

Contract Documents

## Wastewater Facilities

Contract 16.0 – McColl Road Sewer



**CONTRACT DOCUMENTS**  
**CITY OF LAURINBURG**  
**WASTEWATER FACILITIES**  
**CONTRACT 16.0 – McCOLL ROAD SEWER**

CITY OFFICIALS

MAYOR

JAMES T. WILLIS

MAYOR PRO TEMPORE

MARY EVANS

COUNCIL MEMBERS

MARY JO ADAMS  
ROSEMARY RAINER  
BARBARA ROGERS  
ANDREW WILLIAMSON, JR.

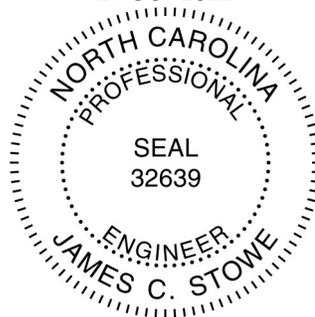
CITY MANAGER

CHARLES D. NICHOLS, III

DIRECTOR OF PUBLIC UTILITIES

STACEY MCQUAGE

27 OCT 2022



A handwritten signature in black ink, appearing to read "James C. Stowe".

**WILLIS ENGINEERS**  
**10700 SIKES PLACE, SUITE 115**  
**CHARLOTTE, NORTH CAROLINA 28277**  
**NC LICENSE NO. F-0114**

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**BID**

**CITY OF LAURINBURG**

**WASTEWATER FACILITIES**

**CONTRACT 16.0 – McCOLL ROAD SEWER**

To City of Laurinburg:

The undersigned hereby declares that he has carefully examined the *Technical Specification* prepared by Willis Engineers issued on October 27, 2022 for the McColl Road Sewer and that he has personally inspected the actual location of the work, together with the local sources of supply, has satisfied himself as to all the quantities and conditions, and understands that in signing this Bid he waives all rights to plead any misunderstanding regarding the same.

<b>Item No.</b>	<b>Description</b>	<b>Unit</b>	<b>Estimated Quantity</b>	<b>Bid Unit Price</b>	<b>Bid Price</b>
1	8-inch PVC Gravity Sewer	LF	40		
2	15-inch PVC Gravity Sewer	LF	200		
3	10-inch PVC Force Main	LF	200		
4	10-inch 90° Bend	EA	2		
5	10-inch 11 1/4° Bend	EA	1		
6	10-inch Two Bolt	EA	1		
7	8-inch Two Bolt	EA	1		
8	16-inch Steel Casing	LF	130		
9	24-inch Steel Casing	LF	130		
10	4-foot dia. Manhole	EA	3		
11	5-foot dia. Doghouse Manhole	EA	1		
12	Site Clearing	LS	1		
13	Erosion Control	LS	1		
14	Restoration	LS	1		
Subtotal (All Items 1-14)					
15	Mobilization (Not to Exceed 3% of Subtotal)	LS	1		
16	Contingency Allowance	LS	1		\$15,000
<b>Total Bid Price (All Items 1-16)</b>				\$	

The undersigned hereby offers to furnish all pipe, labor, materials, supplies, equipment and other facilities and things necessary or proper for, or incidental to the construction and completion of this work, for the following lump sum price.

The undersigned agrees to complete all work within 45 calendar days after notification from the Engineer to proceed with the work. The Engineer will not issue notification until the necessary materials are available for use by the Contractor.

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

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

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

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

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

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

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

This Bid shall be submitted via email to Stacey McQuage at [smcquage@laurinburg.org](mailto:smcquage@laurinburg.org) no later than 2:00 pm local time on November 11, 2022. Receipt of the Bid will be acknowledged by return email.

**CITY OF LAURINBURG  
WASTEWATER FACILITIES  
CONTRACT FOR CONSTRUCTION OF  
CONTRACT 16.0 – McCOLL ROAD SEWER**

This Contract is by and between City of Laurinburg (Owner) and \_\_\_\_\_ (Contractor).

Owner and Contractor hereby agree as follows:

**ARTICLE 1 - THE WORK**

1.01 Description

- A. Work includes all labor, materials, equipment, services, and documentation necessary to construct the Project defined herein. The Work may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
- B. The Contractor shall complete all Work as specified or indicated in the Contract Documents. The Project is generally described as follows:
  - 1. Install 16-inch and 24-inch casing under US 15/401.
  - 2. Install 8-inch and 15-inch gravity sewer with 4 manholes.
  - 3. Install 10-inch force main.
  - 4. Remove existing manhole and abandon gravity sewer.
  - 5. Provide clearing, erosion control, and restoration of all areas.

1.02 Location of Work

- A. The Site of the Work includes property, easements, and designated work areas described in greater detail in the Contract Documents but generally located at the intersection of Hasty Road (SR1615) and McColl Road (US 401).

**ARTICLE 2 - CONTRACT DOCUMENTS**

2.01 Intent of Contract Documents

- A. It is the intent of the Contract Documents to describe a functionally complete project. The Contract Documents do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Owner and Engineer. This Contract supersedes prior negotiations, representations, and agreements, whether written or oral. The Contract Documents are complementary; what is required by one part of the Contract Documents is as binding as if required by other parts of the Contract Documents.
- B. During the performance of the Work and until final payment, Contractor and Owner shall submit all matters in question concerning the requirements of the Contract Documents, or relating to the acceptability of the Work under the Contract Documents to the Engineer.

Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

- C. Engineer will render a written clarification, interpretation, or decision on the issue submitted, or initiate a modification to the Contract Documents.
- D. Contractor, and its subcontractors and suppliers, shall not have or acquire any title to or ownership rights to any of the Drawings, Specifications, or other documents (including copies or electronic media editions) prepared by Engineer or its consultants.

## 2.02 Contract Documents Defined

- A. The Contract Documents consist of the following documents:
  - 1. This Contract
  - 2. Performance bond
  - 3. Payment bond
  - 4. Specifications
  - 5. Drawings
  - 6. The following which may be delivered or issued on or after the Effective Date of the Contract:
    - a. Work Change Directives
    - b. Change Orders
    - c. Field Orders
    - d. Contingency Work Authorization

## ARTICLE 3 - ENGINEER

### 3.01 Engineer

- A. The Engineer for this Project is Willis Engineers located at 10700 Sikes Place, Suite 115, Charlotte, NC 28277. The contact phone number is 704-377-9844.

## ARTICLE 4 - CONTRACT TIMES

### 4.01 Contract Times

- A. The Work will be completed and ready for final payment within 45 days after notification from the Engineer to proceed with the work.

### 4.02 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence in the performance of the Contract, and that Owner will incur damages if Contractor does not complete the Work according to the requirements of Paragraph 4.01. Because such damages for delay would be difficult and costly to determine, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner \$500 for each day that expires after the Contract Time.

#### 4.03 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 or their subcontractors or suppliers.
- 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. Abnormal weather conditions shall be defined as weather extremes which exceed the average precipitation or number of inclement weather days normally experience at the project location as determined by the Engineer. The Piedmont area of North Carolina normally experiences over 40 inches of rain and 70 significant rainfall days annually. The Contractor can reasonably expect four (4) days per month when weather will impact the work and shall take into consideration these anticipated weather impact days when submitting his Bid and planning the work. On a monthly basis the Engineer and Contractor will review the weather and work records documented by the Contractor for the previous month. Any lost work days must be fully documented with rain gauge readings, work logs, site conditions and their effect of on critical path activities. The Engineer will determine the number of eligible lost work days and make a recommendation to the Owner regarding any extension of the Contract Time. The Contract Time may only be extended by Change Order, at the sole discretion of the Owner.
  - 3. acts of war or terrorism.
- D. 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 or Contractor's subcontractors or suppliers.

#### 4.04 Progress Schedules

- A. Contractor shall develop a progress schedule and submit to the Engineer for review and comment before starting Work on the Site. The Contractor shall modify the schedule in accordance with the comments provided by the Engineer.

- B. The Contractor shall update and submit the progress schedule to the Engineer each month. The Owner may withhold payment if the Contractor fails to submit the schedule.
- C. The Contractor shall submit to the Engineer for approval a copy of a practical and feasible work schedule.
- D. The work schedule may be in the form of a critical path or bar graph. All schedules shall be updated by the Contractor on a monthly basis.
- E. Where there is more than one Contract on the Project, the Contractor shall, within ten days following the execution of his Contract with the Owner, submit six copies of his own proposed work schedule to the Engineer for approval. After approval, sufficient additional copies of the approved schedule shall be submitted to the Engineer for transmittal of two copies to each of the other contractors, who shall then prepare and submit their own work schedules for approval. The Contractor shall then incorporate these schedules into his schedule.
- F. The Contractor on each Contract shall adhere to the approved work schedule for his Contract. In the event a Contractor does not adhere to his work schedule and causes other contractors to be damaged, the Contractor causing the delay shall save the Owner and Engineer harmless from all actions and charges of the other contractors against the Owner or Engineer caused by said delay.

## **ARTICLE 5 - CONTRACT PRICE**

### **5.01 Payment**

- A. Owner shall pay Contractor in accordance with the Contract Documents and as shown on the Bid Form.
- B. Owner has included an allowance for additional work in the amount shown on the Bid. Payment for any additional work shall be on the basis of actual cost of the work as directed by the Engineer.

## **ARTICLE 6 - BONDS AND INSURANCE**

### **6.01 Bonds**

- A. Before starting Work, Contractor shall furnish a performance bond and a payment bond from surety companies that are duly licensed or authorized to issue bonds in the required amounts in the jurisdiction in which the Project is located. Each bond shall be in an amount 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 the completion of the correction period specified in Paragraph 7.12 but, in any case, not less than one year after the date when final payment becomes due.

### **6.02 Insurance**

- A. Before starting Work, Contractor shall furnish evidence of insurance from companies that are duly licensed or authorized in the jurisdiction in which the Project is located with a

minimum AM Best rating of A-VII or better. Contractor shall provide insurance in accordance with the following:

1. Contractor shall provide coverage for not less than the following amounts, or greater where required by Laws and Regulations:

- a. Workers' Compensation:

State:	Statutory
Employer's Liability:	
Bodily Injury, each Accident	\$ <u>100,000</u>
Bodily Injury By Disease, each Employee	\$ <u>100,000</u>
Bodily Injury/Disease Aggregate	\$ <u>100,000</u>

- b. Commercial General Liability:

General Aggregate	\$ <u>1,000,000</u>
Personal and Advertising Injury	\$ <u>1,000,000</u>
Each Occurrence (Bodily Injury and Property Damage)	\$ <u>1,000,000</u>

- c. Automobile Liability herein:

Combined Single Limit of:	\$ <u>1,000,000</u>
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- d. Excess or Umbrella Liability:

Per Occurrence	\$ <u>1,000,000</u>
General Aggregate	\$ <u>1,000,000</u>

- B. All insurance policies required to be purchased and maintained 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 insured and additional insured.
- C. Automobile liability insurance provided by Contractor shall provide coverage 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.
- D. Contractor's commercial general liability policy shall be written on a 1996 or later ISO commercial general liability occurrence form and include the following coverages and endorsements:
  1. Products and completed operations coverage maintained for three years after final payment;
  2. Blanket contractual liability coverage to the extent permitted by law;
  3. Broad form property damage coverage; and

4. Severability of interest; underground, explosion, and collapse coverage; personal injury coverage.
- E. The Contractor's commercial general liability and automobile liability, umbrella or excess, and pollution liability policies shall include and list Owner and Engineer and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each as 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.
  1. Additional insured endorsements will 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). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
  2. Contractor shall provide ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent for design professional additional insureds.
- F. Umbrella or excess liability insurance shall be written over the underlying employer's liability, commercial general liability, and automobile liability insurance. Subject to industry-standard exclusions, the coverage afforded shall be procured on a "follow the form" basis as to each of the underlying policies. Contractor may demonstrate to Owner that Contractor has met the combined limits of insurance (underlying policy plus applicable umbrella) specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policies and an umbrella or excess liability policy.
- G. The Contractor shall provide property insurance covering physical loss or damage during construction to structures, materials, fixtures, and equipment, including those materials, fixtures, or equipment in storage or transit.
- H. 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 15.

