch (50-mm) caliper and larger with trunk-wrap tape. Start at base of trunk and spiral cover trunk to height of first branches. Overlap wrap, exposing half the width, and securely attach without causing girdling. Inspect tree trunks for injury, improper pruning, and insect infestation and take corrective measures required before wrapping.

4.08 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as described below or as directed by the Landscape Architect. Unless otherwise directed by Landscape Architect, do not cut tree leaders; remove only injured or dead branches from trees. Prune shrubs to retain natural character. Shrub sizes indicated are size after pruning.

4.09 TREE AND SHRUB GUYING AND STAKING

A. Stake only evergreen trees of 5’ height or 2” min. caliper only. Do not stake deciduous trees.

B. Upright Staking and Tying: Stake trees of 2- through 5-inch (50- through 125-mm) caliper. Stake trees of less than 2-inch (50-mm) caliper only as required to prevent wind tip-out. Use a minimum of 2 stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and to extend at least 72 inches (1800 mm) above grade. Set vertical stakes and space to avoid penetrating balls or root masses. Support trees with 2 strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

C. Guying and Staking: Guy and stake trees exceeding 14 feet (4.2 m) and more than 3-inch (75-mm) caliper unless otherwise indicated. Securely attach no fewer than 3 guys to stakes 30 inches (760 mm) long, driven to grade. Attach flags to each guy wire, 30 inches (760 mm) above finish grade.

D. Removal of Staking and Guying: CONTRACTOR shall return to the site at the end of the Warrantee Period or at the end of one full growing season and completely remove from site all staking and guying materials.

4.10 PLANTING GROUND COVER AND PLANTS

A. Space ground cover and plants as indicated. Dig holes large enough to allow spreading of roots, and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

4.11 MULCHING

A. Mulch backfilled surfaces of pits, trenches, planted areas, trees and other beds as shown on the plans or details.

B. Organic Mulch: Apply the following average thickness of organic mulch and finish level with adjacent finish grades. Do not place mulch against trunks or stems. All areas not designated to receive lawn or sod shall be mulched accordingly.

C. Thickness: 4” of organic triple-shredded hardwood bark.

4.12 SEEDING AND SODDING NEW LAWNS

A. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage. Sow seed at the following rates:

1. Seeding Rate: 5 to 8 lb per 1000 sq. ft. (2.5 to 4 kg per 100 sq. m).

B. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.

C. Protect seeded slopes exceeding 1:4 against erosion with erosion-control blankets installed and stapled according to manufacturer's recommendations. Protect seeded areas with slopes less than 1:6 against erosion by spreading straw mulch after completion of seeding operations. Spread uniformly at a minimum rate of 2 tons per acre (45 kg per 100 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

D. Anchor straw mulch by spraying with asphalt-emulsion tackifier at the rate of 10 to 13 gal. per 1000 sq. ft. (41 to 53 L per 100 sq. m). Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

E. Protect seeded areas against hot, dry weather or drying winds by applying peat mulch within 24 hours after completion of seeding operations. Soak and scatter uniformly to a depth of 3/16 inch (4.8 mm) thick and roll to a smooth surface. Install Zoysia Sod in continuous rows with tight uniform joints. Stagger rows to offset horizontal joints. All sod should be delivered to the job site the same day or within 24 hours from being harvested and shall be installed the same day as delivered. Do not install sod onto saturated muddy soil. Water sod lightly and roll sod immediately following installation.

4.13 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by CONTRACTOR’S operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required. Recondition other existing lawn areas. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from CONTRACTOR’S operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

B. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of it off the Owner's property. Till stripped, bare, and compacted areas thoroughly to a depth of 6 inches (150 mm).

C. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches (100 mm) of soil. Provide new planting soil as required to fill low spots and meet new finish grades. Apply seed and protect with straw mulch as required for new lawns. Water newly planted areas and keep moist until new grass is established.

4.14 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Apply antidesiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage. When deciduous trees or shrubs are moved in full-leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

4.15 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

4.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

4.17 PLANTING SOIL AMENDMENTS SCHEDULE

A. Apply lime, bonemeal, superphosphate, potash, nitrogen, etc. at rates directed from the results of independent soil tests. A minimum of two tests for each planting area required (for lawns, shrub beds, trees, etc.). Submit application rates for trees, shrubs, groundcovers, and lawns to the Landscape Architect for approval prior to installation.

B. Tree Pits or Trenches: Provide soil amendments in not less than the following quantities:

1. Ratio of loose soil conditioners to topsoil by volume: <1 cu. yd. per 75 sq. ft.>

C. Ground Cover and Planting Beds: Provide soil amendments in not less than the following quantities:

1. Ratio of loose soil conditioners to topsoil by volume: <1 cu. yd. per 75 sq.ft.>

D. Lawns: Provide soil amendments in not less than the following quantities:

1. Ratio of loose soil conditioners to topsoil by volume: <1 cu. yd. per 125 sq.ft.>

2. Lime <5lbs. per 1,000sq. ft.>

4.18 SEED MIXTURES SCHEDULE

A. As indicated on drawings and **Section 02 00 90 – Seeding & Mulching**.

PART 5 GENERAL DAMAGES

5.01 DAMAGED VEGETATION: CONTRACTOR MAY BE RESPONSIBLE FOR ANY OR ALL OBSERVED DAMAGED VEGETATION

PART 6 PAYMENT

6.01 BASIS OF PAYMENT: PAYMENT FOR "LANDSCAPING" SHALL BE AT THE UNIT PRICE PER AREA OR LUMP SUM OR AT THE CONTRACT UNIT PRICE FOR EACH ITEM AS INDICATED ON THE ITEMIZED PROPOSAL. PRICE AND PAYMENT SHALL INCLUDE FURNISHING MATERIALS, INSTALLATION, AND REMOVAL AT THE END OF THE PROJECT.

END OF SECTION

SECTION 03 – SPECIAL CONSTRUCTION SPECIFICATIONS

SECTION 03 00 00
SPECIAL CONSTRUCTION

The following items in **Section 03 00 00** are project specific and shall supersede any other conflicting portion of these contract documents.

Conform to the requirements of the pay items included in these Technical Specifications. All other pay items are included in the North Carolina Department of Transportation Standard Specifications and must be conformed to as described in those specifications unless modified herein. In the event of a conflict between these technical specifications and the North Carolina Department of Transportation Standard Specifications these Technical Specifications shall govern.

PART 1 GENERAL

A. Mobilization (which includes demobilization) shall not exceed 5% of the project cost and shall be paid for as lump sum unit price in accordance with **Section 800 of North Carolina Department of Transportation Standard Specifications for Roads and Structures**.

B. The CONTRACTOR will be responsible for attending bi-weekly meetings during the project duration at which a report will be made as to the project status including any problems encountered. CONTRACTOR's representative shall be a project manager familiar with the daily progress and field conditions of the project. CONTRACTOR and SUBCONTRACTORS shall limit communications to those with the Inspector except as otherwise provided by these documents.

C. CONTRACTORS must be licensed with the State of North Carolina as a General Contractor, plus any specialty work performed by the CONTRACTOR and/or SUBCONTRACTOR shall be performed by a Contractor licensed in the respective specialty area.

D. CONTRACTORS must obtain a City of New Bern Encroachment Agreement prior to construction within the Public Right-of-Way. An application can be obtained from the City of New Bern.

E. Where the CONTRACTOR fails to respond in a timely manner to Town directives to complete certain repairs and/or work that, in the Town's opinion, cause a safety hazard or the potential for damages, the Town may have such work performed and deduct the costs plus 25% from the CONTRACTOR'S pay request. This provision shall not, however, obligate the Town to undertake such work that is the responsibility of the CONTRACTOR.

F. CONTRACTOR must meet all requirements of North Carolina Department of Environmental Quality, North Carolina Department of Transportation and other required permits on this project. Permits are inserted into the Appendix prior to construction.

G. CONTRACTOR shall agree to a reduction or an increase in the scope of work as requested by the Town of Trent Woods with no adjustment to unit cost.

H. Construction surveying shall be included in the contract bid. Surveyor shall provide a stakeout of areas where an environmental permit is required prior to performing any construction in or adjacent to these areas. Stake out limits of the permitted work areas according to the approved permit drawings. Provide clear delineation by use of pink or

other highly visible flagging. Insure construction limits do not exceed approved permitted work areas. Immediately notify the Environmental Inspector of any variation of the stakeout limits when compared to the approved permit drawings. The Environmental Inspector shall approve the limits of the staked area prior to the onset of construction in that area. Payment for “Construction Surveying” will be made under the contract lump sum based upon a percentage complete of the project and shall include all labor, equipment, and materials necessary to perform construction surveying and staking during the duration of the contract and after construction as required. Surveying required to complete the as-built plans and submittal of as-built plans (1 set mylar, 2 sets blue prints) to the Town shall be included in the price for "Construction Surveying” and shall be delivered and approved by the Town prior to Final Application for Payment. The as-built plans shall comply with the Town of Trent Woods “Engineering and Construction Standards” requirements for as-builts and the data shall be tied to the nearest North Carolina Geodetic Survey (NCGS) geodetic control monument. All construction surveying shall be staked from the same monument used in the design of the plans.

I. The itemized Bid Quantities are ENGINEER’S estimate and are used for the comparison of bids. The Town maintains the right to add or delete quantities at any time, without an adjustment to the unit price.

J. There shall be no unit price adjustment for materials due to market variability.

PART 2 PRIOR TO CONSTRUCTION

A. The CONTRACTOR shall inspect all features within the construction limits, which according to the plans will remain in place, prior to construction. The CONTRACTOR shall document with the ENGINEER, in writing and recorded on video tape supplemented with appropriate photographs, prior to beginning any construction, the full project limits. The Inspector shall be present during the videotaping. Any damage resulting to existing features from the work of this contract shall be promptly repaired by the CONTRACTOR at no additional cost to the Town, in a manner approved by the ENGINEER.

B. The CONTRACTOR shall accept actual conditions at the site and perform the work specified without additional compensation for possible variation from grades and conditions shown, whether surface or subsurface, except as provided for by the contract documents. Should existing conditions be in variance with the contract drawings, bid or contract documents, the CONTRACTOR shall notify the ENGINEER prior to the bid and / or proceeding with the work, and adjustments be made only as directed by the ENGINEER

C. CONTRACTOR shall stake the easements and install all tree protection fence per plans. Once this is completed a “walk thru” shall be scheduled with the CONTRACTOR, Town’s Development Inspector, and Senior Engineer at which time adjustments may be made. No clearing (even within the easement) shall be started prior to this walk thru. After the walk thru, root pruning and then clearing operations may begin.

PART 3 DEMOLITION/REMOVAL/ABANDONMENT OF STRUCTURES

A. This Section covers the abandonment and demolition, removal, and disposal of the following items as indicated on the Drawings and as specified hereinafter.

1. Site Clearing
2. Asphalt
3. Concrete
4. 4” PVC
5. 15” RCP
6. 24” RCP
7. 18” CMP
8. Catch Basins

B. The CONTRACTOR shall furnish all labor, materials, and equipment to abandon or demolish and remove pavement, storm drainage, and concrete as designated on the construction drawings to be removed or abandoned.

C. The removal of all concrete, pavement, and storm drainage, and any and all materials demolished during construction shall become the CONTRACTOR's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to an approved landfill.

D. The CONTRACTOR may proceed with the removal of the materials scheduled for removal in a sequence suitable to the CONTRACTOR’s schedule so as not to interrupt stormwater flow in the existing and new pipelines and manholes.

E. Any materials removed without proper authorization from the OWNER but which are necessary for the operation of the existing facilities shall be replaced to the satisfaction of the OWNER and at no cost to the OWNER.

F. The CONTRACTOR shall remove, store, and reset items as indicated on construction drawings. This includes items such as gas line markers, trash receptacles, pet waste stations, tree placards, and signs. If these items are damaged, they shall be replaced to the satisfaction of the OWNER and at no cost to the OWNER.

G. Measurement and Payment (**Section 01 02 50**)

1. The lump sum price for clearing the site of incidental paving and curbs, debris, grass, trees, and other plant life in accordance with the plans shall include the labor, equipment, and materials necessary for resetting such items to the location indicated on plans and in original condition once construction has been completed per each item.

2. The unit price for concrete/pavement removal and disposal shall include full compensation for all labor, equipment, and materials for the removal and disposal of concrete and/or pavement per square yard.

3. The unit price for the removal of storm drain pipe and shall include full compensation for all labor, equipment, and materials for the removal and disposal of pipe per linear foot.

4. The unit price for the catch basin removal and disposal shall include full compensation for all labor, equipment, and materials for the removal and disposal of each item.

PART 4 SITE WORK

4.01 GENERAL

A. Site shall be maintained in good condition and all Sedimentation & Erosion Control measures shall be present as shown on plan. At the end of project, all applicable areas shall be fine graded and seeded. This cost is incidental to the project and no additional payment made.

B. All necessary grading work for this project are included in the EARTHWORK line item.

C. The CONTRACTOR shall accept actual conditions at the site and perform the Work specified without additional compensation for possible variation from grades and conditions shown, whether surface or subsurface, except as provided for by the contract documents.

D. At the end of each working day and during periods of construction inactivity, equipment shall be parked and/or stored a minimum of 30 feet from the edge of any travel lane unless deflective barriers are employed in accordance with MUTCD standards. All sight distances shall be kept clear and free of equipment and materials at all times.

E. CONTRACTOR shall be required to re-establish and re-set any existing property corner markers or local survey monuments which are disturbed by construction. Written documentation that such corners were re-established in a proper manner must be provided by a PLS.