## **ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES**

### **7.01 Supervision and Superintendence**

- A. Contractor shall supervise 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, safety, and procedures of construction.
- B. Contractor shall assign a competent resident superintendent who is to be present at all times during the execution of the Work. This resident superintendent shall not be replaced without written notice to and approval by the Owner and Engineer except under extraordinary circumstances.
- C. Contractor shall at all times maintain good discipline and order at the Site.

- D. 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.

#### 7.02 Other Work at the Site

- A. In addition to and apart from the Work of the Contractor, other work may occur at or adjacent to the Site. 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.

#### 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 new, of good quality and 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.
- C. It shall be the obligation and responsibility of the Contractor to provide and maintain temporary electric power necessary for operations under the Contract, and to make all necessary arrangements therefor, including all required connections, ordering the meter, and paying all fees and inspection charges.
- D. The Contractor shall make the temporary electric power facilities available to any and all approved subcontractors, for their use in connection with their Contracts, and may charge each subcontractor for such service an amount not to exceed a fraction of the cost of the services, as billed by the utility, proportional to the value of the project. Removal of temporary facilities shall be by the Contractor.
- E. The permanent electrical service, or any part thereof, shall not be connected until the tests on wiring and grounding systems have been successfully completed and approved by the Engineer.
- F. Where tests on equipment require electric power for testing, such power shall be supplied through the permanent electrical service and through the permanent electrical distribution and control equipment. All power for testing will be provided by the Owner. After the completion of each test or group of tests, the permanent electric service or any part thereof, shall be disconnected, unless otherwise permitted by the Engineer.
- G. Where tests are specified on fuel-burning equipment, or where tests are specified on other equipment, and require simultaneous operation of the fuel burning equipment, all fuel for such tests will be provided by the Owner.
- H. Unless otherwise specified water of acceptable quality for testing shall be furnished by the Contractor.

- I. The Contractor shall make the temporary water service available to any and all approved subcontractors, for their reasonable use in connection with their Contracts. Removal of temporary facilities shall be the responsibility of the Contractor.
  - J. Where the public water supply is available and under the control of the Owner, it will be furnished to the Contractor, subject at all times to the control and supervision of the superintendent or manager of the water utility, and at a cost determined by the schedule or charges on file at the office of the utility. Previous to making use of any municipal water, permission in writing to use the water for any particular purpose must be obtained from the superintendent or manager.
- 7.04 Subcontractors and Suppliers
- A. Contractor may retain subcontractors and suppliers for the performance of parts of the Work. Such subcontractors and suppliers must be acceptable to Owner.
- 7.05 Quality Management
- A. Contractor is fully responsible for the managing quality to ensure Work is completed in accordance with the Contract Documents.
- 7.06 Licenses, Fees and Permits
- A. Contractor shall pay all license fees and royalties and assume all costs incident to performing 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.
  - B. Contractor shall obtain and pay for all construction permits and licenses unless otherwise provided in the Contract Documents.
- 7.07 Laws and Regulations; Taxes
- A. Contractor shall give all notices required by and shall comply with all local, state, and federal 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. 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 if Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations.
  - C. Contractor shall pay all applicable sales, consumer, use, and other similar taxes Contractor is required to pay in accordance with Laws and Regulations.
- 7.08 Record Documents
- A. Contractor shall maintain one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved shop drawings in a safe place at the Site. Contractor shall annotate them to show changes made during construction. Contractor shall deliver these record documents to Engineer upon completion of the Work.

## 7.09 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.
- B. 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.
- C. All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, or anyone for whose acts the Contractor may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Contract Documents or to the acts or omissions of Owner or Engineer and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor).
- D. 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.
- E. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor shall 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.

## 7.10 Shop Drawings, Samples, and Other Submittals

- A. Contractor shall review and coordinate the shop drawing and samples with the requirements of the Work and the Contract Documents and shall verify all related field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information.
- B. 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.
- C. With each submittal, Contractor shall give Engineer specific written notice, in a communication separate from the submittal, of any variations that the shop drawing or sample may have from the requirements of the Contract Documents.
- D. Engineer will provide timely review of shop drawings and samples.
- E. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs.

- F. Engineer's review and approval of a separate item does not indicate approval of the assembly in which the item functions.
- G. 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.
- H. Shop drawings are not Contract Documents.
- I. All discrepancies or deviations from the Contract Drawings or Specifications shall be clearly identified on the front of the shop drawing submittal.
- J. Shop drawings for all equipment requiring electrical power or control connections shall be supplied to the Engineer for approval.
- K. Drawings for electrical equipment shall show physical dimensions, installation details and shall include elementary and connection diagrams for each control assembly and the interconnection diagrams for all equipment. The drawings shall show clearly the coordination of control work, shall identify the components external to electrical equipment and shall define the contact arrangement and control action of the primary and final control elements.
- L. Where standard electrical control equipment having complex internal wiring is required, such as control panels, generator transfer panels, electric or electronic instruments and similar items, the detail shop wiring diagrams for such equipment will not be required and, if submitted, will in general not be reviewed. The submittal for each such item of equipment shall, however, include an elementary diagram of the input and output elements which require connections to external equipment and/or a complete step by step description of the control action of the equipment being submitted. This information shall include properly identified terminal numbers for the electrician to coordinate in the field. In the event that any questions shall arise as to the type of information to be presented on the submittal, the supplier shall direct inquiries to the Engineer through the Contractor in advance of the preparation of his submittal.
- M. It shall be the responsibility of the Contractor to coordinate and complete power, control, and electrical signal interconnections for all equipment included in the Project.
- N. Each drawing shall be dated and shall show the name of the Project, Contract number and the name of the manufacturer of the equipment covered by the drawing or drawings.
- O. No work covered by shop and setting drawings shall be done until the drawings have been approved by the Engineer.
- P. No approval will be given for any shop drawings until shop drawings for related items are received.
- Q. The following procedure shall be followed in the submittal and processing of shop drawings:
  - 1. The Contractor shall submit at least four copies of drawings, catalog data, and similar items for review and approval. This number includes one for return to the Contractor bearing approval or request for amendment. If the Contractor desires more than one copy returned to him, he shall submit with the initial and subsequent transmittals the

additional number desired. If the Engineer requires additional copies, he will so inform the Contractor.

2. In lieu of paper submittal the Contractor may supply a neatly formatted PDF submittal.
3. Drawings and similar data will be stamped by the Engineer as follows:
  - a. "Approved", if no change or rejection is made. All but three copies of the submitted data will be returned.
  - b. "Approved as Noted", if minor changes or additions are made, but resubmittal is not considered necessary. All but three copies of the submitted data will be returned and all copies will bear the corrective marks.
  - c. "Examined and Returned for Correction", if the changes requested are extensive or retransmittal of the submittal is required to another Contractor. In this case resubmittal after correction is necessary and the same number of copies shall be included in the resubmittal.
  - d. "Rejected", if it is considered that the data submitted cannot be reasonably revised to meet approval or when the data submitted are not sufficiently complete to establish compliance with the Drawings and Specifications.
4. Unless otherwise approved in specific cases, all data must be transmitted by the Contractor; not by subcontractors or vendors.
5. Any changes other than those indicated as requested, made in the drawings or other data, must be specifically brought to the attention of the Engineer upon resubmittal. Changes or additions shall not be made in or to approved data without re-approval by the Engineer.

#### 7.11 Warranties and Guarantees

- 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.

#### 7.12 Correction Period

- A. If within one year after the date of substantial completion, 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 and without cost to Owner, correct such defective Work.

#### 7.13 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 they may be liable.

## **ARTICLE 8 - OWNER'S RESPONSIBILITIES**

### **8.01 Owner's Responsibilities**

- A. Except as otherwise provided in the Contract Documents, Owner shall issue all communications to Contractor through Engineer.
- B. Owner shall make payments to Contractor as provided in this Contract.
- C. Owner shall provide Site and easements required to construct the Project.
- D. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, unless stated elsewhere in the Contract Documents, Owner shall have sole authority and responsibility for such coordination.
- E. The Owner shall be responsible for performing inspections and tests required by applicable codes.
- F. 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, 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.
- G. 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.
- H. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

## **ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION**

### **9.01 Engineer's Status**

- A. Engineer will be Owner's representative during construction. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in this Contract.
- B. Neither Engineer's authority or responsibility under this Article 9 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.
- C. Engineer will make visits to the Site at intervals appropriate to the various stages of construction. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work.

- D. Engineer has the authority to reject Work if Contractor fails to perform Work in accordance with the Contract Documents.
- E. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work.
- F. 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, 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.

## **ARTICLE 10 - CHANGES IN THE WORK**

### **10.01 Authority to Change 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.

### **10.02 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 the Work which are: (a) ordered by Owner or (b) agreed to by the parties or (c) resulting from the Engineer's decision, 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
  - 3. Changes in the Contract Price or Contract Times or other changes which embody the substance of any final binding results under Article 12.
- B. 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 11 - DIFFERING SUBSURFACE OR PHYSICAL CONDITIONS**

### **11.01 Differing Conditions Process**

- A. If Contractor believes that any subsurface or physical condition including but not limited to utilities or other underground facilities that are uncovered or revealed at the Site either differs materially from that shown or indicated in the Contract Documents or 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), 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. After receipt of written notice, Engineer will promptly:
  - 1. Review the subsurface or physical condition in question;
  - 2. Determine necessity for Owner obtaining additional exploration or tests with respect to the condition;
  - 3. Determine whether the condition falls within the differing site condition as stated herein;
  - 4. Obtain any pertinent cost or schedule information from Contractor;
  - 5. 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
  - 6. Advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor 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.

## **ARTICLE 12 - CLAIMS AND DISPUTE RESOLUTION**

### **12.01 Claims Process**

- A. The party submitting a claim shall deliver it directly to the other party to the Contract and the Engineer promptly (but in no event later than 10 days) after the start of the event giving rise thereto.
- B. 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. All actions taken on a claim shall be stated in writing and submitted to the other party.
- C. 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 45 days, the claim is deemed denied.
- D. If the dispute is not resolved to the satisfaction of the parties, Owner or Contractor shall give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction unless the Owner and Contractor both agree to an alternative dispute resolution process.

## **ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION OF DEFECTIVE WORK**

### **13.01 Tests and Inspections**

- A. Owner and Engineer 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.
- B. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- C. If any Work 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.

### **13.02 Defective Work**

- A. Contractor shall ensure that the Work is not defective.
- B. Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. The Contractor shall promptly correct all such defective Work.
- E. 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. 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.

## **ARTICLE 14 - PAYMENTS TO CONTRACTOR**

### **14.01 Progress Payments**

- A. The Contractor shall prepare a schedule of values that will serve as the basis for progress payments. The schedule of values will be in a form of application for payment acceptable to Engineer. The unit price breakdown submitted with the bid will be used for unit price work. Break lump sum items into units that will allow for measurement of Work in progress.

### **14.02 Applications for Payments:**

- A. Contractor shall submit an application for payment in a form acceptable to the Engineer, no more frequently than monthly, to Engineer. Applications for payment will be prepared and signed by Contractor. Contractor shall provide supporting documentation required by the Contract Documents. Payment will be paid for Work completed as of the date of the application for payment.
- B. 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.

#### 14.03 Retainage

- A. The Owner shall retain 5% of each progress payment until the Work is substantially complete.

#### 14.04 Review of Applications

- A. Within 10 days after receipt of each application for payment, the Engineer will either indicate in writing a recommendation for payment and present the application for payment to Owner or return the application for payment to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. The Contractor will make the necessary corrections and resubmit the application for payment.
- B. Engineer will recommend reductions in payment (set-offs) which, in the opinion of the Engineer, are necessary to protect Owner from loss because the Work is defective and requires correction or replacement.
- C. The Owner is entitled to impose set-offs against payment based on any claims that have been made against Owner on account of Contractor's conduct in the performance of the Work, incurred costs, losses, or damages on account of Contractor's conduct in the performance of the Work, or liquidated damages that have accrued as a result of Contractor's failure to complete the Work.

#### 14.05 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.

#### 14.06 Substantial Completion

- A. The Contractor shall notify Owner and Engineer in writing that the Work is substantially complete and request the Engineer issue a certificate of substantial completion when Contractor considers the Work ready for its intended use. 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. Engineer will make an inspection of the Work with the Owner and Contractor to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor and Owner in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete or upon resolution of all reasons for non-issuance of a certificate identified in 14.06.B, Engineer will deliver to Owner a certificate of substantial completion which shall fix the date of substantial completion and include a punch list of items to be completed or corrected before final payment.

#### 14.07 Final Inspection

- A. Upon written notice from Contractor that the entire Work 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.

#### 14.08 Final Payment

- A. Contractor may make application for final payment after Contractor has satisfactorily completed all Work defined in the Contract, including providing all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents and other documents.
- B. The final application for payment shall be accompanied (except as previously delivered) by:
  - 1. All documentation called for in the Contract Documents;
  - 2. Consent of the surety to final payment;
  - 3. 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;
  - 4. A list of all disputes that Contractor believes are unsettled; and
  - 5. 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.
- C. 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.

#### 14.09 Waiver of Claims

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor.
- 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.

### **ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION**

#### 15.01 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 60 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.

#### 15.02 Owner May Terminate for Cause

- A. Contractor's failure to perform the Work in accordance with the Contract Documents or other failure to comply with a material term of the Contract Documents will constitute a default by Contractor and justify termination for cause.
- B. If Contractor defaults in its obligations, 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. Owner may not proceed with termination of the Contract under Paragraph 15.02.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.
- D. 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.
- E. In the case of a termination for cause, if the cost to complete the Work, including related claims, costs, losses, and damages, exceeds the unpaid contract balance, Contractor shall pay the difference to Owner.

#### 15.03 Owner May Terminate for Convenience

- A. Upon seven days written notice to Contractor, 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.

#### 15.04 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) 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 provided Owner does not remedy such suspension or failure within that time, either stop the Work until payment is received, or terminate the Contract and recover payment from the Owner.

### **ARTICLE 16 - CONTRACTOR'S REPRESENTATIONS**

#### 16.01 Contractor Representations

- A. Contractor makes the following representations when entering into this Contract:
  1. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

2. Contractor has visited the Site, conducted a thorough 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.
3. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. 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:
  - a. The cost, progress, and performance of the Work;
  - b. The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and
  - c. Contractor's safety precautions and programs.
5. 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.
6. 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.
7. 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.
8. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
9. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Contract are premised upon performing and furnishing the Work required by the Contract Documents.

## **ARTICLE 17 - MISCELLANEOUS**

### **17.01 Cumulative Remedies**

- A. The duties and obligations imposed by this Contract 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.

17.02 Limitation of Damages

- A. Neither Owner, 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.

17.03 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.

17.04 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.

17.05 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.

17.06 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.

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

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

OWNER:

CONTRACTOR:

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

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

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

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

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

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

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

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

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

Address for giving notices:

Address for giving notices:

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

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

License No.: \_\_\_\_\_  
(where applicable)

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

\_\_\_\_\_  
Finance Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
City

## PERFORMANCE BOND

CONTRACTOR (name and address):

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

OWNER (name and address):

### CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (name and location):

### BOND

Bond Number:

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

Amount:

Modifications to this Bond Form:  None  See Paragraph 16

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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)

Contractor's Name and Corporate Seal

\_\_\_\_\_ (seal)

Surety's Name and Corporate Seal

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

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

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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:

## PAYMENT BOND

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

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CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):

### CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

### BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

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

### CONTRACTOR AS PRINCIPAL

### SURETY

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

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

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

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

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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

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

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

*Note: Provide execution by additional parties, such as joint venturers, if necessary.*

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
  - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - 2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
  - 4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
  - 4.2 Claimants who do not have a direct contract with Contractor:
    1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
    2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
    3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
6. Reserved.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant

under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, 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 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.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

#### 15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and 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.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – *(Name, Address, and Telephone)*

Surety Agency or Broker:

Owner's Representative *(Engineer or other)*:

**PROOF OF INSURANCE**

[Insert Insurance Certificate]

## **DIVISION 01 – GENERAL REQUIREMENTS**

### **SECTION 01 14 00 – WORK RESTRICTIONS**

#### **PART 1 - GENERAL**

##### **1.01 TRAVEL NOT TO BE OBSTRUCTED.**

- A. The Contractor shall not allow travel upon any street, park, roadway, or alley to be hindered or inconvenienced needlessly, nor shall the same be wholly obstructed without the written permission of the owner thereof in which case the Contractor shall cause plain and properly worded signs announcing such fact to be placed, with proper barricades, at the nearest cross streets, upon each side of such obstructed portion, where travel can pass around the same in the shortest and easiest way.

##### **1.02 MAINTAINING FLOW OF LINES.**

- A. The Contractor shall, at his expense, provide for and maintain the flow of all sewers, drains, house or inlet connections and all water-courses which may be met with during the progress of the work including any necessary bypass pumping. He shall not allow the contents of any sewer, drain or house inlet connection to flow into trenches, sewers, or other structures to be constructed under the Contract, and shall at his own expense, immediately remove and cart away from the vicinity of the work all offensive matter.
- B. The Contractor shall, at his own expense, provide for and maintain the flow in all water mains or laterals which may be met with during the progress of the work. When water mains or laterals are to be disturbed to the extent that the water will be shut off, the superintendent of the water utility and all parties being served by the lines involved shall be notified 72 hours in advance, giving them time and duration of the shut-off period. Any water service interruption must be scheduled and approved by the Owner.
  - 1. In the case of an accidental breaking of a water line, the repairs of such break shall have priority over all other operations. The Engineer shall be notified immediately.
  - 2. The parties whose services are affected by the break and the utility shall be notified at once and all assistance given to supply emergency water where necessary by temporary lines, tank truck, or other means.
- C. The Contractor shall have the obligation at his expense to assure that all water, gas and sewer connections serving private or public property shall be promptly and correctly restored.
- D. In cases involving fire hydrants, the fire department shall be so notified. In the case of an accidental breaking of a water line, the repairs of such break shall have priority over all other operations. The parties whose services are affected by the break shall be notified at once and all assistance given to supply emergency water where necessary by temporary lines, tank truck, or other means. The Contractor shall have the obligation at his expense to assure that all water, gas and sewer connections serving private or public property shall be promptly and correctly restored.

**1.03 PROJECT SCHEDULE.**

- A. The Contractor shall submit to the Engineer for approval a copy of a practical and feasible work schedule.
- B. The work schedule may be in the form of a critical path or bar graph. All schedules shall be updated by the Contractor on a monthly basis.
- C. Where there is more than one Contract on the Project, the Contractor shall, within ten days following the execution of his Contract with the Owner, submit six copies of his own proposed work schedule to the Engineer for approval. After approval, sufficient additional copies of the approved schedule shall be submitted to the Engineer for transmittal of two copies to each of the other contractors, who shall then prepare and submit their own work schedules for approval. The Contractor shall then incorporate these schedules into his schedule.
- D. The Contractor on each Contract shall adhere to the approved work schedule for his Contract. In the event a Contractor does not adhere to his work schedule and causes other contractors to be damaged, the Contractor causing the delay shall save the Owner and Engineer harmless from all actions and charges of the other contractors against the Owner or Engineer caused by said delay.

**PART 2 – PRODUCTS**

This section not used.

**PART 3 – EXECUTION**

This section not used.

**END OF SECTION 01 14 00**

## SECTION 01 20 00 – MEASUREMENT AND PAYMENT

### **PART 1 - GENERAL**

#### **1.01 SUMMARY.**

- A. This section covers methods of measurement and payment for items of work under the Bid Form.

#### **1.02 GENERAL.**

- A. The total bid price shall cover all work required by the Contract Documents. All costs in connection with the proper and successful completion of the work; including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plans, equipment, and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the bid prices. All work not specifically set forth as to pay item in Bid Form shall be considered subsidiary obligations of the Contractor, and all costs in connection therewith shall be included in the bid prices.
- B. The measurement and payment for Contingency Allowance shall be the Lump Sum Bid Price as listed in Bid Form. Payment for Contingency Allowance will be for additional work specifically directed in writing by Engineer. No Contingency Allowance payments shall be made for work not authorized by Engineer.

#### **1.03 ESTIMATED QUANTITIES.**

- A. All estimated quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work, and (b) for the purpose of comparing the bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefore.
- B. Except where otherwise specified, the unit or lump sum bid price for each item of work, which involves excavation, or trenching shall include all costs for such work. No direct payment shall be made for excavation or trenching unless shown elsewhere.

#### **1.04 MEASUREMENT AND PAYMENT.**

- A. Pipeline, Fittings, and Couplings (Bid Items 1 - 7)
  - 1. The measurement for payment of pipeline will be on the actual number of linear feet of pipe installed based on pipe size and joint type, measured along the centerline of the pipe.

2. The unit price bid per linear foot for the construction of the pipeline shall include all of the Contractor's cost for the complete construction of the pipeline, exclusive of items provided for elsewhere in the Bid Form.
  3. The unit price per linear foot shall include: furnishing, transporting, and installing all pipe; joints and joint materials; restrained joints at fittings; bracing, shoring, and sheeting; screenings; excavation, including exploratory excavation; construction of the specified bedding; backfilling (method of backfill and compaction as specified); protection and adjusting of aboveground and underground utilities and service connections; testing; inspection; restoration to preconstruction conditions including driveway culverts, fences, mail boxes, etc.; seeding; and all other related and necessary materials, work, and equipment required for complete construction of water line not specifically designated elsewhere in the Contract Documents.
  4. Allowable Trench Width. The allowable trench width shall be as specified on the trench details and shall not exceed 12-inch outside the pipe diameter unless specifically shown on the drawings.
  5. Pipe Materials. Allowable pipe materials shall be as shown on the Contract Drawings. Pipe thickness class shall be as shown or specified.
  6. Pipe shall be pressure tested and disinfected in accordance with the Contract Documents.
  7. The measurement for payment of fittings, plugs, couplings and valves shall be on the actual number installed on the basis of pipe size. Price shall include furnishing all materials, labor, tools, equipment, and all work including excavation and backfilling as required.
- B. Cased Crossings (Bid Items 8 - 9)
1. The measurement for payment of cased crossings including the casing pipe shall be the actual linear feet installed measured along the centerline of the pipe.
  2. Unit price shall include excavation of bore pits, furnishing and installation of casing pipe, staking bore pits, boring, jacking, and/or excavation, rock excavation and disposal, backfilling, restoring crossing to original condition, and all other items required by the Contract Documents.
- C. Manholes (Bid Items 10 - 11)
1. The measurement for payment of manholes and castings shall be the actual number installed. Price shall include all materials, labor, tools, equipment, and all work including excavation and backfilling as required.
  2. The Bid Price shall include furnishing and installing manholes, drop manholes, sealed manholes, vented manholes, air relief manholes and manholes over existing sewers as shown on the Drawings as scheduled in the Bid.