F. The CONTRACTOR shall construct all improvements to create and/or maintain positive drainage at all times.

G. The CONTRACTOR shall comply with all requirements listed in the **North Carolina Division of Environmental Management Stormwater Discharge NPDES Permit NCG010000**, including the following conditions listed below. CONTRACTOR shall abide by the approved Sedimentation and Erosion Control Plan for this project (Reference **Section 02 00 10 – Erosion and Sedimentation Controls** for more details) and keep a signed copy of the letter of approval of the plan on-site at all times.

1. There shall be no discharge of any sanitary wastewater from this construction activity except under the provisions of another NPDES permit specifically issued therefore.

2. There shall be no chemicals added to the discharge.

3. All wastes composed of building and construction materials will be disposed of in accordance with N. C. statutes and rules governing solid waste disposal.

4. Maintenance activities for vehicles and heavy equipment shall be performed so as to not result in contamination of the surface or ground waters.

H. CONTRACTOR shall take precautions to avoid damage to existing pavement during construction of proposed roadway and utilities. Whenever pavement or other physical features outside of the construction limits but in proximity to project becomes damaged, unless evidence is presented by the CONTRACTOR to the contrary, CONTRACTOR is assumed responsible for such damages. The CONTRACTOR shall be responsible for the repair of such to a state acceptable by the ENGINEER at no additional cost to the OWNER.

I. If contaminated soil is encountered during construction, the material shall be handled in a manner acceptable to NCDEQ. The CONTRACTOR shall be responsible for obtaining any permits necessary. No additional payment will be made for permitting, removal, disposal, and replacement of contaminated soils.

J. The CONTRACTOR shall restore any grass, landscaping, pavement, and/or other features located on the subject property that is damaged or disturbed as a result of construction with “in-kind” material, and to the satisfaction of the Inspector.

K. Geotechnical reports have been completed for this project and included as reference only. The reports entitled “Report of Subsurface Investigation” by GeoTechnologies, Inc shall be used by the CONTRACTOR for bidding the project at his own discretion. Any material that is not contaminated and not necessary for fill, shall be removed from the site and paid for under the “Earthwork” lump sum pay item.

PART 5 UTILITY WORK

5.01 GENERAL

A. Any underground encounter or unusual circumstance that occurs during construction should be documented by the CONTRACTOR with photographs and field measurements along with prompt notification to the ENGINEER.

PART 6 LANDSCAPING & PLANTING

6.01 GENERAL

A. The CONTRACTOR shall remove and dispose of any surplus soil and waste material, including excess subsoil, unsuitable soil, trash, debris, and/or damaged vegetation and legally dispose of it off the Owner's property.

B. The CONTRACTOR shall be responsible for the replacement and replanting of any damaged vegetation that occurs during construction.

C. The CONTRACTOR shall be responsible for reconditioning any existing lawn areas that were damaged by the CONTRACTOR’s operations, including storage of materials or equipment and movement of vehicles. Including recondition lawn areas where settlement or washouts occur or where minor regrading is required.

D. See **Specification 02 01 00 – Landscape and Planting** for more details.

PART 7 INSPECTION/TESTING

7.01 GENERAL

A. The CONTRACTOR shall provide access to all construction materials and allow time for the inspection/testing of areas, as needed, by a qualified testing firm and/or the Inspector.

PART 8 TRAFFIC CONTROL/SITE ACCESS

8.01 GENERAL

A. All existing driveways, roadways, accesses, etc. shall be maintained and shall be fully accessible at all times. Construction shall not be allowed to interfere with business and/or residential operations. There will be no separate payment for this work. Written notice must be approved by the Town prior to being provided to the property owner.

B. CONTRACTOR will make all efforts not to hinder the access and mobility of emergency vehicles.

C. CONTRACTOR shall be responsible for all traffic control devices and signage per the Manual of Uniform Traffic Control Devices (MUTCD) and North Carolina Supplement to the MUTCD.

D. CONTRACTOR shall place stationary traffic control signs (Advance Warning Signs) at the beginning, end, and at all Y-lines on the project, per MUTCD. All traffic control – stationary and portable – shall be covered under the bid item “Traffic Control” and shall include all equipment, personnel, and related work to insure conformance with MUTCD and North Carolina Department of Transportation standards.

PART 9 SITE AMENITIES

9.01 GENERAL

A. The following technical specifications are provided as a basis of design for the site amenities and furnishings. Alternative products, manufacturers, suppliers, and vendors are allowable with written approval from the OWNER. The CONTRACTOR shall provide shop drawings, technical specification, manufacturer information, and any other pertinent product information to the OWNER for approval no less than 30 days prior to the anticipated installation date. The OWNER shall not be held liable for delays, costs, or damages associated with review and approval of shop drawings.

PART 10 PUNCHLIST INSPECTION

10.01 GENERAL

A. The Punch list shall be in accordance with the Town of Trent Woods Design Standards and/or Specifications and Details and completed in accordance with the contract documents.

B. At the punchlist inspection, the CONTRACTOR shall submit any remaining S&EC rain event logs or S&EC self-inspection logs to the Environmental Technician. The box and drain gauge shall remain on site until the NCDENR S&EC permit is closed out.

END OF SECTION

SECTION 04 – UTILITY SPECIFICATIONS

SECTION 04 00 10

DISINFECTION OF WATER UTILITY PIPING SYSTEMS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials and incidentals necessary to perform and complete the disinfection of potable water lines and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Disinfection of potable water distribution system.
2. Testing and reporting of results.

1.02. REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA B300-10 - Hypochlorites.
2. AWWA C651 - Disinfecting Water Mains.

B. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

C. City of New Bern

1. Water & Sewer Design Standards

1.03. SUBMITTALS

A. **Section 01 30 00 –Electronic Submittals**.

B. Product Data: Submit manufacturer information for proposed chemicals.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04. CLOSEOUT SUBMITTALS

A. Disinfection Report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.
6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing [in ppm] for each outlet tested.

1.05. QUALITY ASSURANCE

A. Perform Work according to AWWA C651, 15A NCAC 18C, and City of New Bern Water & Sewer Design Standards.

PART 2 PRODUCTS

2.01. DISINFECTION CHEMICALS

A. Chemicals:

1. Sodium Hypochlorite: Comply with AWWA B300-10.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Coordinate activity with OWNER and ENGINEER.

3.02. PROCEDURE

A. Provide required equipment to perform Work of this Section.

1. Taps shall be made at the extremities of the line for introducing sodium hypochlorite and for monitoring chlorine concentration and collecting samples.

B. Flush lines to remove sediment and other foreign matter.

C. Introduce sodium hypochlorite solution into piping system to provide a uniform distribution of chlorine throughout the piping system. Powdered hypochlorite and hypochlorite tablets shall not be added directly to piping systems.

1. All pipe, valves, fittings, and appurtenances connected to and forming a part of a potable water supply shall be disinfected in accordance with the procedures described in AWWA C651 Section 4.4.3 (The Continuous Feed Method).

2. A solution of water containing concentrated sodium hypochlorite with 5-15% available chlorine shall be introduced into the line by regulated pumping.

a. The solution shall be of such concentration that the line shall have a uniform minimum concentration of not less than 25 ppm total chlorine immediately after introduction.

b. The sodium hypochlorite solution shall be distributed in the piping system by manipulating the chemical feed pump, the introduction of potable water, hydrants and taps at the extremities of the line to produce an even distribution of chlorine throughout the piping system.

c. Pipelines may, at the option of the CONTRACTOR and in coordination with the OWNER and ENGINEER, be chlorinated in sections isolated by means of gate valves or other approved means.

d. All valves on the lines being disinfected shall be opened and closed several times during the disinfection contact period, except those used to isolate the pipe from the main system.

e. Disinfecting shall take place in the presence of the ENGINEER.

D. The chlorine solution shall remain in contact with interior surfaces of the piping system for a period of 24 hours, minimum.

1. Free residual chlorine after 24 hours shall be not less than 10 ppm.
2. Disinfecting shall be repeated as often as necessary and as directed by the ENGINEER and/or the OWNER until the minimum requirements are reached.
3. The CONTRACTOR shall exercise extreme caution to ensure that the sodium hypochlorite solution does not enter active water mains.

E. Disposal:

1. Neutralize disinfectant solution before disposal.
2. Legally dispose of disinfection solution off Project Site.

F. After final flushing and before the new main is connected to the distribution system two (2) consecutive samples, taken at least 16 hours apart, shall be collected.

1. After water mains have been disinfected and flushed, the CONTRACTOR shall collect samples for turbidity and bacteriological analysis. Payment for testing shall be borne by the CONTRACTOR.
2. All sampling shall be done in the presence of the ENGINEER or a representative of a certified laboratory and shall follow proper chain of custody procedures.
3. The requirements of AWWA C651 shall dictate the number and locations of samples to be collected and tested based on the length and configuration of the constructed system. No water samples shall be collected from a fire hydrant.
4. Bacteriological tests shall be performed by a State Certified Laboratory.
5. Test results shall be provided to the ENGINEER by the authorized testing agency/firm immediately upon completion of the testing procedure.
6. If test results are unsatisfactory, the CONTRACTOR shall re-flush and re-sample the line at no additional cost to the OWNER. If check samples fail then the disinfection procedure shall be repeated until two (2) consecutive tests, taken at least 16 hours apart, provide acceptable results.
7. If bacteriological tests of the samples indicate that the water quality is satisfactory, the OWNER may elect to place the water mains in service.

G. Replace permanent system devices that were removed for disinfection.

END OF SECTION

SECTION 04 00 20

HYDROSTATIC TESTING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete hydrostatic testing of all piping in accordance with the plans. All testing materials and procedures shall be of the type specified herein.

1.02. REFERENCE STANDARDS

A. American Water Works Association

1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
2. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

B. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

C. City of New Bern

1. Water & Sewer Design Standards

1.03. DIRECTIVES TO THE CONTRACTOR

A. CONTRACTOR shall be familiar with and/or provide upon request the following:

1. Testing procedures
2. List of test equipment
3. Testing sequence schedule
4. Provisions for disposal of flushing and test water
5. Certification of test gage calibration

B. CONTRACTOR shall provide the results of all hydrostatic testing to the ENGINEER.

1.04. QUALITY ASSURANCE

A. Perform Work according to 15A NCAC 18C, AWWA standards, and City of New Bern Water & Sewer Design Standards.

PART 2 PRODUCTS

2.01. HYDROSTATIC TESTING

A. Equipment

1. Pressure pump
2. Pressure hose
3. Water meter

4. Test connections
5. Pressure relief valve
6. Pressure gage calibrated to 1.0 psi

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that piping is ready for testing.

B. Verify that trenches are backfilled.

C. Verify that pressure piping thrust restraints have been installed.

3.02. FIELD QUALITY CONTROL

A. Testing

1. General

a. All testing shall be performed in the presence of the OWNER, the ENGINEER, or other authorized representative.

b. Prior to testing any segment of pressure main, care shall be taken to prevent the pipe from moving while under pressure.

c. Water for testing purposes will be provided by the OWNER. CONTRACTOR shall follow all policies and procedures to obtain, measure, and pay for the use of testing water.

d. Water used for testing pressure main installations shall be disposed of in a near-by sanitary sewer, as authorized by the local sewer authority, or in another location in accordance with state and federal laws and regulations.

e. The pressure test may be performed concurrently or separately with the leakage test.

f. The pressure test shall be performed after the pressure main has been backfilled and at least seven days after the pouring of the last thrust block.

g. At no time shall more than 1,000 linear feet of main be tested except as approved by the OWNER or ENGINEER.

h. Tests of insulated and concealed piping shall be made before the piping is covered or concealed. No leakage will be allowed under the above tests for piping under or in buildings.

i. The CONTRACTOR shall notify the ENGINEER when the work is ready for testing with all testing done in the presence of the ENGINEER. All labor, equipment, water, and materials, including meters and gauges shall be furnished by the CONTRACTOR at his own expense.

j. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

2. Pressure test piping system according to AWWA C600 (ductile iron pipe), C605 (PVC pipe), and following:

3. Test Pressure
    a. Shall be 1.5 times the maximum working pressure of the pipe segment.
    b. Shall be maintained constant (plus or minus 5 psi) during the entire time that line leakage measurements are made.
    c. Conduct hydrostatic test for a minimum of two consecutive hours.
    d. Introduced water from a temporary connection made in the pressure main or as approved by ENGINEER and OWNER.
    e. Slowly fill (approximately one foot per second) section to be tested with water; expel air from piping at high points. Pressure shall be applied to the main by means of a hand pump for small lines or by use of a mechanical pump for larger lines.
    f. If permanent air vents are not located at all high points, the CONTRACTOR shall install corporation cocks at such points so the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied.
    g. Raise pressure to specified test pressure. Test duration shall be 2 hours minimum.
    h. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
    i. Compute maximum allowable leakage using following formula:

$$L = \frac{SD\sqrt{P}}{C}$$

L = testing allowance, gph.
S = length of pipe tested, feet.
D = nominal diameter of pipe, inches.
P = average test pressure during hydrostatic test, psig.
C = 148,000.

    j. If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.
    k. Leakage:
        1) If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
        2) Correct visible leaks regardless of quantity of leakage.
        3) The allowable leakage for various pipe sizes and test pressures is graphically represented below:

Allowable Makeup Water per 1,000 Feet of Pipeline (Gallons/Hour)														
Test Pressure (P.S.I.)	Pipe Diameter													
	2	3	4	6	8	10	12	14	16	18	20	24	30	36
100	0.14	0.20	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43
125	0.15	0.23	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72
150	0.17	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98
175	0.18	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22
200	0.19	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44
225	0.20	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65
250	0.21	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85
275	0.22	0.34	0.45	0.67	0.90	1.12	1.34	1.57	1.79	2.02	2.24	2.69	3.36	4.03
300	0.23	0.35	0.47	0.70	0.94	1.17	1.40	1.64	1.87	2.11	2.34	2.81	3.51	4.21

4. Pressure test HDPE piping according the following:
    a. Test Pressure: Not less than 150 psig based on the elevation of the highest point of the line or section under test.
    b. The pressure testing of an HDPE line section shall be tested separately from the PVC and DIP line sections.
    c. Maximum duration for pressure test, including initial and final phase of the test, shall not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section and then allow it to “relax” for at least eight (8) hours before bringing the test section up to test pressure again.
    d. Introduce water from a temporary connection made in the pressure main or as approved by ENGINEER and OWNER. Bleed as much air as possible.
    e. Slowly fill (approximately one foot per second) section to be tested with water; expel air from piping at high points. Pressure shall be applied to the main by means of a hand pump for small lines or by use of a mechanical pump for larger lines.
    f. Initially, the pressure within the test section shall be raised to approximately 160 psi and then allowed to be idle (no additional make-up water to be injected) for approximately 3 hours. During this 3-hour period, the test section shall be allowed to stabilize and come to an equilibrium stage. No additional make-up water shall be injected to the test section during this 3-hour stabilization period unless the line pressure drops below 140 psi. In this case, make-up water shall only be injected to the test section to maintain a minimum of 140 psi (during the 3-hour stabilization period).

g. The final phase of the pressure test shall involve injecting make-up water to achieve an “Initial test pressure” of 150 psi (minimum) / 155 psi (maximum). The test section is then allowed to be idle (no additional make-up water to be injected) for a period of 2 hours. After this 2-hour period, make-up water is injected to re-establish the “initial test pressure.”

h. Maintain pressure within plus or minus 5 psi of test pressure.

i. Leakage is defined as the quantity of water necessary to maintain test pressure during period of test.

j. If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

k. Leakage:

1) If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.