3. The measurement for payment of connection to existing systems shall be the actual number of connections. Price shall include all labor, materials, tools, equipment and all work as required to connect new sewer to an existing manhole.
- D. Site Clearing (Bid Item 12)
1. The measurement for payment for site clearing shall be on the lump sum price stated in the Bid. The lump sum price shall include furnishing all materials, labor, tools, equipment, and all work as required to clear construction limits.
  2. No additional compensation shall be made for clearing of areas larger than those specified.
- E. Erosion Control (Bid Item 13)
1. The Contractor shall include in the lump sum price for erosion control measures the cost of all materials and labor required to install, maintain, and remove all erosion control devices as specified, shown on the Contract Drawings required by the NCDENR Permit in accordance with the Sedimentation and Pollution Control Act of 1972, other applicable regulations, and DWQ'S NPDES GENERAL PERMIT TO DISCHARGE STORMWATER. This includes, but is not limited to erosion and sedimentation control practices including site preparation, seeding & surface stabilization, runoff control & conveyance measures, outlet & inlet protection, sediment traps & barriers, stream protection, construction entrances, other related practices and NPDES Stormwater minimum visual monitoring & reporting requirements (including an onsite rain gauge & log).
- F. Restoration (Bid Item 14)
1. The measurement for payment for restoration work shall be the lump sum price stated in the Bid.
  2. The lump sum bid price for restoration shall include all materials, equipment, labor and tools necessary for restoration and replacement of existing fences, gates, signs, shrubs, planters and other miscellaneous items as described in the Contract Drawings.
- G. Mobilization (Bid Item 15)
1. The lump sum bid for mobilization shall include all costs for bonds, insurance, fees, permits, establishing a field office, moving construction equipment to the site, and other necessary but "nonscheduled" work. Mobilization shall not exceed 3% of the Subtotal as shown on the Bid Schedule.
- H. Contingency Allowance (Bid Item 16)
1. The Contingency Allowance shall be the lump sum or percentage price as stated in the Bid Form.

2. Payment for Contingency Allowance will be for additional work specifically directed in writing by the Engineer through the issuance of a Contingency Work Authorization. Payments will be deducted from the Contingency Allowance.
3. No Contingency Allowance payments shall be made for work not authorized by the Engineer.

**PART 2 – PRODUCTS**

This section not used.

**PART 3 – EXECUTION**

This section not used.

**END OF SECTION 01 20 00**

## SECTION 01 33 00 – SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### **1.01 GENERAL.**

- A. The Contractor shall submit shop drawings for all equipment and materials in accordance with the provisions of the General Conditions.
- B. All discrepancies or deviations from the Contract Drawings or Specifications shall be clearly identified on the front of the shop drawing submittal.
- C. Each drawing shall be dated and shall show the name of the Project, Contract number and the name of the manufacturer of the equipment covered by the drawing or drawings.
- D. No work covered by shop and setting drawings shall be done until the drawings have been approved by the Engineer.
- E. No approval will be given for any shop drawings until shop drawings for related items are received.

#### **1.02 SHOP DRAWING APPROVAL PROCEDURE.**

- A. The following procedure shall be followed in the submittal and processing of shop drawings:
  - 1. The Contractor shall submit at least four copies of drawings, catalog data, and similar items for review and approval. This number includes one for return to the Contractor bearing approval or request for amendment. If the Contractor desires more than one copy returned to him, he shall submit with the initial and subsequent transmittals the additional number desired. If the Engineer requires additional copies, he will so inform the Contractor.
  - 2. In lieu of paper submittal the Contractor may supply a neatly formatted PDF submittal.
  - 3. Drawings and similar data will be stamped by the Engineer as follows:
    - a. "Approved", if no change or rejection is made. All but three copies of the submitted data will be returned.
    - b. "Approved as Noted", if minor changes or additions are made, but resubmittal is not considered necessary. All but three copies of the submitted data will be returned and all copies will bear the corrective marks.
    - c. "Examined and Returned for Correction", if the changes requested are extensive or retransmittal of the submittal is required to another Contractor. In this case resubmittal after correction is necessary and the same number of copies shall be included in the resubmittal.
  - 4. Unless otherwise approved in specific cases, all data must be transmitted by the Contractor; not by subcontractors or vendors.

5. Any changes other than those indicated as requested, made in the drawings or other data, must be specifically brought to the attention of the Engineer upon resubmittal. Changes or additions shall not be made in or to approved data without re-approval by the Engineer.

**PART 2 – PRODUCTS**

This section not used.

**PART 3 – EXECUTION**

This section not used.

**END OF SECTION 01 33 00**

**SECTION 01 57 13 – GROUND STABILIZATION AND MATERIALS HANDLING**

**PART 1 – GENERAL**

**1.01 GENERAL.**

- A. The Contractor shall take whatever measures necessary to minimize soil erosion and siltation caused by his operations. He shall keep fully informed of all such regulations which in any way affect the conduct of the work, and shall at all times observe and comply with all such regulations.
- B. The North Carolina Sedimentation Pollution Control Act of 1973 requires that all visible sediment be contained within the boundaries of a construction site. The Contractor shall exercise every reasonable precaution, throughout the life of the project, to contain all siltation within the construction site and to prevent the eroding of soil and the silting of streams, lakes, reservoirs, other water impoundments, ground or roadway surfaces or other property. The erosion/siltation control measures for this project, as stated in these specifications and shown on the Drawings, have been approved by the North Carolina Department of Environmental Quality (NCDEQ), Division of Energy, Mineral and Land Resources. Details referenced herein are the required minimum details prescribed by the State. This project is subject to periodic inspection by the Department during construction.
- C. The ground stabilization, and materials handling measures defined herein and shown on the Drawings are in accordance with General Permit No. NCG01. The Contractor shall comply with the applicable details and specifications in order to maintain compliance with the General Permit.
- D. The measures defined herein and approved by NCDEQ do not include offsite borrow or spoil areas. The use of offsite borrow or spoil areas will require proper documentation by the Contractor that all applicable regulations are being satisfied.

**1.02 GROUND STABILIZATION.**

- A. The erosion and siltation control measures shown on the plans or required by field conditions at the time of construction shall be installed before any land disturbing activity in the drainage area within which they are located. They shall be maintained in proper working order until permanent ground cover is re-established. Permanent ground cover shall be established within the number of calendar days after ceasing land disturbing activities as specified below:

<b>Site Area Description</b>	<b>Calendar Days</b>	<b>Timeframe Variations</b>
Perimeter dikes, swales, ditches, and perimeter slopes	7	None
High Quality Water (HQW) Zones	7	None

Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes & HQW Zones -10 days for Falls Lake Watershed
Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes & HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

- B. Ground cover will consist of seeding, mulching and fertilizing as specified. Particular attention will be given to prompt establishment of temporary ground cover along cut and fill slopes. The Contractor will be required to follow the land disturbing activities (as closely as practical) with his site restoration, fertilizing, seeding, and mulching.
- C. After the permanent completion of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

**1.03 TEMPORARY GROUND COVER.**

- A. If land disturbing activities are completed such that permanent seeding will be delayed or vegetative cover is needed for less than one year, temporary ground cover shall be established. If temporary ground cover is required between January 1 and May 1, the cover shall be established with a seed mixture of Rye Grain applied at a rate of 120 lbs per acre and Kobe Lespedeza applied at a rate of 50 lbs per acre. If temporary ground cover is required between May 1 and August 15, the cover shall be established with a seed mixture of German Millet applied at a rate of 40 lbs per acre. If temporary ground cover is required between August 15 and December 30, the cover shall be established with a seed mixture of Rye Grain applied at a rate of 120 lbs per acre. All seeding shall be as specified.
- B. Lime, fertilizer, and mulching shall be provided as specified. Mulch shall be anchored by crimping using a mulch anchor tool or by application of a liquid mulch binder.

**1.04 BUFFER ZONE.**

- A. When practical, the Contractor shall leave intact a natural buffer zone between construction and the natural watercourse. This zone shall contain sufficient vegetative cover to be adjudged capable of retarding and confining visible siltation. Should the proximity of construction not allow an adequate natural buffer zone, the Contractor shall erect and maintain erosion and siltation control devices as necessary to prevent silt from escaping the site in the event of rainfall prior to backfill and restoration.

- B. Buffer zones shall be in compliance with the North Carolina Sedimentation Pollution Control Act of 1973 and General Permit No. NCG01.

## **PART 2 – PRODUCTS**

### **2.01 POLYACRYLAMIDES (PAMS) AND FLOCCULANTS.**

- A. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
- B. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
- C. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary contaminant structures.

### **2.02 SEDIMENT FENCES.**

- A. Sediment Fences (Silt Check Fence) shall be constructed where shown on the plans. Construction shall conform to Erosion Control Detail 6.62.
- B. Synthetic filter fabric shall be Mirafi, Inc., Phillips Petroleum Company, or equal. Posts shall be 4-inch pine, 2-inch oak, or 1.33 pound per foot steel. Post spacing shall be maximum 8 feet on center with wire mesh fabric support, or may be 6 feet on center with extra strength filter fabric.
- C. Inspect silt fences weekly and after each rainfall event 1.0 inch and greater. Remove sediment as needed to maintain adequate storage. If silt fence becomes damaged or collapses, replace immediately. Silt fence shall be removed after drainage area has been stabilized. Any maintenance or replacement of silt fence shall be properly documented with an Inspection Report.

### **2.03 MATTING.**

- A. All disturbed ditches shall be lined with excelsior matting per the manufacturer's recommendations. Matting for erosion control shall not be dyed, bleached or otherwise treated in a manner that will result in toxicity to vegetation. Other acceptable material manufactured especially for erosion control may be used when approved by the Engineer in writing before being used.
- B. Excelsior matting shall consist of a machine produced mat of curled wood excelsior at least 47" in width and weigh 0.975 lb/sy with a tolerance of  $\pm 10\%$ . At least 80% of the individual excelsior fibers shall be 6" or more in length. Evenly distribute the excelsior fibers over the entire area of the blanket. Cover one side of the excelsior matting with an extruded plastic mesh. The mesh size for the plastic mesh shall be no more than 1" x 1".
- C. Matting shall be held down with machine made staples of No. 11 gauge new steel wire formed into a U-shape. The size when formed shall be not less than 6" in length with a throat of not less than 1" in width.