2) Correct visible leaks regardless of quantity of leakage.

3) The allowable leakage for various pipe sizes is graphically represented below. If the actual make-up water quantity is equal to or less than the allowable amount, the pressure test passes. If the actual make-up water quantities are greater than the allowable amount, the pressure test fails.

5. Hydrostatic Pressure Testing of Gravity Lines

a. Where indicated on the drawings, gravity lines shall conform to materials, testing methods, and acceptability standards meeting water main standards. A hydrostatic pressure test shall be conducted in accordance with the testing requirements except that the test pressure shall be as indicated on the drawings. The test shall be performed prior to the installation of any services.

Allowable Make-Up Amount (HDPE) Pipe	
Nominal Pipe Size (inches)	Make-up Water Allowance (U.S. Gallons /100 ft. of Pipe) 2-Hour Test
6	0.30
8	0.50
10	0.65
12	1.15
14	1.40
16	1.65
18	2.15
20	2.75
22	3.50
24	4.40
26	5.00
28	5.55
30	6.35
32	7.15
34	8.10
36	9.00
42	11.55
48	13.50
54	15.70

END OF SECTION

SECTION 04 00 30

PUBLIC WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work

1. Furnish all labor, equipment, materials and incidentals necessary to install and complete installation of potable water lines and appurtenances in accordance with the plans. All pipe and appurtenance material shall be of the type and class specified herein.

2. All pipeline and appurtenance excavation, bedding, pipe laying, jointing and coupling of pipe joints shall be completed as described herein.

B. Section Includes:

1. Pipe materials and fittings for public water distribution systems,

2. Tapping sleeves and valves.

3. Positive-displacement meters.

4. Pipe support systems.

5. Bedding and cover materials.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

3. ASTM A536 – Standard Specification for Ductile Iron Castings.

4. ASTM D882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

5. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

6. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

7. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

8. ASTM D2564 – Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
9. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
10. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

D. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
7. AWWA C153 - Ductile-Iron Compact Fittings.
8. AWWA C206 - Field Welding of Steel Water Pipe.
9. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
10. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
11. AWWA C606 - Grooved and Shouldered Joints.
12. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In., for Water Transmission and Distribution.
13. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In., for Water Transmission and Distribution.
14. AWWA M23 – PVC Pipe – Design and Installation.
15. AWWA M41 – Ductile Iron Pipe and Fittings.

E. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.

F. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

G. North Carolina Department of Transportation:

1. Standard Specifications for Roads & Structures, latest edition.

H. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

I. City of New Bern

1. Water & Sewer Design Standards

1.03. COORDINATION

A. Coordinate Work of this Section with utility OWNER and the ENGINEER.

B. Do not interrupt service to facilities occupied by OWNER or others unless approved by the ENGINEER and OWNER no fewer than 72 hours in advance of proposed interruption and after arranging to provide temporary water distribution service and fire flow protection.

1.04. SUBMITTALS

A. **Section 01 30 00 – Submittals/Electronic Submittals**.

B. Product Data: Submit product technical information regarding pipe materials, pipe fittings, valves, hydrants, and other appurtenances.

C. Product technical information shall be furnished to the ENGINEER for his review and approval prior to installation of any materials. The ENGINEER may augment the technical information or product or request substitute products and technical information if, in his opinion, it will best serve the interest of the OWNER.

D. Field Quality-Control Submittals: Indicate results of CONTRACTOR-furnished tests and inspections.

E. Preconstruction Photographs and/or Video: Submit digital files of photographs and/or video of Work areas and material storage areas, as specified in **Section 01 39 00 – Pre-construction Video**.

1.05. CLOSEOUT SUBMITTALS

A. **Section 01 72 00 – Project Record Documents**.

B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06. QUALITY ASSURANCE

A. Perform Work according to 15A NCAC 18C and City of New Bern's Water & Sewer Design Standards.

B. Valves: Mark valve body with manufacturer's name and pressure rating.

C. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372, including marking "NSF-pw" on piping

D. As applicable, comply with NSF 14 for plastic potable-water service piping, including marking "NSF-pw" on piping.

E. Perform Work according to the following requirements:

1. Comply with all requirements of utility OWNER including the tapping of water mains and backflow prevention.

2. Comply with all standards of authorities having jurisdiction for potable water service piping, including materials, installation, testing, and disinfection.

3. Comply with standards of authorities having jurisdiction for fire suppression water service piping, including materials, hose threads, installation, and testing.

1.07. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience. Upon request of the ENGINEER, Manufacturer shall provide documentation of experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience in installation of necessary materials. Upon request of the ENGINEER, Installer shall provide documentation of experience.

1.08. DELIVERY, STORAGE, AND HANDLING

A. **Section 01 55 00 – Site Access and Storage**.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Handle and store materials according to manufacturer instructions.

2. Block individual and stockpiled pipe lengths to prevent moving.

3. Do not place pipe or pipe materials on private property without documented written permission or in areas obstructing pedestrian or vehicle traffic.

4. Store all pipe and appurtenances on sills above storm drainage level and deliver for laying after the trench is excavated.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

2. Plastic materials shall be supported to prevent sagging and bending.

3. Plastic materials shall be covered with tarps.

4. Provide additional protection according to manufacturer instructions.

1.09. EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.

2. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.01. WATER PIPING

A. General Requirements

1. All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs, and other imperfections, and true to industry-specified

shapes and forms throughout. All materials shall be subject to the inspection of the ENGINEER at the plant, trench, or other point of delivery, for the purpose of culling and rejecting material which does not conform to the requirements of these specifications. Such material shall be marked by the ENGINEER, and the CONTRACTOR shall remove it from the project site upon notice being received of its rejection.

2. The use of couplings will not be allowed except as necessary and approved by the ENGINEER.

3. When the work requires the use of a transition coupling, the use of such couplings shall be as approved by the ENGINEER. When the nominal diameter of the pipe does not change, an approved transition coupling may be used, as necessary. In these cases, a ductile iron, mechanical joint, solid sleeve shall be used to joint these materials. The solid sleeve shall be as specified for fittings and shall be the long body type. The appropriate gaskets shall be selected based on the outside diameter(s) of the material(s) being joined. All gaskets shall be as specified. In all cases, the gap between the pipe sections being joined shall not exceed 0.25 inches.

4. Where the nominal diameter of an existing water line changes as part of a rehabilitation project, an appropriate ductile iron, mechanical joint reducer, as specified for fittings, shall be used to joint these materials. The appropriate gaskets shall be selected based on the outside diameter(s) of the material(s) being joined. All gaskets shall be as specified.

5. All rubber gaskets for DIP pipe and fittings shall be in accordance with AWWA C111 and ASTM F477 for PVC pipe and fittings. All gaskets shall be a product of the pipe manufacturer, made specifically for the pipe being installed, and shall match the shape and configuration of the joint.

6. Gaskets

    a. Gasket material shall be an elastomeric material.

B. Ductile-Iron Pipe:

1. Ductile iron pipe shall be of the size indicated on the Drawings and shall be in accordance with AWWA C150 and manufactured in accordance with AWWA C151.

2. Class numbers or pressure rating shall be clearly marked on the pipe and fittings at the factory.

3. Bituminous Outside Coating

    a. All ductile iron pipe shall have an outside pipe coating of an asphaltic material a minimum of 1 mil thickness in accordance with AWWA C151. The final coat shall be continuous and smooth being neither brittle when subjected to low temperatures nor sticky when exposed to hot sun. The coating shall adhere to the pipe at all temperatures.

4. Pipe Mortar Lining (Interior Lining):

    a. Line all ductile iron pipe and fittings with a cement mortar lining conforming to AWWA C104 except where other lining systems are specified by the ENGINEER.

5. Joints:
    a. Slip Joints (Push-on)
        1) Unless otherwise specified by the ENGINEER, pipe joints shall be slip-joint type.
        2) Comply with AWWA C111.
        3) Bells of “slip” joint pipe shall be contoured to receive a bulb-shaped circular rubber gasket, and plain ends shall have a slight taper to facilitate installation. The gasket and associated lubricant shall be furnished by the pipe manufacturer.
    b. Mechanical Joints
        1) Comply with AWWA C111.
        2) Bolts for mechanical joints shall be high grade steel, low alloy type, with tee head and American Standard threads. Mechanical joint gland shall be ductile or gray iron and shall utilize a plain rubber gasket.
        3) Bolted mechanical pipe joints shall be used under all concrete structures and between all treatment structures for underground piping.
    c. Flanged Joints
        1) Comply with AWWA C110, C115, and ASME B16.1.
        2) Flanged pipe shall have flanges with long hubs, shop fitted on the threaded end of the pipe.
        3) Where required, flanges shall be tapped for stud bolts. Flanges shall be accurately faced at right angles to the pipe axis and shall be drilled smooth and true, and covered with coal tar pipe varnish or otherwise protected against corrosion of flange faces. Flange faces shall be cleaned to bare metal with wire brushed before installation of pipe.
        4) Ductile iron flanged joint pipe shall be as specified by the ENGINEER. Pipe shall be ordered in lengths needed as no pipe shall be cut, threaded or flanged in the field. All pipe shall have Class 125 flanges unless otherwise specified.
        5) Flanged joints shall be made with through bolts of the required size. Bolts shall be zinc plated, with good and sound, well-fitting threads, so that the nuts may be turned freely by hand.
        6) Connecting flanges shall be in proper alignment and no external force shall be used to bring them together
    d. Restrained Joints
        1) Restrained joints shall be the boltless type to include ductile iron locking segments and rubber retainers
        2) Restrained pipe and fittings shall be Flex-Ring or Lok-Ring as manufactured by American Cast Iron Pipe Company, TR Flex or HDSS as manufactured by US Pipe, Bolt-Lok as manufactured by Griffin Pipe Products, or approved equal.

C. Pressure Class Polyvinyl Chloride (PVC) Pipe

1. Comply with AWWA C900 (4” through 60”) DR18 or DR14.
2. Fittings shall be ductile iron mechanical joint as described herein.
3. Joints:
    a. The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints meeting the requirements of ASTM D3139 and ASTM F477.
    b. The lubricant used in making up the joints shall be furnished by the pipe manufacturer and shall be NSF approved.
    c. Solvent-cement couplings are only permitted on above ground or exposed piping where specified by the ENGINEER. Solvent cement shall conform to ASTM D2564.

D. PVC: Pressure Rated PVC

1. Comply with ASTM D2241.
2. Maximum diameter: 12” nominal.
3. Pressure Class: Minimum allowable rating and thickness shall be Pressure Rating 200, SDR 21. Sustained pressure and quick-burst pressure testing requirements shall be in accordance with ASTM 1598 and ASTM 1599, respectively.
4. The exterior of all PVC Pipe shall bear a stamp which shows the AWWA certification, SDR, size and NSF seal.
5. Fittings shall be ductile iron mechanical joint as described herein.
6. Joints:
    a. The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints meeting the requirements of ASTM D3139 and ASTM F477.
    b. The lubricant used in making up the joints shall be furnished by the pipe manufacturer and shall be NSF approved.
    c. Seals: PVC flexible elastomeric.
    d. Solvent-cement couplings are not permitted.

E. PVC: Scheduled PVC

1. Scheduled PVC shall be used only in above ground, interior plumbing.
2. Comply with ASTM D1784 and D1785.
3. Schedule: 40, 80, or as shown on the Drawings.
4. Fittings shall be ductile iron mechanical joint as described herein.
5. Joints:
    a. The pipe shall have bell and spigot ends with push-on, O-ring rubber gasket, compression type joints meeting the requirements of ASTM D3139 and ASTM F477.

b. The lubricant used in making up the joints shall be furnished by the pipe manufacturer and shall be NSF approved.

c. Solvent-cement couplings are only permitted on above ground or exposed piping. Solvent cement shall conform to ASTM D2564.

2.02. FITTINGS

A. General

1. All fittings for any type of water distribution piping shall be ductile iron.

2. Compact mechanical joint fittings shall be used for subsurface installations and compact flanged fittings shall be used for above-ground installations.