## **2.04 WATTLE.**

- A. Wattles (straw logs) are tubular products consisting of straw materials encased in synthetic netting. Wattles shall be constructed where shown on the plans and where required along the roadside drainage ditches. Wattles shall be 12-inch diameter made of biodegradable fibers. Wattles shall be anchored utilizing hardwood stakes a minimum 2-feet long with a 2-inch x 2-inch square cross section. A minimum of four stakes shall be installed on the downstream side with no more than 2-inches exposed. Wattles shall also be secured to the soil by wire staples every 12-inches and at the end of each section.
- B. Inspect wattles weekly and after each rainfall event 1.0 inch and greater. Clean out sediment and other debris to prevent damage to channel vegetation. The wattle shall be replaced if clogged or worn.

## **PART 3 – EXECUTION**

### **3.01 EQUIPMENT AND VEHICLE MAINTENANCE.**

- A. Maintain vehicles and equipment to prevent discharge of fluids.
- B. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- C. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- D. Remove leaking vehicles and construction equipment from service until the problem has been corrected.

### **3.02 LITTER, BUILDING MATERIAL, AND LAND CLEARING WASTE.**

- A. The Contractor shall never bury or burn waste. Place litter and debris in approved waste containers.
- B. The Contractor shall provide a sufficient number and size of waste containers (e.g. dumpsters, trash receptable) on site to contain construction and domestic wastes.
- C. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- D. Waste shall be disposed of off-site at an approved disposal facility.

### **3.03 PAINT AND OTHER LIQUID WASTE.**

- A. Contractor shall not dump paint and other liquid waste into storm drains, streams or wetlands.
- B. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- C. Contractor shall prevent the discharge of soaps, solvents, detergents, and other liquid wastes from construction sites.

**3.04 EARTHEN STOCKPILE MANAGEMENT.**

- A. Stockpiles shall be located only as shown on the Contract Drawings. Stockpile areas shall not be placed within 50 feet of storm drain inlets, sediment basins, perimeter sediment controls and surface waters.

**3.05 CONCRETE WASHOUTS.**

- A. Contractor shall not discharge concrete or cement slurry from the site.
- B. Dispose of, or recycle, settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- C. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- D. Following completion of concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

**3.06 HERBICIDES, PESTICIDES, AND RODENTICIDES.**

- A. Herbicides, pesticides, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act and label restrictions.
- B. Contractor shall store herbicides, pesticides, and rodenticides in their original containers with the label, which lists directions for use, ingredients, and first aid steps in case of accidental poisoning.

**3.07 HAZARDOUS AND TOXIC WASTES.**

- A. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules established by 15A NCAC, Subchapter 13A.
- B. Contractor shall create a designated hazardous waste collection area on-site as applicable.

**3.08 DRAWDOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSEOUT.**

- A. Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is feasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (e.g. times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:
  - 1. The Erosion and Sediment Control plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or

conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items.

2. The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of General Permit NCG01.
3. Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems.
4. Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in Item 3 above.
5. Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices.
6. Sediment removed from the dewatering treatment devices described in Item 3 above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

### **3.09 CONSTRUCTION SEQUENCE.**

- A. Install erosion control measures in advance of land disturbing activities.
- B. Construct facilities.
- C. Maintenance of erosion control devices is the Contractor's responsibility. Erosion control measures shall be inspected weekly and after each rain event. The devices shall be inspected for damage and repairs shall be completed immediately.
- D. Reseed, mulch, and stabilize disturbed areas where applicable following equipment installation.
- E. Maintain all erosion control measures. After project area is stabilized, remove erosion control devices.

### **3.10 SELF-INSPECTIONS.**

- A. The Contractor shall perform self-inspections as required during normal business hours in accordance with the table below. When adverse weather or site conditions would hinder the safety of the inspection personnel, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0-inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency	Inspection Record Includes
Rain gauge maintained in good working order	Daily	Daily rainfall amount. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero". The permittee may use another rain-monitoring device approved by the Division.
E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	<ol style="list-style-type: none"> <li>1. Identification of the measures inspected.</li> <li>2. Date and time of the inspection.</li> <li>3. Name of the person performing the inspection.</li> <li>4. Indication of whether the measures were operating properly.</li> <li>5. Description of maintenance needs for the measure.</li> <li>6. Description, evidence, and date of corrective actions taken.</li> </ol>
Stormwater discharge outfalls (SDCs)	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	<ol style="list-style-type: none"> <li>1. Identification of the discharge outfalls inspected.</li> <li>2. Date and time of the inspection.</li> <li>3. Name of the person performing the inspection.</li> <li>4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration.</li> <li>5. Indication of visible sediment leaving the site.</li> <li>6. Description, evidence, and date of corrective actions taken.</li> </ol>
Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	<p>If visible sedimentation is found outside the site limits, then a record of the following shall be made:</p> <ol style="list-style-type: none"> <li>1. Actions taken to clean up or stabilize the sediment that has left the site limits.</li> <li>2. Description, evidence, and date of corrective actions taken.</li> <li>3. An explanation as to the actions taken to control future releases.</li> </ol>
Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	<p>If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made:</p> <ol style="list-style-type: none"> <li>1. Description, evidence, and date of corrective actions taken</li> </ol>

		2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit.
Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land disturbing activity, construction of redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

\*Note: The rain inspection resets the 7 calendar day inspection requirement.

### 3.11 RECORDKEEPING.

- A. The approved E&SC plan as well as any approved deviation shall be kept on-site at all times. The approved plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on-site and available for inspection at all times during normal business hours:

Item to Document	Documentation Requirements
Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date, and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date, and sign an inspection report.
Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

- B. In addition to the E&SC plan documents above, the Contract shall keep the following items on site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:
  - 1. A copy of the approved General Permit NCG01 as well as the Certificate of Coverage.
  - 2. Records of inspections made during the previous twelve months. The Contractor shall record the required observations on the Inspection Record Form included in this Contract. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.
- C. All inspection records for the project shall be given to the Owner after completion of the project.

### **3.12 REPORTING.**

- A. The Contractor shall inform the Owner or Engineer of the following as soon as practical:
  - 1. Visible sediment deposited in a stream or wetland.
  - 2. Oil spills if:
    - a. They are 25 gallons or more
    - b. They are less than 25 gallons but cannot be cleaned up within 24 hours
    - c. They cause sheen on surface waters (regardless of volume)
    - d. They are within 100 feet of surface waters (regardless of volume)
  - 3. Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act or Section 102 of CERCLA or G.S. 143-215.85.
  - 4. Anticipated bypasses and unanticipated bypasses.
  - 5. Noncompliance with the conditions of General Permit NCG01 that may endanger health or the environment.

### **3.13 ADDITIONAL CONTRACTOR RESPONSIBILITY.**

- A. Borrow and/or spoil areas either at the project site or at other locations shall be subject to all erosion control requirements contained herein. Excavated soils shall be piled in such a manner to prevent eroding or otherwise washing.
- B. The Contractor shall periodically check all erosion control devices in place to determine the need for cleaning or otherwise removing silt build-up to restore them to their original condition. Silt build-up shall be periodically removed as needed. Erosion control measures shall be maintained in good order throughout the project and until their removal is directed.

The Contractor, upon completion of this project, shall leave intact those temporary erosion control devices deemed necessary by the Engineer for future protection.

- C. These requirements are not meant to be all inclusive, but rather to make the Contractor aware of minimum requirements. Failure of the Contractor to comply with any of the preceding requirements will result in the Contractor receiving formal notification to initiate such measures. If compliance is not forthcoming within 48 hours of receipt of same, the Engineer will suspend work pursuant to the North Carolina Sedimentation Pollution Control Act.

**END OF SECTION 01 57 13**

## DIVISION 31 – EARTHWORK

### SECTION 31 01 00 – MAINTENANCE OF EARTHWORK

#### PART 1 – GENERAL

##### 1.01 GENERAL.

- A. Earthwork shall include the loosening and removing, transporting, storage, backfilling, and all handling of material of either natural soils, deposited soils, rock or boulder for the construction and completion of all work under this Contract.

##### 1.02 ASSOCIATED DEFINITIONS.

- A. EARTH includes all materials such as sand, gravel, clay, loam, muck, soft or disintegrated rock, not requiring blasting, barring or wedging from their original beds, and specifically excludes all ledge or bedrock, and individual boulders or masonry larger than one-half cubic yard in volume.
- A. SUBGRADE is earth material on which structures or other materials are to be placed.
- B. BACKFILL includes selected materials for the backfilling of all excavations and trenches up to the original surface of the ground or to other grades as may be shown or directed.
- C. SPOIL includes surplus excavated materials not required or suitable for backfills or embankments.
- D. EMBANKMENTS include fills constructed of selected materials above the original surface of the ground.
- E. ROCK includes all pieces of ledge or bedrock, boulders, or masonry larger than one-half cubic yard in volume requiring blasting for removal.
- F. The term EXCAVATION where used, shall be deemed and understood to cover the following described work:
  - 1. Grubbing, removing, storing, and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to construction and completion of all the work under Contract;
  - 2. All sheeting, sheetpiling, bracing and shoring, and the placing, driving, cutting off and removing the same;
  - 3. All diking, ditching, fluming, cofferdamming, pumping, bailing, and draining or otherwise disposing of water;
  - 4. The refilling of trenches and pits and the furnishing and placing of material over trenches and pits to the line of filling indicated on the Contract Drawings or directed;
  - 5. The compacting of all materials used in filling or refilling by rolling, ramming, water, puddling, as may be required;

6. The removing and disposing of all surplus materials from the excavations in the manner specified;
7. The maintenance, accommodation and protection of travel;
8. The supporting and protecting of all tracks, rails, buildings, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, shrubbery, pipes, sewers, conduits, or other structures or property in the vicinity of the work, whether over or underground or which appear within the excavations, and the restoration of the same in case of settlement or other injury;
9. All temporary bridging and fencing and the removing of same, the temporary paving of highways, roads, driveways, and the permanent repairing or replacing and relaying of pavements, curbs, gutters, and sidewalks removed, disturbed, or injured, the removing and cleaning away of all construction rubbish, refuse, unused materials, plant, and tools from the site of the work;
10. The dressing, sodding or seeding of all unpaved areas as may be necessary to leave the surface in as good condition as it was previous to the commencement of the work.

## **PART 2 – PRODUCTS**

This section not used.

## **PART 3 – EXECUTION**

### **3.01 EXCAVATION.**

- A. Excavations shall be of sufficient size, and only of sufficient size, to give suitable room for the proper construction of structures and appurtenances, including allowances for sheeting, dewatering, and other similar work necessary for completion of the Contract.
- B. Excavations for structures shall be made only to the lines and grades shown on the Contract Drawings, specified, or directed.
- C. In no case will undercutting excavation faces for extended footings be permitted. Not less than 12-inches clearance shall be provided between excavation faces and exterior wall surfaces. Adequate clearance shall be provided for placement and compaction of backfill material.
- D. Where necessary, a layer of Class "D" concrete of sufficient thickness to withstand subsequent construction operations shall be installed below the specified subgrade elevation and the structure concrete deposited thereon. Subject to the approval of the Engineer, granular materials may be used for subsoil reinforcement if satisfactory results can be obtained thereby. Such material shall be applied in layers, each layer being entirely embedded in the subsoil by thorough tamping. All excess soil shall be removed to compensate for the displacement of the gravel or crushed stone and the finished elevation of any subsoil reinforced in this manner shall not be above the specified subgrade.
- E. The trenches in which pipelines are to be constructed, shall be excavated in all cases in such manner and to such depths and widths as will give suitable room for the pipelines which the

trenches are to contain for sheeting, pumping, and draining, and for removing the material not suitable for pipe subgrade.

- F. Trenches for pipes shall be not less than 6-inches wider than the pipe on each side. Width of trenches, measured 18-inches above the top of the pipe shall not exceed 12-inches on each side, except sheeted trenches wherein this width shall not exceed 24-inches.
- G. Where, for any reason, the width of the lower portion of the trench, measured at 18-inches above the top of the pipe, exceeds the maximum width, additional concrete cradle or concrete encasement, as required by loading conditions shall be furnished and installed by the Contractor at his own expense.
- H. Under ordinary conditions, excavation shall be open cut. Where the depth of the trench and soil conditions permit, tunneling may be required beneath crosswalks, curbs, gutters, pavements, trees, concrete driveways, roadways, railroad tracks and other surface structures. No additional compensation will be allowed for such tunneling over the price bid for open cut excavation of equivalent depths below the ground surface unless such tunnel excavation is specifically provided for in the Bid.
- I. Trenches shall not be opened for more than 100 feet or NCDOT limit in advance of the completed pipe or sewer nor left unfilled for more than 100 feet in the rear thereof without consent of the Engineer. Excavation of the trench shall be fully completed at least 20 feet in advance of the pipe laying or construction of the invert unless specifically permitted otherwise.

### **3.02 EXCAVATION BELOW SUBGRADE.**

- A. In case the materials encountered at the limiting subgrades are not suitable for proper support of structures, the Contractor shall excavate from the limiting subgrades shown or specified, to such new lines and grades, as will be ordered by the Engineer. Excavation below subgrade shall be done only upon express orders of the Engineer. Unless otherwise shown or specified, the limiting subgrade for structures shall be the underside of structures at the footing lines.
- B. The additional space excavated below the subgrade shall be refilled with granular materials, Class "D" concrete or with other materials as the Engineer may direct.
- C. Excavation below subgrade and the special backfill materials so ordered, will be paid for under appropriate items of the Contract.

### **3.03 EMBANKMENT.**

- A. Embankments shall be constructed to establish lines and grades at the locations shown on the Contract Drawings and as directed by the Engineer. Embankment materials shall be natural soil free from excessive moisture, frost, stumps, trees, roots, sod, muck, marl, vegetable matter or other unsuitable materials. Embankment material shall be obtained from acceptable materials on the site or from approved borrow pits and shall be well graded from fine to coarse with a minimum content of silt. All materials shall be suitable for compaction in layers not exceeding 8-inches in thickness and shall remain stable when wet.

- B. The entire surface to be covered with embankment shall be stripped of all grass, vegetation, topsoil, rubbish, or other unsuitable materials before any embankment material is placed.
- C. In general, embankment materials shall be placed in horizontal layers not exceeding 8-inches in thickness, measured after compaction, and shall be thoroughly compacted. Stones, if any, shall not exceed 6-inches in greatest dimension and shall be well distributed throughout the mass. Where embankments are to be constructed across ground which will not support the weight of the construction equipment, the fill shall be constructed by placing successive loads of granular material in uniform layers until a satisfactory bearing is obtained. In areas upon which structures are to be built, the embankment materials shall be placed in layers not exceeding 6-inches in thickness, measured after compaction. All embankments shall be subject to Density Control.

### **3.04 UNAUTHORIZED EXCAVATION.**

- A. Whenever excavations are carried beyond or below the lines and grades shown on the Contract Drawings, or as given or directed by the Engineer, all such excavated space shall be refilled with granular material, concrete or other materials as the Engineer may direct. All material which slides, falls or caves into the established limits of excavations due to any cause whatsoever, shall be removed and disposed of at the Contractor's expense. Owner shall not incur any cost associated with over excavation or backfill of excavation.
- B. No extra compensation will be paid the Contractor for any materials ordered for refilling the void areas left by a slide, fall, cave-in, or any other unauthorized excavation.

### **3.05 REMOVAL OF WATER.**

- A. The Contractor shall at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the prosecution of the work or the proper placing of pipelines, masonry, or other work.
- B. Removal of water includes the construction and removal of cofferdams, sheeting and bracing, the furnishing of materials and labor necessary therefor, excavation and maintenance of ditches and sluice-ways and the furnishing and operation of pumps, wellpoints, and appliances needed to maintain thorough drainage of the work in a satisfactory manner.
- C. Water shall not be allowed to rise over or come in contact with any masonry, concrete or mortar, until at least 24 hours after placement, and no stream of water shall be allowed to flow over such work until such time as the Engineer may permit.
- D. Unless otherwise specified all excavations for structures and pipelines which extend to or below the static ground water elevations shall be dewatered by lowering and maintaining the ground water to an elevation at least two feet below the excavation subgrade. All cost for installing, operating and removing pumping systems and wellpoints shall be the responsibility of the Contractor.
- E. Where the presence of fine grained subsurface materials and a high ground watertable may cause the upward flow of water into the excavation with a resulting quick condition, the

Contractor shall install and operate a wellpoint system to prevent the upward flow of water during construction.

- F. Where wellpoints are used, the ground water shall be lowered and maintained continuously (day and night) at a level not less than two feet below the bottom of the excavation. Excavation shall not be permitted at a level lower than two feet above the water level as indicated by the observation wells.
- G. The effluent pumped from the wellpoints shall be examined periodically by qualified personnel to determine if the system is operating satisfactorily without the removal of fines.
- H. The water level shall not be permitted to rise until construction in the immediate area is completed and the excavation is backfilled to the original grade.
- I. Wellpoint headers points, and other pertinent equipment shall not be placed within the limits of the excavations in such manner or location as to interfere with the laying of pipe or trenching operations or with the excavation for and construction of other structures. Stand-by gasoline or diesel powered equipment shall be provided so that in the event of failure of the operating equipment, the stand-by equipment can be readily connected to the system. The stand-by equipment shall be maintained in good order and actuated regularly not less than twice a week when directed.
- J. Wellpoints shall be installed in the center of a sand wick drain which shall be placed by means of a sanding shell or other approved means to provide a sand core not less than 10-inches in diameter.
- K. Detached observation wells of similar construction to the wellpoints shall be installed at intervals of not less than 50 feet along the opposite side of the trench from the header pipe and line of wellpoints, to a depth of at least 5 feet below the proposed excavation. In addition, one wellpoint in every 50 feet shall be fitted with a tee, plug, and valve so that the wellpoint can be converted for use as an observation well. Observation wells shall be not less than 1-1/2-inches in diameter.
- L. Water pumped or drained from excavations, or any sewers, drains or water courses encountered in the work shall be disposed of in a suitable manner without injury to adjacent property, the work under construction, or to pavements, roads, and drives. No water shall be discharged to sanitary sewers. Sanitary sewage shall be pumped to sanitary sewers or shall be disposed of by an approved method.
- M. Any damage caused by improper handling of water shall be repaired by the Contractor at his own expense.

### **3.06 STORAGE OF MATERIAL.**

- A. Any sod cut during excavation shall be removed and stored during construction so as to preserve the grass growth, and shall be replaced in position upon completion of the work.
- B. Topsoil suitable for final grading shall be removed and stored on the site separately from other excavated material.

- C. All excavated material shall be piled in a manner that will not endanger the work. Excavated material will be piled a safe distance away from the edge of the excavation allowing room for an adequate angle of repose and if shoring, sheeting, and bracing is used to protect the excavation, no material will be piled within three (3) feet of the nearest edge. Sidewalks, driveways, hydrants, valve pit covers, valve boxes, curb stop boxes, existing manholes, fire and police call boxes, or other utility controls shall be unobstructed and accessible until the work is completed. Gutters, catch basins, and natural watercourses shall not be obstructed or silted.
- D. When working in close proximity with a creek channel or natural watercourse the Contractor shall pile all excavated material on the side of his excavation away from the watercourse.

### **3.07 SHEETING AND BRACING.**

- A. The Contractor shall furnish, place and maintain such sheeting, bracing, and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, injure the pipe, sewers, masonry, or other work, or endanger existing structures, pipes or pavements; cause the excavation limits to exceed the rights-of-way limits; or to occasion a hazard to persons engaged on the project or the general public.
- B. In no case will bracing be permitted against pipes or structures in trenches or other excavations. All timber sheeting and bracing shall be sound and straight, free from cracks, shakes, and large or loose knots, with dressed edges where directed, and shall otherwise conform with National Design Specifications for Stress Grade Lumber for lumber of a minimum fiber stress of 1,200 pounds per square inch.
- C. Steel sheeting and bracing shall be sound and shall conform with ASTM A328, with a minimum thickness of 3/8-inch. The Contractor shall be solely responsible for the adequacy of all sheeting and bracing.
- D. Sheeting shall be driven as the excavation progresses, and in such manner as to maintain pressure against the original ground at all times. The sheeting shall be driven vertical with edges tight together, and all bracing shall be of such design and strength as to maintain the sheeting in its proper position.
- E. In general, all sheeting and bracing, whether of steel, timber or other material, used to support the sides of trenches or other open excavations, shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a pipe or sewer shall be withdrawn, unless directed, before more than 6-inches of earth is placed above the top of the pipe or sewer and before any bracing is removed. The voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose, or otherwise as may be approved.
- F. If, to serve any purpose of his own, the Contractor files a written request for permission to leave sheeting or bracing in the trench or excavation, the Engineer may grant such permission, in writing, on condition that the cost of such sheeting and bracing be assumed and paid by the Contractor. All such conditions shall be subject to any and all NCDOT requirements.

- G. The Contractor shall leave in place all sheeting, shoring, and bracing which are shown on the Drawings, or specified to be left in place or which the Engineer may order in writing to be left in place. All shoring, sheeting and bracing shown or ordered to be left in place will be paid for under the appropriate items of the Contract. No payment allowance will be made for wasted ends or for portions above the proposed cut-off level which are driven down instead of cut-off.
- H. In case sheeting is left in place, it shall be cut-off or driven down as directed so that no portion of the same shall remain within 12-inches of the finished street or ground surface.

### **3.08 BACKFILLING.**

- A. Backfill around structures may be placed by machine, provided the work shall be done carefully to prevent damage to the structure. In no case shall backfill materials be allowed to fall directly on a structure until at least 12-inches of hand placed material has been placed thereon and compacted.
- B. Backfill around structures shall be deposited in horizontal layers not more than one foot in thickness and shall be compacted to prevent settlement.
- C. All excavations shall be backfilled to the original surface of the ground or to such other grades as may be shown, specified or directed. Backfilling shall be done with suitable excavated materials, approved by the Engineer, which can be satisfactorily compacted during refilling of the excavation. In the event the excavated materials are not suitable, special backfill obtained from approved borrow pits shall be used for backfilling. Frozen earth shall not be used for backfilling.
- D. Backfilling shall be subject to Density Control.

### **3.09 DENSITY CONTROL.**

- A. All earthwork specified for Density Control shall have a minimum dry density of 95 percent of the maximum dry weight density in pounds per cubic foot as determined by the Standard Proctor Compaction Test.
- B. Compaction curves shall be developed for each type of soil proposed for use. The development of the curves from the standard density or compaction test shall be done by an approved testing laboratory at the Contractor's expense.
- C. Field control samples shall be taken as required during construction. Such samples shall be tested by an approved laboratory at the Contractor's expense. If the soil is suitable, in the opinion of the Engineer, Proctor needle tests may be substituted for the field control samples. In such event, the development of the compaction curves shall include a calibration for the needle test, and the Contractor shall furnish a needle and suitable needle points for field use.
- D. For embankments, one test will be taken for approximately every 500 cubic yards of material placed unless field conditions dictate that additional tests are required.