3. Coating and Lining:

a. Bituminous Coating: Comply with AWWA C110.

b. Cement-Mortar Lining: Comply with AWWA C104.

B. 2” Ductile Iron Fittings

1. Material: Grade 65-45-12 ductile iron in accordance with ASTM A536. Fittings shall have deep bell push-on joints with gaskets meeting ASTM F477. Transition gaskets are not allowed.

C. 3” through 64” Ductile Iron Fittings

1. Material: Ductile iron; comply with AWWA C110.

2. Compact Fittings (mechanical joint and flanged): Comply with AWWA C153.

2.03. UNDERGROUND PIPE LOCATION

A. Warning Tape

1. Provide and install an early warning detection tape above all underground piping.

2. Tape shall be 3” wide by 4 mils thick. Tape shall be solid blue in color with continuously printed caption in black letters “CAUTION – BURIED WATER LINE BELOW”. Tape shall have a minimum tensile strength in accordance with ASTM D882.

3. Install approximately 18” below ground and directly over pipeline.

B. Tracer Wire

1. Where specified, provide and install tracer wire meeting the following.

a. Wire shall be a minimum #14 AWG high strength copper clad steel conductor wire secured to the pipe at 10’ maximum spacing and rated for direct burial use at 30 volts.

b. Wire shall be insulated with 30 mil, high density, high molecular weight polyethylene (HDPE).

c. Wire break load shall be a minimum 250 lbs.

d. Install wire at the 12 o’clock position, directly atop the pipeline.

C. Tracer Wire Access Point

1. A tracer wire testing station shall be installed in every valve box.

2.04. PIPE SUPPORTS AND ANCHORING

A. Metal for Pipe Support Brackets:

1. Material: Structural steel.
2. Finish: Galvanized.
3. Coating: Bituminous paint.

B. Metal Tie Rods and Clamps or Lugs:

1. Material: Stainless steel.

2.05. CONCRETE ENCASEMENT AND CRADLES

A. Concrete:

1. Concrete design: As specified.
2. Type: Reinforced, air entrained.
3. Compressive Strength: 4,000 psi at 28 days.
4. Finish: Rough troweled.
5. Reinforce concrete as specified.

2.06. MATERIALS

A. Bedding and Backfill:

1. General: No rock, boulders, stone or debris larger than four inches shall be allowed in the bedding or backfill material. Deficient or unsuitable bedding or backfill material shall be replaced or substituted with suitable bedding or backfill material. Excavated material intended for use as bedding or backfill shall not be used if exceedingly wet nor shall trenches be backfilled if flooded or excessively wet.
2. Stone: Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67.
3. Soil: Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability

a. Class I Soil -Angular, 6 to 40 mm (¼" to 1½'), graded stone, including a number of fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.

b. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm (1½"), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.

c. Class III Soil - Fine sand and clayey gravels, including fine sands, sand clay mixtures, and gravel clay mixtures. Soil types GM, GC, SM, and SC are included in this class.

d. Class IV Soil Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.

e. Class V Soil - Includes the organic soils types OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than 1½ inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

2.07. ACCESSORIES

A. Steel Rods, Bolt, Lugs, and Brackets:

1. Comply with ASTM A36 and A307.

2. Grade A carbon steel.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that existing utility water main size, location, and invert are as indicated on Drawings.

B. Existing Utilities

1. The CONTRACTOR shall be required to excavate to determine the precise location of utilities or other underground obstructions which are shown on the Plans and/or marked by the utility owners. Such location and excavation shall be performed prior to installation of the pipeline.

2. The CONTRACTOR shall notify all utility owners prior to excavation as required by the 1985 Underground Damage Prevention Act. Utility owners who are members of NC 811 may be notified by calling 811 (toll free) before any excavation or drilling. The CONTRACTOR will be fully responsible for damage to any utilities if the Owners have not been properly notified as required by the Underground Damage Prevention Act. All damage to such structures and pipelines and all damage to property or persons resulting from damage to such structures and pipelines shall be borne by the CONTRACTOR and shall be completely repaired within a reasonable time. No claim shall be made against the OWNER for damage or delay of the work on account of the proximity of, or the leakage from, such structures and pipelines. Where high pressure gas lines are to be crossed, they shall be uncovered by hand excavation methods before other excavation near them is started.

3. Utility Owners may, at their option, have representatives present to supervise excavation in the vicinity of their utilities. The cost of such supervision, if any, shall be borne by the CONTRACTOR.

4. Conflicts with underground utilities may necessitate changes in alignment and/or grade of this construction. The CONTRACTOR shall notify the ENGINEER promptly upon the discovery of such conditions. Changes in alignment and/or grade shall be approved by the ENGINEER before construction may proceed.

5. When underground obstructions not shown on the Plans are encountered, the CONTRACTOR shall promptly report the conflict to the ENGINEER and shall not proceed with construction until the conflict is resolved.

3.02. PREPARATION

A. Section 01 39 00 – Pre-Construction Video.

B. Preconstruction Site Documentation:

1. Record video and/or photographs along centerline of proposed pipe trench; minimum one photograph for each 50 feet of pipe trench.

2. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing site features.

3. Include Project description, date taken, and sequential number on back of each photograph.

C. Pipe Cutting:

1. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.

2. Use only equipment specifically designed for pipe cutting; use of chisels or hand saws is not permitted.

3. Grind edges smooth with beveled end for push-on connections.

4. In the case of slip joint pipe, the cut ends shall be tapered with a portable grinder or coarse file to match the manufactured taper.

D. Remove scale and dirt on inside and outside of pipe before assembly.

E. Prepare pipe connections to equipment in accordance with equipment manufacturer's requirements.

3.03. INSTALLATION

A. General:

1. Pipe and fittings shall be laid as shown on the Drawings.

2. CONTRACTOR shall provide all materials, labor, tools, equipment and incidentals required for the excavation, installation, backfilling and testing of water mains and associated appurtenances.

3. Do not use flanged pipe, fittings, or valves or unions for underground (buried) piping. Fittings and valves for underground (buried) piping shall be mechanical joint. Flanged pipe, fittings and valves and unions shall be used on aboveground piping and piping in vaults.

4. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used as specified, unless otherwise indicated.

5. All pipe fittings, valves, hydrants and accessories shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into

the trench. Any defective, damaged, or unsound material shall be repaired or replaced as directed by the ENGINEER.

B. Bedding and Backfill:

1. General:

a. Place bedding material to the level shown on the Drawings.

b. Work material carefully around the pipe to ensure adequate haunching.

2. PVC Pipe:

a. After excavation is completed, bed with 4" of Class I, Class II, or No. 67 stone material to bring trench bottom to grade. Excavated native material may be used if material conforms to this specification.

b. After the joint has been made, backfill to spring line of pipe with Class I, Class II, or No. 67 stone material. Additional bedding requirements are outlined in project drawings and shall be followed.

3. Ductile Iron Pipe:

a. After excavation and the joint has been made, bed with 4" of Class I, II, III, or IV bedding material. This may be the native trench bottom if material conforms to this specification

b. Compact backfill by hand tamping under the haunches of the pipe barrel to assure a firm circular bearing surface for the pipe taking care not to move or raise the pipe or in any way create a non-uniform bearing surface. Additional bedding requirements outlined in project drawings and shall be followed.

4. Compaction:

a. Backfill in 6- to 12-inch lifts. Tamp each lift carefully and uniformly so as to eliminate the possibility of lateral displacement of the pipeline.

b. Compact pipe bedding and embedment material to 95% Standard Proctor.

C. Piping:

1. Comply with AWWA C600, C605, M41, and M23.

2. Handle and assemble pipe according to manufacturer instructions.

3. Steel Rods, Bolts, Lugs, and Brackets: Coat buried steel before backfilling.

4. Pipe Separation

a. Lateral Separation of Sewers and Water Mains

5. Maintain 10 feet of horizontal separation between water main and sewer piping.

1) If local conditions or barriers prevent a 10-foot separation:

a) The water main shall be 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

b) The water main shall be 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.

b. Crossing a Water Main over a Sewer

1) 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 a distance of 10 feet on each side of the point of crossing.

c. Crossing a Water Main under a Sewer

1) Both the water main and the sewer shall be constructed of ferrous materials and with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing. A section of water main pipe shall be centered at the point of crossing.

d. Crossing a Storm Sewer

1) All water lines shall have a minimum 12 inches of vertical separation from storm sewers.

6. Pipe Insulation

a. All outdoor piping 4” in diameter and smaller which is not buried shall be insulated except where specifically stated otherwise on the Drawings or in these specifications.

b. Provide heat tape and controls as recommended by manufacturer for temperatures down to -10º f. This requirement shall also apply to piping in vaults.

c. The piping shall be insulated with 1” thick polyfoam with the insulation laminated to an outside jacket of PVC with a finished color of white. The material shall be furnished in standard 25’ rolls with insta-grip closure.

d. Fittings and valves shall be insulated with preformed white insulated fitting covers with 1” thick polyurethane foam insert.

e. Pipe insulation shall be wrapped around pipe and trac locked down in position. Insulation shall be held in place by sealing trac with fastener-weld or equal.

f. All butt joints and fitting covers shall be sealed with silicone sealant and then taped in place to provide a vapor barrier.

g. Installation procedures and accessory materials shall all be in accordance with the pipe insulation manufacturer’s written instructions.

7. Connection to Existing Water Main/System

a. The CONTRACTOR shall make connection to the old mains when and as directed by the ENGINEER. In no case shall the CONTRACTOR shut off the water or operate the fire hydrants or gate valves of the old distribution system. In case it becomes necessary to delay the cut-off, such instructions shall be given and obeyed

without recourse. At no time shall the CONTRACTOR operate any valves, gates, pumps, etc. All of these operations must be done by OWNER's personnel.

b. In making connections to the old distribution system, valves shall be set as shown on the plans or at such designated place as the ENGINEER may direct. If due to unforeseen conditions, these locations have to be changed or additional valves or fittings added, the CONTRACTOR shall install the valves or fittings at the new locations upon approval by the ENGINEER. Payment for special fittings or couplings will not be made unless approved by the ENGINEER prior to installation.

c. The CONTRACTOR shall be responsible for determining and utilizing all measures required by the water utility OWNER in tapping existing water mains. The CONTRACTOR shall also make appropriate arrangements with the water utility OWNER based on the size and location of the tap indicated on the drawings.

d. If the proposed water extension does not begin at an existing valve, a new tapping sleeve and valve of the size specified shall be installed at the required location as specified. All tapping sleeves and valves shall be installed in accordance with MSS SP-60. Alternately, if water service interruption is acceptable to the OWNER, a valve may be installed at the appropriate location in the existing water piping.

e. The CONTRACTOR shall be responsible for installing all backflow prevention devices or other "jumpers" as may be required by the Plans or the water utility OWNER at the point of connection with the existing water system. For extensions of the existing system, the valve isolating the new system from the existing system will not be opened until all other water system construction has been completed and satisfactorily passed all testing in compliance with these specifications unless specifically authorized by the water utility OWNER.

8. Thrust Block Installation

a. All turns, fittings, etc., that induce pressure which would cause separation of pipe, break-age, etc., shall be provided with adequate thrust blocks. Thrust blocks shall be constructed to the minimum dimensions shown on the drawings or as directed by the ENGINEER.

b. Thrust blocks shall be made of ready mix concrete with a minimum compressive strength at 28 days of not less than 3,000 PSI when tested in accordance with ASTM C39. Sakrete or any similar material will not be permitted under any circumstances.

c. Blocking shall be formed and placed in such a manner that the pressure to be exerted at the point of blocking shall be transferred to firm, undisturbed earth. Where possible, the concrete shall be placed so that the fitting joints will be accessible for repair.

d. All bolts and pipe joints shall be protected against contact with thrust block concrete by the installation of a 20 mil polyethylene film placed between the fittings and the concrete. Where any section of a main is provided with concrete thrust blocks, the hydrostatic pressure test shall not be made until seven days after installation of the concrete thrust blocks unless otherwise approved by the ENGINEER. Where trench conditions are, in the opinion of the ENGINEER, unsuitable for thrust blocks, the CONTRACTOR shall provide steel tie rods and

socket clamps to adequately anchor the piping. All tie rods and clamps shall be given a bituminous protective coating or shall be galvanized.

e. The CONTRACTOR shall also be responsible for any damage or repairs caused by blow-outs of any insufficiently blocked pipe.

9. Joint Construction

a. All pipe joints shall be constructed in strict accordance with the pipe manufacturer's specifications and materials and any deviation must have prior approval of the ENGINEER.

b. The maximum deflection per joint of flexible joint pipe shall be that deflection recommended by the manufacturer. However, at no time will a deflection greater than 3 degrees (11 inches in an 18'-0" pipe section) be allowed.

c. Mechanical Joints

1) Clean last 8-inches outside the spigot, and the inside of the bell of mechanical joint pipe to remove oil, grit, tar (other than standard coating) and other foreign matter from the joint and then paint area clean with an approved soap solution. The ductile iron gland shall then be slipped on the spigot end of the pipe with the extension of the gland toward the socket or bell end. The rubber gasket shall be painted with the soap solution and placed on the spigot end with thick edge toward the gland.

2) Push entire section of pipe forward to seat spigot end in the bell. Press gasket into place within the bell, being careful to have the gasket evenly located around the entire joint. Move ductile iron gland along the pipe into position for bolting, insert all bolts and screw nuts up tightly with fingers. Tighten all nuts with a suitable (preferably torque-limiting) wrench. Tighten nuts that are spaced 180 degrees apart alternately in order to produce equal pressure on all parts of the gland. If effective sealing is not obtained by tightening the bolts to the specified torques, the joint shall be disassembled and reassembled after thorough cleaning.