- E. Each layer of material shall be thoroughly tamped or rolled to the required degree of compaction by sheepfoot or pneumatic rollers, mechanical tampers, or vibrators, unless a satisfactory compaction is obtained by the travel of trucks and earth moving machines. Successive layers shall not be placed until the layer under construction has been thoroughly compacted.
- F. Trucks or other heavy equipment shall not be operated over pipelines until a minimum of 24-inches of backfill above the crown of the pipe has been placed and properly compacted by tampers or other approved methods.
- G. Operation of any construction equipment over the pipe, regardless of the depth of backfill should be done with care and at the Contractor's risk.
- H. Where required, the Contractor shall, at his own expense, add sufficient water during rolling and tamping to assure complete consolidation of the fill material. If, due to a rain or other causes, the material is too wet for satisfactory compaction, it shall be allowed to dry as required, before compaction.

### **3.10 HAULING MATERIAL ON STREETS.**

- A. When it is necessary to haul material over the streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles the Contractor shall clean up as often as directed and keep the crosswalks, streets and pavements clean and free from dirt, mud, stone, and other hauled material.

### **3.11 ROADWAYS.**

- A. Fill sections of roadways shall be constructed in accordance with applicable provision of Paragraph 3.04, "Embankment".
- B. In cut sections, the subgrade shall be properly shaped and compacted to the minimum dry density for a depth of 6-inches before any base course or surface course of pavement is placed thereon.
- C. When any portion of the subgrade is constructed in a location that conforms to or approximately with, the elevation of the subgrade, the existing surface shall be plowed and manipulated in order that the subgrade when compacted will have a uniform density.
- D. Ditches and drains shall be provided and maintained to satisfactorily drain the subgrade. In no case shall any base course or surface course of pavement be placed on frozen or muddy subgrade.

### **3.12 SPOIL.**

- A. In general, all spoil material shall be placed on the site. Should either the quantity or the composition of the spoil material dictate that it be removed from the site, the Contractor shall obtain a place to accommodate it. Prior to removing the spoil to another area, the Contractor shall transmit to the Engineer, with a copy to the property owner, a signed statement that suitable arrangements have been made with the property owner for placing

the spoil and that neither the Owner nor the Engineer shall be held liable for noncompliance with the arrangement.

- B. The surface of all spoil placed on the site shall be graded and dressed. No unsightly mounds or heaps shall be left on completion of the work. After grading all spoil areas shall be landscaped and seeded in accordance with the Contract Documents.

**END OF SECTION 31 01 00**

## **SECTION 31 05 16 – AGGREGATES FOR EARTHWORK**

### **PART 1 – GENERAL**

#### **1.01 GENERAL.**

- A. This section includes crushed stone aggregates for earthwork.

### **PART 2 – PRODUCTS**

#### **2.01 GENERAL.**

- A. Granular materials shall consist of clean, sound, hard stone free from coatings and shall fully comply with the Standard Specifications for Roads and Structures of the North Carolina Department of Transportation. Gradation shall be in accordance with Table 1005-1 & 2 of Section 1005 NC DOT Standard Specifications. The size used shall be as noted on the Contract Drawings or elsewhere in these Specifications.

### **PART 3 – EXECUTION**

#### **3.01 PLACING.**

- A. Granular materials shall be placed in horizontal layers, not more than 6-inches in thickness, in a manner to prevent segregation. Each layer shall be thoroughly compacted to prevent settlement.
- B. Any settlement in finished work due to settlement of the compacted granular materials shall be made good by the Contractor at his own expense.

### **END OF SECTION 31 05 16**

## **SECTION 31 10 00 – SITE CLEARING**

### **PART 1 – GENERAL**

#### **1.01 GENERAL.**

- A. This section shall include clearing of sites, rights-of-way, and easements.
- B. Unless otherwise directed, clearing of sites shall consist of removing all underbrush, but only those trees which will interfere with construction. Any tree which will not, in the opinion of the Engineer, hinder construction or landscaping shall be protected by stakes placed in a circle having a radius of not less than five feet as measured from the base of the trunk around the tree. Landscaping within the circle shall be accomplished by hand tools unless otherwise permitted by the Engineer.
- C. On pipelines the permanent right-of-way shall be cleared of all obstructions prior to the delivery of the pipe materials in the area. No clearing shall be done on the temporary easements unless necessary for the execution of the work and only by permission of the Engineer. The cost of clearing permitted in the temporary right-of-way shall be done at the Contractor's expense and no payments will be made therefor.
- D. The Contractor shall take such precautions as necessary to protect livestock and shall maintain such barriers as are required for this protection. The Contractor shall be solely liable for the death of any livestock due to his construction operations.

### **PART 2 – PRODUCTS**

This section not used.

### **PART 3 – EXECUTION**

#### **3.01 REMOVAL OF DEBRIS.**

- A. Debris shall not be burned unless written permission or permit is issued by the Fire Marshal having jurisdiction in the area. A copy of this permit shall be submitted to the Engineer prior to beginning any burning operation. The Contractor shall adhere to all limitations and conditions set forth in the permit.
- B. If burning is not permitted, all brush and trees shall be removed from the area and disposed of by the Contractor in an approved manner. Trees and brush other than Wild Cherry may be mulched with an approved mulching machine and the residue distributed over the permanent right-of-way.

### **END OF SECTION 31 10 00**

## **DIVISION 32 – EXTERIOR IMPROVEMENTS**

### **SECTION 32 92 00 – TURF AND GRASSES**

#### **PART 1 – GENERAL**

##### **1.01 GENERAL.**

- A. Landscaping shall include rough and fine grading, topsoil if required, fertilizer, lime, seeding and mulching.

#### **PART 2 – PRODUCTS**

##### **2.01 FERTILIZER.**

- A. 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 Department of Agriculture.
- B. 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.

##### **2.02 LIME.**

- A. The quality of lime and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Lime Law and regulations adopted by the North Carolina Department of Agriculture.
- B. During the handling and storing, the lime shall be cared for in such a manner that it will be protected against hardening and caking. Any hardened or caked lime shall be pulverized to its original condition before being used.
- C. Lime shall be agriculture grade ground dolomitic limestone. It shall contain not less than 85 percent of the calcium and magnesium carbonates and shall be of such fineness that at least 90 percent will pass a Number 10 sieve and at least 50 percent will pass a Number 100 sieve.

##### **2.03 SEED.**

- A. The quality of seed and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Seed Law and regulations adopted by the North Carolina Department of Agriculture.
- B. All seeding activities shall include permanent seed for primary stabilization and temporary seed for immediate ground stabilization.
- C. 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 eight 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. 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 application

sufficiently to obtain the minimum pure live seed content specified, provided that such an increase in the rate of application does not cause the quantity of noxious weed seed per acre or square yard, as the case may be, to exceed the quantity that would be allowable at the regular rate of application.

- D. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents, or other causes.
- E. Seed shall be entirely free from bulblets or seed of Johnson Grass, Nutgrass, Sandbur, Wild Onion, Wild Garlic, and Bermuda Grass. The specifications for restricted noxious weed seed refers to the number per pound, singularly or collectively, of Blessed Thistle, Wild Radish, Canada Thistle, Corncockle, Field Bindweed, Quackgrass, Dodders, Dock, Horsenettle, Bracted Plantain, Buckhorn, or Wild Mustard; but in no case shall the number of Blessed Thistle or Wild Radish exceed 27 seeds of each per pound. No tolerance on weed seed will be allowed.

### **PART 3 – EXECUTION**

#### **3.01 FERTILIZING, SEEDING AND MULCHING.**

- A. Established lawns and landscaped areas damaged by construction shall be restored to their former condition by seeding, unless the type and condition of the existing sod warrants it being cut, removed, preserved, and replaced. All areas, regardless of previous condition, damaged by construction shall be fertilized, seeded, and mulched as outlined below:
  - 1. Seed Bed Preparation: The seed bed shall be prepared by pulverizing the soil in an approved manner to a depth of three (3) inches for field conditions or slopes that are 3:1 or flatter and to a depth of one (1) to three (3) inches, as determined on site for slopes steeper than 3:1. The soil shall be tilled until a well pulverized, firm, reasonably uniform seed bed is prepared conforming substantially to ground elevations as shown on the Plans and/or as existed prior to construction. The disturbed area shall blend uniformly into adjacent topography. Good surface drainage must be provided, allowances for settlement made and ground elevations adjusted accordingly. Visible ponding will not be allowed. All stones, roots, sticks, rubbish, and other objectionable material shall be removed.
  - 2. Soil Improvements: Soil additives shall be incorporated in an approved manner into the top soil at the following rates:
    - a. Fertilizer - 20 pounds per 1000 square feet of 5-10-10 fertilizer generally and 30 pounds per 1000 square feet of 10-10-10 fertilizer for established lawn areas.
    - b. Lime - 100 pounds per 1000 square feet.
    - c. Superphosphate (0-20-0) - 12 pounds per 1000 square feet.
  - 3. Seeding must be done within thirty (30) calendar days after the initial ground disturbing activity.
    - a. The seed bed must be in good, friable condition and not muddy or hard at the time seeding is performed.

- b. Seed shall be applied at the rate specified and raked or tilled into the topsoil with the resulting furrows running across the natural slope of the ground. Under no circumstances will any tilling activity be allowed parallel with said slope.
  - c. Slopes steeper than 3:1 shall require the use of hydraulic seeding unless otherwise specifically approved by the Engineer.
4. Mulching: After fertilizing, seeding and raking, dried straw shall be spread uniformly over the area at a rate of 90 pounds per 1000 square feet. Approximately 1/4 of the ground should remain visible to avoid smothering seedlings. The straw shall be sprayed with liquid asphalt to bond it together and anchor it in place within road right-of-way and areas subject to erosion.
5. Maintenance: The Contractor shall maintain the seeded areas until there is a uniform growth three (3) inches high. Maintenance shall consist of watering, weed and pest control within established lawns, fertilization, erosion repair, reseeding and all else necessary to establish a vigorous healthy and uniform stand of grass. All areas and spots which do not show a uniform stand of grass, for any reason, shall be treated repeatedly until a uniform stand is attained.
6. Seasonal seeding mixtures and rates of application shall be as follows. All rates are in pounds per 1000 square feet and any rates listed below may be cut by 1/2 for temporary erosion control measures only.

September 15 - March 1:

- a. Maintained/Established Lawns or road rights-of-way
  - 1) 6# Kentucky Fescue No. 31
  - 2) 2# Rye Grain
  - 3) 30# Fertilizer (10-10-10)
  - 4) 100# Lime
  - 5) 12# Superphosphate
- b. Open-Field (Anything other than an established lawn)
  - 1) 4# Kentucky Fescue No. 31
  - 2) 2# Rye Grain
  - 3) 20# Fertilizer (5-10-10)
  - 4) 100# Lime
  - 5) 12# Superphosphate
- c. Open-Field For Slopes 2:1 or greater or areas subject to erosion

- 1) 2# Kentucky Fescue No. 31
- 2) 4# Sericea Lespedeza (Unscarified)
- 3) 2# Rye Grain
- 4) 30# Fertilizer (5-10-10)
- 5) 100# Lime
- 6) 12# Superphosphate

February 1 – October 15

- a. Maintained/Established Lawns or road rights-of-way
    - 1) 8# Kentucky Fescue No. 31
    - 2) 30# Fertilizer (10-10-10)
    - 3) 100# Lime
    - 4) 12# Superphosphate
  - b. Open-Field (Anything other than an established lawn)
    - 1) 6# Kentucky Fescue No. 31
    - 2) 2# Sudangrass (May, June, and July only)
    - 3) 20# Fertilizer (5-10-10)
    - 4) 100# Lime
    - 5) 12# Superphosphate
  - c. Open-Field For Slopes 2:1 or greater or areas subject to erosion
    - 1) 2# Kentucky Fescue No. 31
    - 2) 4# Sericea Lespedeza (Scarified)
    - 3) 2# Sudangrass (May, June, and July only)
    - 4) 20# Fertilizer (5-10-10)
    - 5) 100# Lime
    - 6) 12# Superphosphate
7. The Engineer will be consulted prior to seeding for a determination of appropriate seed mixture.