3) An adapter having a fitting bell and a mechanical joint socket may be used by the CONTRACTOR when joining an existing bell and spigot to a new mechanical joint.

d. Push-on Joints

1) Clean gasket and spigot and inside of bell thoroughly to remove all direct and other foreign matter.

2) Insert gasket furnished by the pipe manufacturer into the gasket groove in the bell. Gasket shall be properly seated in the grooves provided in the pipe bell.

3) Using a non-toxic vegetable soap, apply a film by hand to the inside surface of the gasket that comes into contact with the entering pipe and to the first 1" of the spigot end of the entering pipe. Use only lubricant specified by the pipe manufacturer.

4) Align entering pipe with the bell to which it is to be joined. Enter the spigot end into the bell until it just makes contact with the gasket. Apply sufficient pressure to force the spigot end past the gasket up to solid contact with the bell.

5) When it is necessary to field cut pipe with rubber gaskets, chamfer the cut end 1/8 inch x 30 degrees and check for roundness before inserting into a rubber gasket bell.

e. Copper Joints: Pressure-sealed joints for copper tubing shall be made using proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.

10. Ductile-Iron Piping and Fittings: Comply with AWWA C600.
11. Grooved and Shouldered Pipe Joints: Comply with AWWA C606.
12. Field Welding Materials: Comply with AWWA C206.
13. Exposed Piping
    a. All exposed piping to be installed inside tanks, wetwells, vaults and buildings shall be installed as shown on the Drawings. All exposed pipe shall be ductile iron utilizing flanged joints unless otherwise noted.
    b. All exposed ductile iron pipe, fittings and valves shall be field painted with two (2) coats of epoxy paint as recommended by the paint manufacturer. Color of paint shall be as selected by the OWNER.
14. No pipe shall be laid except in the presence of the ENGINEER or his Representative or with special permission from the ENGINEER.
15. Route pipe in straight line, and re-lay pipe that is out of alignment or grade.
16. Pipe shall be removed at any time if broken, injured or displaced in the process of laying same, or of backfilling the trench.
17. High Points:
    a. Pipe shall be installed in a manner that minimizes localized high points in the piping.
    b. If unforeseen field conditions arise that necessitate high points, install air-release valves as specified, as indicated on Drawings, or as directed by the ENGINEER.
18. Bearing:
    a. Maintain bearing along entire length of pipe.
    b. Excavate bell holes to permit proper joint installation.
    c. Do not lay pipe in wet or frozen trench.
19. Prevent foreign material from entering pipe during placement.
20. Allow for expansion and contraction without stressing pipe or joints.
21. Close pipe openings with watertight plugs during Work stoppages.
22. Establish elevations of buried piping with not less than 3 feet of cover.

a. Measure depth of cover from final surface grade to top of pipe barrel.

D. PE Encasement:

1. Encase piping in PE where indicated to prevent contact with surrounding backfill material.

2. Comply with AWWA C105.

3. Terminate encasement 3 to 6 inches above ground where pipe is exposed.

E. Backfilling: Backfill around sides and to top of pipe as specified.

3.04. FIELD QUALITY CONTROL

A. Testing: Pressure test and disinfect as specified.

END OF SECTION

SECTION 04 00 35

PUBLIC SANITARY SEWERAGE GRAVITY PIPING

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials and incidentals necessary to install and complete installation of sanitary sewer gravity piping and appurtenances in accordance with the plans. All pipe and appurtenance material shall be of the type and class specified herein.

B. Section Includes:

1. Sanitary sewerage piping.
2. Connection to existing manholes.
3. Wye branches.
4. Sanitary laterals.
5. Pile support systems.
6. Bedding and cover materials.

1.02. REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
5. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
6. AWWA C600 – Installation of Ductile-Iron Mains and Their Appurtenances.

C. ASTM International:

1. ASTM A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM A746 – Standard Specification for Ductile Iron Gravity Sewer Pipe
3. ASTM C891– Standard Practice for Installation of Underground Precast Concrete Utility Structures
4. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
5. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
6. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
7. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
8. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
9. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe

D. North Carolina Administrative Code

1. 15A NCAC 02T – Waste Not Discharged to Surface Waters

E. National Fire Protection Association

1. NFPA 70 – National Electrical Code

1.03. COORDINATION

A. Coordinate Work of this Section with appropriate utilities department.

B. Do not interrupt service to facilities occupied by OWNER or others unless approved by the ENGINEER and OWNER no fewer than 72 hours in advance of proposed interruption and after arranging to provide temporary sewer service.

1.04. SUBMITTALS

A. Section 01 30 00 – Submittals/Electronic Submittals.

B. Product Data: Submit manufacturer information indicating proposed materials, accessories, details, and construction information.

C. Installation manuals shall be furnished to the ENGINEER for his review and approval prior to installation of any materials. The ENGINEER may augment any manufacturer's installation recommendations if, in his opinion, it will best serve the interest of the OWNER.

D. Shop Drawings:

1. Drawings and descriptive data on manholes (including wall thicknesses, vertical dimensions, and deflection angles), concrete used in manufacture of manholes and precast inverts, rubber gaskets, joint sealant, flexible manhole sleeves and joints, frames and covers, inverts, and manhole steps shall be submitted to the ENGINEER for review prior to their manufacture.

2. All sizes and types of pipe.

3. All pipe fittings and appurtenances.

4. All transition couplings.

E. Field Quality-Control Submittals: Indicate results of CONTRACTOR-furnished tests and inspections.

F. Preconstruction Photographs and/or Video: Submit digital files of photographs and/or video of Work areas and material storage areas, as specified in Section 01 39 00 – Pre-Construction Video

1.05. CLOSEOUT SUBMITTALS

A. Section 01 72 00 – Project Record Documents.

B. Project Record Documents: Record invert elevations and actual locations of pipe runs, connections, material changes, manholes service lines, and cleanouts.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06. QUALITY ASSURANCE

A. Perform Work according to 15A NCAC 02T and the following requirements:

1. Comply with all requirements of utility OWNER.

2. Comply with all standards of authorities having jurisdiction for public sanitary sewerage, including materials, installation, and testing.

B. All piping materials shall bear label, stamp, or other markings of specified testing agency.

1.07. QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience. Upon request of the ENGINEER, Manufacturer shall provide documentation of experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience in installation of necessary materials. Upon request of the ENGINEER, Installer shall provide documentation of experience.

C. The design, installation and operation of any temporary pumping system, when required to maintain sewer flows in the existing system, shall be the CONTRACTOR's responsibility. Demonstrate experience in the design and operation of temporary bypass pumping systems or employ the services of a vendor who can demonstrate this experience. The CONTRACTOR or vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed within the past three (3) years. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction and not interrupt existing wastewater service nor cause road closures.

1.08. DELIVERY, STORAGE, AND HANDLING

A. Section 01 55 00 – Site Access and Storage.

B. Coordinate material deliveries with the manufacturer/supplier. Handle and store all materials in accordance with the manufacturer’s recommendations using methods that will prevent damage to the materials. Further, all manhole components shall be handled and stored in accordance with ASTM C891.

C. Transport:

1. Unload pipe and appurtenances so as to avoid deformation or other injury thereto. Pipe shall not be placed within pipe of a larger size and shall not be rolled or dragged over gravel or rock during handling. If any defective material is discovered after installation, remove and replace with sound pipe or repair in an approved manner at no additional cost to the OWNER.

D. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

E. Storage:

1. Store materials according to manufacturer instructions.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
4. Store plastic materials out of sunlight.
5. Store all pipe and appurtenances on sills above storm drainage level and deliver for laying after the trench is excavated.

F. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Plastic materials shall be supported to prevent sagging and bending.
3. Plastic materials shall be covered with tarps.
4. Provide additional protection according to manufacturer instructions.
5. When any material is damaged during transporting, unloading, handling or storing, the undamaged portions may be used as needed, or, if damaged sufficiently, the ENGINEER will reject the material as being unfit for installation. The ENGINEER will reject any ductile iron pipe with a damaged cement mortar lining.

1.09. EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

B. Existing Service:

1. Interruption of Existing Sanitary Sewerage Service: The interruption of sewer flows within the collection system or service to any occupied structure or facility will not be permitted unless specifically approved by the utility OWNER. Maintain sewer flows at all times.
2. When by-pass pumping of sewer flows is necessary, submit a by-pass pumping work plan to the ENGINEER and utility OWNER as specified.

PART 2 PRODUCTS

2.01. GENERAL

A. All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs and other imperfections, and true to theoretical shapes and forms throughout.

B. As particular specifications are cited, the designation shall be construed to refer to the latest revision under the same specification number, or to superseding specifications under a new number except provisions in revised specifications which are clearly inapplicable.

2.02. SANITARY SEWERAGE PIPING

A. Gaskets

1. Gasket material shall be Styrene Butadiene Copolymer (SBR) unless otherwise noted.

B. Ductile Iron Pipe:

1. All ductile iron pipe shall conform to ASTM A746 and be Pressure Class 350 unless otherwise specified. Class numbers or pressure rating shall be clearly marked on the pipe and fittings at the factory.

2. Ductile iron pipe shall be of the size indicated on the Drawings and shall be designed in accordance with AWWA C150 and manufactured in accordance with AWWA C151.

3. Bituminous Outside Coating

   a. All ductile iron pipe shall have an outside pipe coating of an asphaltic material a minimum of 1 mil thickness in accordance with AWWA C151. The final coat shall be continuous and smooth being neither brittle when subjected to low temperatures nor sticky when exposed to hot sun. The coating shall adhere to the pipe at all temperatures.

4. Interior Lining

   a. Unless otherwise specified, line the interior of all ductile iron pipe and fittings with a ceramic epoxy coating consisting of two-part component, amine cured novalac epoxy containing a minimum of 20% by volume ceramic pigmentation.

5. Joints:

   a. Unless otherwise shown on the Drawings, pipe joints shall be push joint type.

6. Long Span Pipe:

   a. “Long span” type ductile iron pipe shall be used for unsupported spans greater than 20’-0”. “Long span” ductile iron pipe and associated pipe joints shall be designed by the pipe manufacturer specifically for elevated crossings with unsupported spans shown on the drawings. Submit shop drawings from the pipe manufacturer for the long span pipe. Shop drawings shall include material specifications for the pipe and joints, and shall specify locations of joints with respect to the pier locations shown on the drawings. Long span ductile iron pipe shall be as manufactured by American, U.S. Pipe, or equal.

C. PVC

1. All PVC pipe shall conform to Type PSM SDR-35PVC unless otherwise specified. Class and pressure rating shall be clearly marked on the pipe at the factory.
2. PVC pipe shall be of the size indicated on the Drawings and shall be designed in accordance with ASTM D3034.
3. Pipe shall be supplied in 20-foot lengths.
4. Joints:
    a. Unless otherwise shown on the Drawings, pipe joints shall be bell-and-spigot style, with rubber-ring-sealed gasketed compression type joints.
    b. Joints and gaskets to comply with ASTM F477 and ASTM D3212.
5. Fittings: PVC or as shown on the Drawings.

D. PVC Pressure Pipe for Gravity Sewer Applications Conforming to Water Main Standards:

1. PVC pressure pipe for gravity sewer applications conforming to water main standards shall be used where called for on the Drawings.
2. Material: Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784.
3. Comply with ASTM D2241.
4. Minimum SDR 26, Pressure Rated 160.
5. Pipe shall be green in color signifying its use in a sewer application.
6. Joints
    a. Pipe shall have an integral elastomeric-gasket bell end.
    b. Joints and gaskets to comply with ASTM F477 and ASTM D3139.

2.03. WYE BRANCHES AND SADDLES

A. Wye Branches

1. Material: Wyes shall be of the same material and strength as the sewer mains on which they are installed.
2. PVC wyes shall conform to ASTM D3034 and DIP wyes to ASTM A536.

B. Saddles

1. Use saddle wye or tee with stainless steel clamps for taps into existing piping.
2. Saddle type fittings shall not be used on new construction.
3. Material
    a. Saddles shall be of the same material and strength as the sewer mains on which they are installed.

b. Straps and hardware shall be 304 stainless steel.

4. Saddles on PVC pipe shall comply with ASTM D3034.

5. Saddles on PVC pipe shall comply with ASTM A536.

6. Lay out holes with template and cut holes with mechanical cutter.

2.04. SERVICE LATERALS

A. Unless otherwise specified in the Plans and/or Specifications, service laterals shall be constructed of 4-inch diameter Schedule 40 PVC pipe or Class 350 psi ductile iron pipe, including the cleanout stack.

B. PVC pipe shall comply with ASTM D1785.

2.05. FLEXIBLE COUPLINGS

A. The use of flexible couplings will not be allowed on a new gravity system unless specifically called for on the Drawings.

B. In general, during the rehabilitation of existing sewer lines, the use of appropriate transition couplings shall be permitted as approved by the ENGINEER. All changes in pipe size within the gravity sewer collection system shall require the installation of a manhole as specified elsewhere.

C. Couplings shall comply with the following:

1. Material: Shielded rubber sleeve with a stainless-steel shear ring and clamps

2. Sleeve shall comply with ASTM C425 and ASTM C1173. Shear ring shall comply with ASTM A240.

3. Accessories: Clamps shall be included with nut and bolt or worm drive take-up fasteners. “O” ring-type seals shall be provided under each sealing clamp to prevent slippage and provide a positive seal.

4. The gap between the pipe sections being jointed shall not exceed 0.25 inches.

D. Only electro-fusion couplings shall be used when connecting HDPE pipe.

2.06. FLEXIBLE PIPE BOOTS FOR MANHOLE PIPE ENTRANCES

A. Description:

1. Material: Ethylene-propylene-diene terpolymer (EPDM).

2. Comply with ASTM C923.

3. Attachment: stainless-steel clamp and hardware.

4. Deflection: permit at least an 8° deflection from the centerline of the opening in any direction while maintaining a watertight connection.

5. Seal: Joints shall be watertight under a 30 foot head of water.

2.07. CONCRETE ENCASEMENT AND CRADLES

A. Concrete:

1. Strength: 4,000 psi at 28 days.

2. Air entrained.
3. Finish: Rough troweled.
4. Concrete shall be as specified.

2.08. MATERIALS

A. Bedding and Backfill:

1. General: No rock, boulders, stone or debris larger than four inches shall be allowed in the bedding or backfill material. Deficient or unsuitable bedding or backfill material shall be replaced or substituted with suitable bedding or backfill material. Excavated material intended for use as bedding or backfill shall not be used if exceedingly wet nor shall trenches be backfilled if flooded or excessively wet.
2. Stone: Stone used for pipe bedding and trench stabilization shall meet the gradation requirements of standard aggregate size No. 67.
3. Soil: Soils for bedding and backfill are described in the ASTM D2487 Figure 1 soils classification chart, and, for purposes of these Specifications, are grouped into five (5) categories as follows, according to their suitability
   a. Class I Soil -Angular, 6 to 40 mm (¼" to 1½"), graded stone, including a number of fill materials that have regional significance, such as coral, slag, cinders, crushed stone, and crushed shells.
   b. Class II Soil - Coarse sands and gravels with maximum particle size of 40 mm (1½"), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil types GW, GP, SW, and SP are included in this class.
   c. Class III Soil - Fine sand and clayey gravels, including fine sands, sand clay mixtures, and gravel clay mixtures. Soil types GM, GC, SM, and SC are included in this class.
   d. Class IV Soil Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH, and CL are included in this class. These materials are not recommended for bedding, haunching, or initial backfill.
   e. Class V Soil - Includes the organic soils types OL, OH, and PT, as well as soils containing frozen earth, debris, rocks larger than 1½ inches in diameter, and other foreign materials. These materials are not recommended for bedding, haunching, or initial backfill for any of the accepted pipe materials.

PART 3 EXECUTION

3.01. EXAMINATION

A. Verify that excavation base is ready to receive Work of this Section.

B. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

C. Existing Utilities

1. All utility Owners shall be notified prior to excavation as required by the 1985 Underground Damage Prevention Act. Utility Owners who are members of NC

OneCall may be notified by calling 811 (toll free) before any excavation or drilling. The CONTRACTOR will be fully responsible for damage to any utilities if the Owners have not been properly notified as required by the Underground Damage Prevention Act. All damage to such structures and pipelines and all damage to property or persons resulting from damage to such structures and pipelines shall be borne by the CONTRACTOR and shall be completely repaired within a reasonable time. No claim shall be made against the OWNER for damage or delay of the work on account of the proximity of, or the leakage from, such structures and pipelines. Where high pressure gas lines are to be crossed, they shall be uncovered by hand excavation methods before other excavation near them is started.

2. Where required by the Contract Documents, excavate to determine the precise location of utilities or other underground obstructions which are shown on the Plans and/or marked by the utility Owners. Such location and excavation shall be at least 500 feet ahead of construction, unless otherwise noted.

3. Utility Owners may, at their option, have representatives present to supervise excavation in the vicinity of their utilities. The cost of such supervision, if any, shall be borne by the CONTRACTOR.

4. When underground obstructions not shown on the Plans are encountered, promptly report the conflict to the ENGINEER and do not proceed with construction until the conflict is resolved.

5. Conflicts with underground utilities may necessitate changes in alignment and/or grade of this construction. All such changes will be approved by the ENGINEER before construction proceeds.

3.02. PREPARATION

A. Preconstruction Site Photos:

1. As specified in Section 01 39 00 – Pre-Construction Video.

2. Take photographs along centerline of proposed pipe trench; minimum one photograph for each fifty (50) feet of pipe trench.

3. Show mailboxes, curbing, lawns, driveways, signs, culverts, and other existing Site features.

4. Include Project description, date taken, and sequential number on back of each photograph.

B. Protect and support existing utilities and appurtenances.

C. Inspect each pipe and fitting before and after installation; replace those found defective and remove from site. Provide proper equipment for lowering sections of pipe into trenches.

D. Provide tools, implements, and facilities for the safe completion of pipe laying in accordance with manufacturer requirements and these specifications. All pipe and other materials used in the laying of pipe will be lowered into the trench piece by piece by means of suitable equipment in such a manner to prevent damage to the pipe, materials, to the protective coating on the pipe materials, and to provide a safe working condition to all personnel in the trench. Each piece of pipe being lowered into the trench shall be

clean, sound and free from defects. It shall be laid on the prepared foundation, as specified elsewhere to produce a straight line on a uniform grade, each pipe being laid so as to form a smooth and straight inside flow line. Pipe shall be removed at any time if broken, injured or displaced in the process of laying same, or of backfilling the trench.

E. When cutting short lengths of pipe, a pipe cutter, as recommended by the manufacturer, will be used and the cut shall be made at right angles to the centerline of the pipe. In the case of push on joints, the cut ends shall be tapered with a portable grinder, in accordance with manufacturer guidelines.

3.03. INSTALLATION

A. Installing Pipe on Line and Grade:

1. Excavate pipe trench as specified.
2. Excavate to lines and grades as indicated on Drawings.
3. Dewater excavations where required to maintain dry conditions and to preserve final grades at bottom of excavation.
4. Provide sheeting and shoring as specified.

B. Bedding and Backfill:

1. Place bedding material (No. 67 stone) to establish the required invert elevation and pipe grade.
2. Work bedding material carefully around pipe to ensure adequate haunching.

C. PVC Pipe:

1. After the joint has been made, backfill to top of pipe with No. 67 stone material. Do not allow the pipe to shift. Additional bedding requirements outlined in project drawings shall be followed.

D. Ductile Iron Pipe:

1. After joint has been made, backfill to top of pipe using Class I or Class II soils or No. 67 stone. Do not allow pipe to shift. Additional bedding requirements outlined in project drawings shall be followed.

E. Backfill and Compaction:

1. Backfill in 8 to 12-inch lifts. Tamp each lift carefully and uniformly so as to eliminate the possibility of lateral displacement of the pipeline.
2. Compact pipe bedding and embedment material to 95% Standard Proctor.

F. Piping:

1. Pipe is to be installed in strict accordance with the manufacturer's recommendations and the contract specifications. The ENGINEER may augment any manufacturer's installation recommendations if, in his opinion, it will best serve the interest of the OWNER.
2. Install pipe to grades and invert elevations indicated on Drawings.
3. Begin at downstream end of system and progress upstream.

4. Lay gravity sewer pipe with the bell ends in the upgrade direction.
5. All pipe laid on a grade of twenty (20) percent or greater shall require thrust blocking or keying as shown on the drawings and standard details.
6. Plug end of piping at end of each day and when work stops. No trench water or other material shall be permitted to enter the pipe. Clear interior of piping and manholes of dirt and debris as work progresses. If water is in the trench do not remove the plug until the danger of mud or earth entering the pipe has passed.
7. Backfill and compact as specified.
8. Do not displace or damage pipe when placing and compacting backfill.
9. Ductile Iron Gravity Sewer
    a. Comply with ASTM A746 and AWWA C600
10. PVC Gravity Sewer
    a. Comply with ASTM D2321 and ASTM F1668
    b. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

G. Connections to Existing Manholes:

1. Connect to new manholes at precast inverts using the integrally cast neoprene boot and following manufacturer's guidelines. When new inverts must be made in manholes, use concrete core saw. pneumatic hammers, chipping guns, or sledge hammers shall not be used to form new inverts.
2. Install watertight neoprene gasket and seal annular space with nonshrink concrete grout.
3. Prevent construction debris from entering existing sewer line when making connection.

H. Wye Branches and Saddles:

1. Concurrent with pipe-laying operations, install service connections using appurtenance indicated and at locations indicated on Drawings.

I. Sanitary Laterals:

1. Construct laterals from service connection to terminal point at right-of-way or edge of permanent easement. Terminate lateral with clean-out in accordance with detail.
2. Minimum Depth of Cover over Piping: two (2) feet.
3. Minimum Separation Distance between Laterals: five (5) feet.
4. Minimum residential sewer service slope: two (2) percent.
5. Install watertight plug at termination of lateral, braced to withstand pipeline test pressure.

J. PE Encasement:

1. Encase piping in PE where indicated to prevent contact with surrounding backfill material.
2. Comply with AWWA C105.
3. Terminate encasement three (3) to six (6) inches above ground where pipe is exposed.

3.04. ABANDONMENT OF EXISTING SEWERS AND MANHOLES

A. Manholes which are to be abandoned shall first have both influent and effluent lines plugged inside the manhole with watertight masonry or concrete. The manhole will then be filled with non-compressible material (crushed stone or materials approved by the ENGINEER), to a point not less than three (3) feet below the finish grade. The remainder of the manhole shall be broken down and removed. The excavation shall be backfilled to finish grade.

B. Abandoned mains at active manholes shall be completely disconnected from the manhole by cutting the pipe outside the manhole and then plugging the abandoned main and the manhole wall with watertight masonry. The invert shall then be rebuilt to conform to new flow pattern.

C. The minimum length of watertight masonry and concrete plugs will be the diameter of the abandoned pipe plus one (1) foot.

3.05. REINSTATING EXISTING SEWER SERVICE LINES

A. Where existing sewer mains are being rehabilitated, sewer service lines shall be constructed for each property that is occupied by a business or dwelling if it is currently served by the system being rehabilitated.

B. The CONTRACTOR shall be responsible to locate and connect all existing sewer service lines to the new main. In the event a service is missed during construction, return to the site and perform all work necessary to reinstate the connection. The CONTRACTOR will be compensated in accordance with the original contract unit pricing; however, re-mobilization to the site will not be paid for. In addition, the CONTRACTOR shall be responsible for any costs associated with a sanitary sewer overflow and associated damage to public or private property through the omission of reinstating an active sewer service.

C. Service lines four (4) inches or less in diameter shall be tapped into the sewer main, not into a manhole. Service connections six (6) inches or greater shall only be made into an existing or proposed manhole, unless otherwise approved by the ENGINEER.

3.06. TOLERANCES

A. Maximum Variation from Indicated Slope: 1/8 inch in ten (10) feet, but installed slope shall never be less than the minimum slope for the pipe size.

3.07. FIELD QUALITY CONTROL

A. Pipe Testing: As specified.

END OF SECTION

SECTION 04 00 40

VALVES AND HYDRANTS

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials and incidentals necessary to perform and complete the installation of valves, fire hydrants, and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Valves.
2. Valve boxes.
3. Fire hydrants.

1.02. REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. American Water Works Association:

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.

2. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
3. AWWA C502 - Dry-Barrel Fire Hydrants.
4. AWWA C504 – Rubber Seated Butterfly Valves, 3 In. through 72 In.
5. AWWA C507 - Ball Valves, 6 in. through 60 in.
6. AWWA C508 – Swing-Check Valves for Waterworks Service, 2-In. through 24-In. NPS.
7. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
8. AWWA C512 - Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
9. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
10. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

C. ASTM International:

1. ASTM A48 – Standard Specification for Gray Iron Castings.
2. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A536 – Standard Specification for Ductile Iron Castings.
4. ASTM D429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.
5. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
6. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
2. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. National Fire Protection Association:

1. NFPA 291 - Recommended Practice for Fire Flow Testing and Marking of Hydrants.

F. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

G. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.03. COORDINATION

A. Coordinate Work of this Section with installation of water mains.

1.04. SUBMITTALS

A. Section 01 30 00 – Submittals/Electronic Submittals.

B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.

C. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

1.05. CLOSEOUT SUBMITTALS

A. **Section 01 72 00 – Project Record Documents**.

B. Project Record Documents: Record actual locations of valves and hydrants.

1.06. QUALITY ASSURANCE

A. Perform Work according to 15A NCAC 18C.

B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

C. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.

1.07. DELIVERY, STORAGE, AND HANDLING

A. **Section 01 55 00 – Site Access and Storage**.

B. Delivery:

1. Seal valve and hydrant ends to prevent entry of foreign matter.

2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from contamination by storing in clean, dry location remote from construction operations areas.

2. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.01. VALVES

A. Unless otherwise noted, valves shall have the following performance and design criteria:

1. Pressure Rating:

a. 12-inch Diameter and Smaller: 200 psig.

b. 14-inch Diameter and Larger: 150 psig.

2. Underground (Buried) Installations:

a. Mechanical joint connections.

b. Non-rising stem type.

c. 2-inch square operating nut.

3. Above Ground Installations:

a. Flanged ends with Class 125 flanges unless otherwise noted.

b. Rising stems, unless otherwise noted, with outside stem and yoke and 18-inch diameter minimum hand wheel.

c. All valves shall be operated by handwheel.

4. Valves shall have a clear waterway equal to the full nominal diameter of the pipe.

5. Each valve shall have the initials or name of the maker, pressure rating and year of manufacture cast on the body.

6. Valves shall have an arrow cast in the operating nut indicating the direction of opening.

7. Coatings:

a. Comply with AWWA C550.

b. Application: Interior and exterior.

8. Operation: Counterclockwise opening.

B. Resilient-Wedge Gate Valves:

1. Description:

a. Gate valves 2 inches through 24 inches in diameter size shall be of the resilient seated wedge type in accordance with AWWA C509 or C515. All valves shall be from one manufacturer and parts interchangeable.

b. Materials:

1) Body, bonnet, and gate: Cast iron or ductile iron.

2) Stem: Cast bronze with integral collars.

c. Coating:

1) The valve body and bonnet shall be coated on both the interior and exterior surfaces with an NSF 61 approved fusion bonded epoxy paint conforming to AWWA C550.

2) The gate shall be fully coated in accordance with ASTM D2000. Coating adhesion shall be in accordance with ASTM D429.

d. Stem:

1) Non-rising stems shall have two O-rings located above thrust collar and one O-ring below. The non-rising stems on 4”-12” valves shall also have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.

e. Operation:

1) Where called for in Plans, valves larger than 12 inches in diameter shall be designed for horizontal installation with beveled gear boxes with reduction gears to reduce the number of turns required to operate valve.

C. Double-Disc Gate Valves:

1. Description:

a. Gate valves larger than 24 inches in diameter shall be of the double disc parallel seat type. All valves shall be from one manufacturer and parts interchangeable. Valves shall have a working pressure of 150 PSI.

b. Comply with AWWA C500.

c. Materials:

1) Body, bonnet, and gate: Ductile iron conforming to ASTM A536.

2) Gates: High strength cast iron.

3) Stem: Cast bronze

4) Trim, rollers, tracks, and scrapers: Bronze.

d. Coating: The valve body and bonnet shall be coated on both the interior and exterior surfaces with an NSF 61 approved fusion bonded epoxy paint conforming to AWWA C550.

e. Valves shall use bottom wedging type design with a two part floating wedge contact. The wedge and hook shall be separate castings and not a single piece.

f. The stuffing box shall use “O”-ring seal type with two rings located above the thrust collar. The rings shall be replaceable with the valve fully open and under pressure. Flat gaskets and blind bolts are not allowed.

g. Operation:

1) Horizontal installation with beveled gear boxes with reduction gears to reduce the number of turns required to operate valve.

D. Butterfly Valves:

1. Description:

a. Butterfly valves shall be of the tight-closing type with zero leakage at rated pressures with flow in either direction and shall be satisfactory for frequent operation and for applications involving valve operation after long periods of inactivity.

b. Butterfly valves shall be Class 150B in accordance with AWWA C504.

c. Materials:

   1) Body: Cast iron (flanged - ASTM A126 Class B, mechanical joint – ASTM A48 Class 40) or ductile iron (ASTM A536 Grade 65 45 12)

   2) Seat ring: Stainless-steel that is mechanically retained without use of clamping devices, adjusting segments, or other hardware being in the waterway.

   3) Valve Disc: ductile iron without any external vanes, ribs, etc., to obstruct flow or alloy cast iron.

   4) Shaft: 18-8 Type 304 or Type 316 stainless-steel.

   5) Taper keys: 416 stainless-steel.

d. Coatings:

   1) Valve body shall be primed with manufacturer's standard primer.

   2) Rubber seats shall be securely fastened to the valve body. No metal-to-metal seating surfaces shall be permitted. Valves shall have seats that are simultaneously molded in, vulcanized and bonded to the body. Seat bond must withstand 75 lbs. pull under test procedure ASTM D429, Method B.

e. Discs and Resilient Seat:

   1) Seat shall be located on edge of disc, offset from the shaft, and seal against mating stainless steel body seat with 360 degree uninterrupted contact.

   2) Valve discs shall rotate 90 degrees from the full open position to the tight shut position.

   3) The resilient seal shall be locked to the disc by three separate means of retention, and be field-adjustable, if necessary, with no tools other than a standard socket wrench.

   4) Replacement of seat in field shall be possible without valve disassembly.

f. Shaft:

   1) The disc shall be connected to the offset shaft by locked taper wedge keys and stainless steel retaining nuts on the back side of the disc.

   2) Shaft shall be stub type for valves 30 inches and larger in diameter; one piece for valves 24 inches in diameter and smaller.

   3) The valve shall be equipped with adjustable thruster for centering the disc on valves 30 inches and larger in diameter, if required.

   4) Two trunnions for shaft bearings shall be integral with each valve body.

5) Shaft shall have nylon sleeve or woven Teflon fiberglassed backed sleeve for bearing surfaces. Bearings shall be corrosion resistant and self-lubricating.

6) Bearing load shall not exceed 1/5 of the compressive strength of the bearing or shaft material.

7) Shafts shall be turned, ground and polished.

g. Operation:

1) Manual operators shall be of the traveling nut, self-locking type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.

2) Operators shall be equipped with mechanical stop-limiting devices to prevent over-travel of the disc in the open and closed positions.

3) Operators shall be fully enclosed and designed to produce the specified torque with a maximum pull of 80 lb. on the operator or handwheel.

4) Operator components shall withstand an input of 150 Ft.-Lbs. at extreme operator position without damage.

E. Plug Valves:

1. Description:

a. Eccentric Plug Valves shall be of the tight closing, resilient faced non-lubricating variety and shall be of eccentric design such that the valve's pressure member (plug) rises off the body seat contact area immediately upon shaft readaptation during the opening movement. Plug valves shall be satisfactory for applications involving throttling service as well as frequent or infrequent on-off service.

b. Eccentric plug valves and actuators shall meet or exceed the latest revisions of AWWA C517 and other applicable standards. Flanged ends shall be per ANSI B16.1, mechanical joint ends per AWWA C111, and grooved ends per AWWA C606.

c. Pressure Rating:

1) Pressure ratings shall be bi-directional. Every valve shall be given a certified hydrostatic and seat test, with test reports being available upon request.

2) 12-inch Diameter and Smaller: 175 psig.

3) 14-inch Diameter and Larger: 150 psig.

d. Materials:

1) Body: ASTM A126 Class B cast iron or ASTM A536 ductile iron.

2) Bearings: sleeve type made of sintered, oil-impregnated permanently lubricated type 316 stainless steel per ASTM A743 Grade CF8M.

3) Seats: 1/8-inch thick welded overlay of not less than 95 percent pure nickel.

4) Grit Excluders: PTFE

5) Shaft Seals: BUNA-N.

e. Port: Rectangular with area 100 percent of Standard class pipe area.

f. Seats:

1) Seat shall be at least ½-inch wide and raised.

2) 1/8-inch thick welded overlay of not less than 90 percent pure nickel

3) The raised surface shall be completely covered with nickel to ensure that the resilient plug face contacts only the nickel seat.

g. Plug:

1) The plug shall have a cylindrical seating surface eccentrically offset from the center of the shaft.

2) Plug shall not contact the seat prior to 90 percent closed.

3) Plug facing shall be Chloroprene (CR), or other resilient facing suitable for the application. The rubber compound shall be approximately 70 (Shore A) durometer hardness. The rubber to metal bond must meet ASTM D429 Method B.

4) Plug shall rotate approximately 90 degrees from the full-open to full-closed position and vice-versa.

h. Shaft:

1) Shaft seals shall permit inspection, adjustment or complete replacement of packing without disturbing any part of the valve or actuator assembly except the packing gland follower.

2) Adjustable Packing shall be of the multiple V-ring type, with a packing gland follower.

i. Actuator:

1) Manual valves shall have lever or worm gear type actuators with handwheels, 2" square nuts, or chainwheels attached.

2) Lever actuators shall be furnished on valves 8" and smaller where the maximum unseating pressure is 25 psig or less.

3) Worm gear type actuators shall be furnished on all 4" or larger valves where the maximum unseating pressure is 25 psig or more.

4) Actuators shall be enclosed in a cast iron housing, with outboard seals to protect the bearings and other internal components.

5) The actuator shaft and gear quadrant shall be supported on permanently lubricated bronze bearings.

6) Buried actuators shall be 90 percent grease filled. Input shaft and fasteners shall be stainless steel. Actuator mounting brackets shall be totally enclosed.

j. Position Indicators

1) Unless otherwise specified, each valve shall be provided with a position indicator to display the position of the plug relative to the body seat opening.

2) For valves installed in interior locations, the indicating pointer shall be mounted on the outer end of the valve operating shaft extension and shall operate over an indicating scale on the operating mechanism cover. A suitable stuffing box or other seal shall be provided to prevent the entrance of water where the shaft passes through the cover.

3) Position indicators will not be required for buried valves.

F. Valves 1-1/2 Inches and Smaller

1. Description:

a. Unless otherwise noted, valves shall be full port ball valves with adjustable packing suitable for underground installation.

b. Comply with MSS-SP-110.

c. Body: Forged brass

d. End Connections: Threaded ends conforming to NPT standards.

e. Operation: Quarter-turn.

G. PVC Ball Valves:

1. Description:

a. PVC ball valves ½-inch to 2-inch shall be true union design and 3-inch valves shall be a single union design.

b. Materials:

1) Body: from Type 1, Grade 1, Polyvinyl Chloride as outlined in ASTM D1784.

2) Ball seals: Teflon

3) Stem and body seals: Viton

c. The valves shall carry a pressure rating of 150 psi at 73 degrees F.

H. Air Release and Combination Air/Vacuum Valves:

1. Description:

a. Air release and combination air/vacuum valves shall be rated for a working pressure of 150 PSI minimum and hydrostatic test pressure of 300 PSI.

b. Combination air valves shall combine the operation of both an air/vacuum and air release valve.

c. Comply with AWWA C512.

d. Materials:

1) Body: Cast iron or Type 304 or 316 stainless steel, or as specified.

e. Inlets:

1) The valve shall have a minimum two (2) inch NPT inlet.

2) Combination air valves sized from 2 inches to 4 inches shall be provided with NPT inlets and outlets unless otherwise submitted for approval with flanged connections.

I. Swing Check Valves:

1. Description

   a. Check valves shall be in accordance with AWWA C508.

2. Materials:

   a. Body: high-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 125 and be suitable for horizontal or vertical installation.

   b. Body seat ring: Stainless steel and shall be mechanically retained by means of roll pins or stainless steel cap screws. The body seat ring shall be replaceable.

   c. Disc: Cast iron per ASTM A126 Class B, bronze, or alloy cast iron with bronze or stainless steel disc rings.

   d. Disc arm: Ductile iron or steel.

   e. Shaft: Austenitic stainless-steel.

3. Disc:

   a. The valve disc shall be attached to the disc arm by means of a single center pin permitting 360-degree articulation.

   b. The disc shall present a convex surface to the direction of flow to compensate for oscillation.

   c. Disc seats shall be replaceable.

4. Shaft:

   a. The shaft shall rotate freely without the need for external lubrication.

   b. The shaft shall be sealed where it passes through the body by means of a stuffing box and adjustable packing.

   c. Simple O-ring shaft seals are not acceptable. Hinge shafts shall be constructed of 316 stainless steel

   d. Pivot pins and bushings: bronze or stainless steel.

5. The valve body shall be the full waterway type, designed to provide a net flow area not less than the nominal inlet pipe size when swung open no more than 25 degrees.

6. Unless otherwise noted, the valve shall be supplied with an outside lever and adjustable counterweight to initiate valve closure.

7. Air Cushioned Swing Check Valve:

   a. Final closure shall be dampened by means of a single, side-mounted bronze air-cushion assembly directly mounted to the valve body on machined pads. The amount of cushioning shall be easily adjustable without the need for pre-charged

air chambers. Commercial air cylinders, which pivot and/or are attached with fabricated brackets, are not acceptable.

J. Ball Check Valves:

1. Description:

a. Material:

1) ASTM A536 ductile iron with sinking type ball made of a hollow metal core with vulcanized nitrile rubber covering, or;

2) ASTM D1784 PVC with sinking type ball made of nitrile or Teflon.

b. The valves shall insure a positive seal to prevent reverse flow even with extremely low back pressure.

c. The valves shall be designed for horizontal or vertical installation and have a removable cover to permit inspection.

2.02. TAPPING SLEEVES AND VALVES

A. Tapping Sleeves:

1. Description:

a. Material: Ductile iron meeting ASTM A536 Grade 65-45-12.

b. Type: Dual compression.

c. Outlet Flange

1) Comply with ASME B16.1, Class 125, and MSS SP-60.

2) Outlet flange seals shall be of the O-Ring type of either round, oval, or rectangular cross-sectional shape

d. Bolts

1) Body: High strength cast iron bolts.

2) Glands: Steel bolts fastened to the bell opening of the sleeves.

e. Gasket: full circumferential type providing a 360° seal around existing pipe.

f. Bituminous Coating: Comply with AWWA C110.

B. Tapping Valves:

1. Description:

a. Valves will be identical to resilient wedge gate valves elsewhere specified with inlet and outlet ends adaptable to the tapping machine and to provide mechanical joint connections to discharge pipes

2.03. FIRE HYDRANTS

A. Manufacturers:

1. The fire hydrants shall be Mueller Cat. No. A421, 4 ½" or American-Darling Mark73-5 with New Bern standard Storz connector on the pumper nozzle.

B. Dry-Barrel, Breakaway Type:

1. Comply with AWWA C502.
2. Design:
    a. Hydrants shall be of the traffic or safety model type incorporating a break away flange arrangement which will permit the upper section of the hydrant barrel to separate from the lower section upon impact and the hydrant valve will remain closed and reasonably tight.
3. Rating: Designed for a minimum working pressure of 150 psi and a hydrostatic test pressure of 300 psi with the valve in both the open and closed positions.
4. Burial Depth:
    a. All hydrants shall be furnished with barrel and stem extensions as required to provide a nominal minimum cover of approximately three feet or greater if so required by field conditions.
5. Main Valve:
    a. Size: 5-1/4 inches, unless otherwise specified.
    b. Type: Compression type, closing with line pressure and capable of withstanding 250 PSI working pressures and 500 PSI hydrostatic test pressures, unless otherwise specified.
    c. The valve seat ring shall thread into a bronze sub-seat, and all gaskets sealing the seat ring shall be a bronze-to-bronze surface.
6. Drain Valve: All bronze and allowing complete drainage of all residual water in the hydrant barrel.
7. Opening Nut: Pentagonal, 1-1/2 inches from the point to the flat, counterclockwise opening.
8. Stem and Seals:
    a. Hydrants shall be of the "dry top" type with the upper rod threads completely enclosed in a sealed grease or oil chamber to lubricate the entire length of the threaded part of the valve stem each time the hydrant is operated.
    b. All-weather grease shall be used to provide permanent lubrication. A thermoplastic thrust washer shall be used to reduce friction in the thrust collar while opening the hydrant.
    c. Two (2) “O”-ring seals between the revolving nut and bronze-sheathed upper section of the valve rod shall be utilized to ensure that threads on the valve stem do not come into contact with water at any time.
    d. The top of the rod shall also be fitted with a travel stop nut to limit downward travel of the rod.
9. End Connections: 6-inch Mechanical joint.
    a. Joint restraint, if specified, shall be accomplished for mechanical joint by use of mechanical joint gripper glands.
10. Bolts and Nuts: Stainless steel.

11. Interior Coating: Comply with AWWA C550.

C. Hose Connections:

1. One 4-1/2-inch pumper nozzle.
2. Two (2) 2-1/2-inch hose nozzles.
3. All connections shall be bronze with National Standard Threads.
4. Cast iron nozzle caps attached by separate steel chains.
5. Nozzles shall be reverse threaded into the fire hydrant barrel.

D. Finishes:

1. All hydrants shall be painted the manufacturer's standard red unless otherwise specified.
2. Color: Comply with requirements of utility company or fire department.

2.04. YARD HYDRANTS

A. Type: 2-1/8-inch freeze-less post.

B. Inlet: 2-inch mechanical joint.

C. Nozzles:

1. One (1) 2-1/2-inch fire nozzle with 1-1/2-inch nipple.
2. One (1) standard ¾-inch hose nozzle for wash down

D. Provide and install 3 cubic feet of crushed stone at freeze drain.

2.05. FREEZE-PROOF HOSE BIBS

A. Manufacturers:

1. The hose bibs shall be manufactured by Nibco (No. 74VB) or approved equal.

B. All hose bibs shall be freeze-proof.

2.06. VALVE BOXES

A. Description: Valve boxes shall be of the close-grained gray cast iron and adjustable. The word “WATER” shall be cast in the lid. Valve boxes shall be coated with a protective bituminous coat before being shipped from the factory. Valve box weight shall not bear upon the valve bonnet.

B. Precast Concrete Valve Box Protector Ring:

1. Each cast iron valve box located outside of paved areas shall be installed with a 24" diameter, precast reinforced concrete protector ring.

2. Each cast iron valve box located in a paved area shall have a cast in place 24” x 24” x 7-1/2” concrete encasement installed 2” below grade with the top 2-1/2” being asphalt.

PART 3 EXECUTION

3.01. EXAMINATION

A. Determine exact location and size of valves and/or hydrants from Drawings.

B. Identify required lines, levels, contours, and datum locations.

C. Verify that elevations of existing facilities, prior to excavation and installation of valves and/or hydrants, are as indicated on Drawings.

3.02. PREPARATION

A. Locate, identify, and protect from damage utilities to remain.

B. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.

1. Notify ENGINEER not less than two days in advance of proposed utility interruption.

3.03. INSTALLATION

A. General:

1. CONTRACTOR shall provide all materials, labor, tools, equipment and incidentals required for the excavation, installation, backfilling and testing of valves and/or hydrants and associated appurtenances.

2. All valves and hydrants shall be installed in accordance with the manufacturer’s instructions.

3. Valves, hydrants and accessories shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage.

4. Perform trench excavation, backfilling, and compaction as specified.

5. Disinfection of Water Piping System: Flush and disinfect valves and hydrants with water mains as specified.

6. Install valves and hydrants in conjunction with pipe laying.

B. Valve Installation:

1. Before setting each valve, the CONTRACTOR shall make sure the interior is clean and test opening and closing.

2. Valves shall be set with stems plumb, unless horizontal installation is called for on the plans, and at the exact locations shown.

3. Provide buried valves with valve boxes installed flush with finished grade.

4. Air Release and Combination Air/Vacuum Valves:

a. All air release and combination air/vacuum valve assemblies shall be:

1) Installed at locations shown and in accordance with specifications and details provided on the Plans.

2) Installed in standard eccentric manhole.

3) Provided with a saddle tap of the same size as the combination air valve assembly and isolated with a gate valve of the same size. The isolation gate valve shall be provided with NPT threads and connected with brass or bronze piping. Brass or bronze ball valves may be used in lieu of gate valves for installations 2 inches or smaller. The isolation valve shall be rated for 200 psi service or greater.

5. Tapping Sleeves and Valves:

a. As indicated on Plans and according to manufacturer instructions. All sleeves are to include the end joint accessories and split glands necessary to assemble sleeve to pipe. Concrete thrust blocks shall be installed as specified prior to backfilling.

C. Valve Box Installation:

1. A valve box shall be installed over each underground valve. All boxes shall be installed in accordance with the manufacturer's instructions and set plumb and centered on the operating nut. Top of the valve box shall be flush with finished grade and with a precast concrete "donut" unless located within a hardened surface such as roadway or concrete slab.

D. Fire Hydrant Installation:

1. Fire hydrants shall be located as shown on Plans.

2. Each hydrant shall be connected to the main with a 6-inch diameter branch line, which shall include a 6-inch gate valve. The branch line shall have at least as much cover as the distribution main.

3. Hydrants shall be rodded to the 6-inch branch tee.

4. Orientation:

a. Set valves and hydrants plumb.

b. Set fire hydrants with pumper nozzle facing roadway.

c. Set fire hydrants with centerline of pumper nozzle 18 inches above finished grade and with safety flange above grade but not more than 2 inches above grade.

5. Provide thrust blocking and not less than eight (8) cubic feet of drainage gravel while installing fire hydrants; do not block drain hole. Place a cap block beneath the fire hydrant foot for a solid bottom.

6. After main-line pressure testing, flush fire hydrants and check for proper drainage.

3.04. FIELD QUALITY CONTROL

A. Testing: Pressure test valves and hydrants with water mains as specified.

END OF SECTION

SECTION 04 00 50

MISCELLANEOUS VALVES AND APPURTENANCES

PART 1 GENERAL

1.01. SUMMARY

A. Scope of Work:

1. Furnish all labor, equipment, materials, and incidentals necessary to perform and complete the installation of valves, and appurtenances in accordance with the plans. All products and procedures shall be of the type and class specified herein.

B. Section Includes:

1. Insertion Valves.

1.02. REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. American Water Works Association:

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
2. AWWA C508 – Swing-Check Valves for Waterworks Service, 2-In. through 24-In. NPS.
3. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
4. AWWA C515 - Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
5. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

C. ASTM International:

1. ASTM A48 – Standard Specification for Gray Iron Castings.
2. ASTM A126 – Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM A536 – Standard Specification for Ductile Iron Castings.
4. ASTM D429 – Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.
5. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
6. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-60 - Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
2. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved, and Flared Ends.

E. North Carolina Administrative Code

1. 15A NCAC 18C – Rules Governing Public Water Systems

F. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

G. City of New Bern

1. Water & Sewer Design Standards

1.03. COORDINATION

A. Coordinate Work of this Section with installation of water mains.

1.04. SUBMITTALS

A. **Section 01 30 00 – Electronic Submittals**.

B. Product Data: Submit manufacturer information regarding component materials, fittings, assembly and parts diagram, and accessories.

C. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

D. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

1.05. CLOSEOUT SUBMITTALS

A. **Section 01 72 00 – Project Record Documents**.

B. Project Record Documents: Record actual locations of valves.

1.06. QUALITY ASSURANCE

A. Where appropriate, perform Work according to 15A NCAC 18C and City of New Bern's Water & Sewer Design Standards.

B. Materials in Contact with Potable Water: Certified according to NSF 61 and NSF 372.

C. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.

1.07. DELIVERY, STORAGE, AND HANDLING

A. **Section 01 55 00 – Site Access and Storage**.

B. Delivery:

1. Seal valve to prevent entry of foreign matter.

2. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from contamination by storing in clean, dry location remote from construction operations areas.

2. Provide additional protection according to manufacturer instructions.

PART 2 PRODUCTS

2.01. VALVES

A. Unless otherwise noted, valves shall have the following performance and design criteria:

1. Pressure Rating:

a. 12-inch Diameter and Smaller: 200 psig.

b. 14-inch Diameter and Larger: 150 psig.

2. Underground (Buried) Installations:
    a. Mechanical joint connections.
    b. Non-rising stem type.
    c. 2-inch square operating nut.
3. Above Ground Installations:
    a. Flanged ends with Class 125 flanges unless otherwise noted.
    b. Rising stems, unless otherwise noted, with outside stem and yoke and 18-inch diameter minimum hand wheel.
    c. All valves shall be operated by handwheel.
4. Valves shall have a clear waterway equal to the full nominal diameter of the pipe.
5. Each valve shall have the initials or name of the maker, pressure rating, and year of manufacture cast on the body.
6. Valves shall have an arrow cast in the operating nut indicating the direction of opening.
7. Coatings:
    a. Comply with AWWA C550.
    b. Application: Interior and exterior.
8. Operation: Counterclockwise opening.

B. Altitude Control Valves:
1. Manufacturers:
    a. The altitude control valve shall be manufactured by Cla-Val, GA Industries, Inc., Singer or approved equal.
2. Description:
    a. Altitude control valves shall be hydraulically operated, pilot actuated diaphragm type globe or angle valve designed for ground level control of water in an elevated storage tank and reservoirs.
    b. The valve operates on a differential in pressure between the height of the water in the reservoir and an adjustable spring-loaded pilot control.
    c. Materials:
        1) Body: Cast iron (ASTM A126).
        2) Shaft/Stem: Stainless-steel.
        3) Seat ring: Bronze
        4) Upper stem bushing: Bronze
        5) Diaphragms: Nylon reinforced.
        6) Valve control pilots: Bronze

7) Internal parts: Stainless-steel and Buna N.

d. The valve is to be non-throttling and will remain in the full open position until the shut off point is reached.

e. It shall be designed for an internal working pressure of 175 PSI and maximum differential pressure across the diaphragm of basic valve and pilots is not to exceed 300 PSI.

f. The installation shall be designed for either one-way flow or two way flow as indicated on the Contract drawings.

1) One-way flow: The valve will be used where pressure on the inlet side of the valve is greater than the pressure created by the maximum reservoir or tank head. The valve's sole function is to fill an elevated tank or reservoir to a desired level.

2) Two-way flow: The valve will be used when pressure on the inlet side is variable. When inlet pressure falls below reservoir pressure the valve opens, allowing reverse falls below reservoir pressure the valve opens, allowing reverse flow from the reservoir and thus maintaining fluid pressure within the water distribution system.

C. Pressure-Reducing Valves:

1. Manufacturers:

a. The pressure-reducing valve shall be manufactured by GA Industries, Inc. (Figure 4500-D) or approved equal.

2. Description:

a. Pressure Reducing Valves larger than 2-inches in diameter shall consist of a main valve assembly and a pilot system, completely assembled tested as unit and ready for field installation.

b. The valve shall function to reduce a higher, fluctuating inlet pressure to a lower, steady outlet pressure regardless of variations in demand.

c. Materials:

1) Body: High-strength cast iron conforming to ASTM A126 Class B with integral flanges, faced and drilled per ANSI B16.1 Class 125.

d. Valve body shall be globe style and have an integral bottom pad or feet to permit support directly beneath the body.

e. The main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area and the area on the upper surface is greater than that of the underside. There shall be no diaphragms or springs in the main valve.

f. The valve piston shall be fully guided on its outside diameter and all guiding and sealing surfaces shall be bronze. To minimize the consequences of throttling, throttling shall be by long, stationary vee-ports located downstream of the seat and not by the seat itself. Sawtooth attachments or other add-on devices are not permitted.

g. The valve shall be fully capable of operating in any position without the need of springs and shall not incorporate stems, stem guides or spokes in the waterway. A visual position indicator shall be provided.

h. The main valve shall be serviceable in the line through a single flanged cover which provides easy access to all internal components.

i. Pilot System:

1) Provide a system of pilots and controls to enable the valve to perform the function listed below. All controls and control piping shall be non-corrosive and suitable for the working pressure.

2) System shall include a normally open, direct-acting, diaphragm operated, spring loaded bronze pressure reducing pilot. Pilot shall be easily field-adjustable from near zero to a minimum of 10 percent above the factory setting. Controls shall include adjustable closing speed control, y-strainer, and pilot isolating valves.

PART 3 EXECUTION

3.01. EXAMINATION

A. Determine exact location and size of valves and/or appurtenances from Drawings.

B. Identify required lines, levels, contours, and datum locations.

C. Verify that elevations of existing facilities, prior to excavation and installation of valves and/or hydrants, are as indicated on Drawings.

3.02. PREPARATION

A. Locate, identify, and protect from damage utilities to remain.

B. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.

1. Notify ENGINEER not less than two days in advance of proposed utility interruption.

3.03. INSTALLATION

A. General:

1. CONTRACTOR shall provide all materials, labor, tools, equipment and incidentals required for the excavation, installation, backfilling and testing of valves and/or associated appurtenances.

2. All valves and appurtenances shall be installed in accordance with the manufacturer's instructions.

3. Valves and appurtenances shall be carefully lowered into the trench with suitable equipment in a manner that will prevent damage.

4. Perform trench excavation, backfilling, and compaction as specified.

5. Disinfection of Water Piping System: Flush and disinfect valves and appurtenances with water mains as specified.

6. Install valves and appurtenances in conjunction with pipe laying.

B. Valve Installation:

1. Before setting each valve, the CONTRACTOR shall make sure the interior is clean and test opening and closing.
2. Valves shall be set with stems plumb, unless horizontal installation is called for on the plans, and at the exact locations shown.
3. Provide buried valves with valve boxes installed flush with finished grade.

3.04. FIELD QUALITY CONTROL

A. Testing: Pressure test valves and hydrants with water mains as specified.

END OF SECTION