8. Unless otherwise required by the North Carolina Department of Transportation or the Engineer seeding within road rights-of-way will be as specified for established lawns.

**END OF SECTION 32 92 00**

## DIVISION 33 – UTILITIES

### SECTION 33 05 07 – TRENCHLESS UTILITY INSTALLATION

#### **PART 1 – GENERAL**

##### **1.01 GENERAL.**

- A. This section shall include construction methods for pipelines installed by jacking, or boring, in the locations and between the limits as shown on the Contract Drawings.
- B. The Contractor shall inspect the locations at the proposed crossings and shall familiarize himself with the conditions under which the work will be performed, and with all necessary details and the suitability of his equipment and methods for the work required.
- C. In addition, the requirements specified herein, all work is subject to other conditions from the applicable agencies including the North Carolina Department of Transportation (NCDOT).
- D. Any costs associated with rock excavation and disposal shall be included under this section. No additional payment will be made for this work.

##### **1.02 EXPERIENCE.**

- A. The Contractor may install the pipeline with his own organization provided he has been engaged in the construction of installations of a similar nature for a period of three years and can furnish a record of successful performance.
- B. If the Contractor does not meet the qualifications outlined above, he shall employ a sub-contractor, who has had the required experience. Evidence of the Contractor's or sub-contractor's experience shall be submitted as requested by the Engineer.

##### **1.03 CONSTRUCTION METHODS.**

- A. The type of construction used shall be as shown or specified on the Contract Drawings. Any approval by the Engineer to allow the Contractor to use a construction method other than that shown or specified will be granted only upon receipt of a written request from the Contractor.
- B. Installation of the pipeline shall be carried out without disturbance of the embankment, pavement, tracks, or other railroad or highway facilities and without obstructing the passage of traffic at any time.

#### **PART 2 - PRODUCTS**

##### **2.01 CASING PIPE.**

- A. Casing pipe shall be of the type, size and class as shown on the Drawings. All casing pipes shall in all respects conform to the applicable portions of the Contract Documents. The steel casing pipe shall have a minimum yield strength of 35,000 psi and a minimum ultimate strength of 60,000 psi. The casing pipe shall have a protective coating consisting of coal-tar primer followed by hot coal-tar enamel at least 1/16-inch thick, or approved equal.

- B. Unless otherwise specified all casings shall be a minimum of 1/4-inch thickness and comply with NCDOT standards.

### **PART 3 – EXECUTION**

#### **3.01 BORING.**

- A. The boring machine shall be accurately aligned before the boring is commenced, and the Contractor shall take such necessary steps as required to accurately place the casing with respect to line and grade. As the boring operation progresses, each new section of the encasement pipe shall be butt welded to the section previously jacked into place. The boring auger shall not be of a greater diameter than the outside diameter of encasement. The leading edge of the steel casing shall be kept as close to the cutting head as possible and shall be advanced at the same rate of speed as the cutting head in order to minimize any unsupported holes in the earth. All voids are to be filled with grout at 50 psi pressure to ensure that there will be no settlement of the roadway.

#### **3.02 JACKING.**

- A. To ensure that a relatively uniform distribution of the axial load round the periphery of the pipe is maintained, the Contractor shall ensure that the jacking force is properly distributed through the jacking frame to the pipe and parallel with the axis of the pipe. The pipe ends shall be maintained parallel within the tolerances prescribed by ASTM 76. The pipe shall be jointed by placing a bituminous coated or tarred rope around each tongue. The inner surfaces of all joints shall be filled with mortar and brushed smooth.
- B. The leading edge of the pipe shall be equipped with a cutter or shoe to protect the pipe. As the pipe is jacked forward, the material shall be trimmed and removed through the pipe. Care shall be taken to ensure that excavation does not precede the jacking operation more than necessary.

#### **3.03 PIPELINE INSTALLATION.**

- A. After completion of the casing, the Contractor shall insert the pipeline in prejointed segments.
- B. After placing and jointing the pipeline, the ends of casing pipes shall be closed with brick masonry bulkheads.

### **END OF SECTION 33 05 07**

## SECTION 33 05 61 – MANHOLES, VAULTS, FRAMES, AND COVERS

### PART 1 – GENERAL

#### 1.01 GENERAL.

- A. Manholes, vaults, and inlets shall include standard and drop manholes, valve and meter vaults, catch basins, curb inlets, surface water inlets, and similar structures, complete with frames and covers, manhole steps and appurtenances.

### PART 2 – PRODUCTS

#### 2.01 STRUCTURES.

- A. Manholes, vaults, and inlets shall be constructed of precast concrete as shown on the Contract Documents. Concrete construction shall be as specified under the Section headed, "Concrete". Brick and precast concrete construction shall be as hereinafter specified.
- B. The Contractor shall furnish and install up to three brick courses as required to adjust the frames of all manholes, vaults, and inlets to grade. No extra payment will be made for such brick courses. Precast concrete rings may also be utilized.
- C. The Contractor shall furnish and build into the work all the necessary inlet and outlet connections, manhole steps, frames and covers, sleeves and appurtenances as shown or specified. Concrete floors of manholes and vaults shall be broom finished.
- D. Drop manholes shall consist of a standard manhole having a drop pipe, restrained with mega-lugs, constructed on the outside of the manhole, as shown. The pipe specials at the top and bottom of the drop, and the straight pipe used in the drop for the drop pipe shall be included and constructed as part of the manholes.
- E. Manholes, vaults, and inlets shall be tested for water tightness as specified herein.

#### 2.02 BRICK MASONRY FOR LEVELING FRAMES.

- A. Masonry for leveling frames and covers shall include brick courses for concrete manholes, where required, to bring the frames and covers to grade, and the building in of metal castings, pipes, sleeves, and other items required in the work, complete as shown, specified, and directed. All common brick shall be ASTM Designation C-62, Grade SW.

Mortar mix shall be:

1 sack of masonry cement (94 pounds)

3 cubic feet of dry sand (240 pounds)

- B. Masonry cement shall be in accordance with ASTM Designation C-91, Type II. Sand shall be of graded quality conforming to the requirements of ASTM Designation C-144. Water shall be clean, potable water, free from injurious or deleterious materials.

- C. All bricks shall be of the best quality, hard burned brick, shall be whole, sound, straight, hard, uniform in structure, with true faces and shall be of standard size.
- D. Bricks shall be sampled and tested for absorption in accordance with ASTM Designation C-67. Absorption shall not exceed nine percent. Tests shall be at an independent testing laboratory and all tests shall be at the expense of the Contractor. Certified test reports shall be furnished to the Engineer.
- E. The bricks shall be laid in mortar of a kind and quality above specified. They shall be laid with a shove joint and all spaces between bricks shall be solidly and completely filled with mortar. The bricks shall be laid to a line, with the bed in the line of the radii of the curves, and with close joints not exceeding 1/4-inch. Bricks shall be thoroughly moistened before laying. Each brick shall be completely bedded in mortar at its bottom side and end, at one operation. Joints on face work shall be struck and neatly pointed. Care shall be taken to have the interior surface smooth and regular. Competent masons shall be employed for this work.
- F. No masonry shall be erected when the temperature has dropped below 45 degrees Fahrenheit unless it is rising and at no time when it has dropped below 40 degrees Fahrenheit, except by permission of the Engineer. When masonry work is permitted below 40 degrees Fahrenheit, provisions shall be made for heating and drying the materials and the completed work shall be protected in accordance with the Structural Clay Products Technical Institute Notes, Volume 1, No. 1. Masonry shall not be laid with ice or frost on its surface and no masonry shall be laid on frozen work. Any work which freezes before the mortar has set shall be removed and replaced at the Contractor's own expense.
- G. The outside faces of the brick work of each manhole shall be neatly plastered with mortar not less than 3/8-inch thick, of the quality above specified, and trowelled smooth.
- H. All fresh work shall be protected from injury of all kinds and any injured work shall be made good by the Contractor in a manner satisfactory to the Engineer. All new work, unless immediately covered with earth, shall be kept moist until the mortar has become hard and will not crack in the sun.

### **2.03 PRECAST CONCRETE SECTIONS.**

- A. Precast concrete manhole risers shall be the approved standard design of the manufacturer and shall conform to ASTM Designation C-478 of the latest revision for Precast Reinforced Concrete Manhole Sections, except as modified herein. Unless otherwise noted in the Contract Drawings, all precast reinforced concrete manhole risers shall have a minimum nominal inside diameter of 48-inches and a wall thickness of 5-inches.
- B. Minimum compressive strength of concrete shall be 4,000 psi and the maximum permissible absorption shall be eight percent. Risers shall be reinforced with a single cage of steel placed within the center third of the wall. The tongue or the groove of the joint shall contain one line of circumferential reinforcement equal in area to that in the barrel of the manhole riser. The minimum cross-sectional area of steel per lineal foot shall be 0.12 square inches for sizes up to and including 54-inches in diameter and 0.17 square inches for larger sizes.
- C. Tapered sections, where required, shall be of truncated cone design, having the same wall thickness and reinforcement as the cylindrical ring sections.

- D. Precast reinforced concrete manhole base sections shall be cast monolithic, have flat bottoms and a 6-inch thick reinforced concrete base slab. The same steel requirement shall apply to precast manhole bases as applies to riser sections and the base steel shall be tied or welded to the riser steel.
- E. At the option of the Contractor, precast reinforced concrete manhole sections may be constructed on poured-in-place concrete slab foundations.
- F. New sewers or pipelines shall be connected to the precast concrete manhole with flexible pipe connections conforming to ASTM C-923. Openings of approved size shall be provided in the base sections as required to straddle existing sewers or pipelines or drop pipes in drop manholes. Openings cut into manhole sections for drop connections must be cut with extreme care to avoid damage to the manhole. The method of cutting these openings shall be approved by the Engineer.
- G. Precast reinforced concrete manhole sections, unless otherwise specified, shall have steps with maximum vertical spacing of 16-inches. The steps shall be copolymer polypropylene plastic, reinforced with one-half inch diameter steel bar, grade 60. The steps shall be capable of resisting a pull out force of 1,500 pounds and an impact of 300 foot pounds with only minor deflection and no cracking. The steps shall have serrated tread and end lugs to prevent feet from slipping off the step. The steps shall be either precast into the manhole risers or bases or secured with cadmium plated anchor bolts to expansion anchors and treaded inserts precast with the section.
- H. Precast concrete manhole sections shall fit together readily and unless specifically noted, the connections shall be either jointed with approved non-shrink cement mortar and self-contained "O" ring gaskets conforming to ASTM Designation C-361, date of latest revision. Top sections shall have a surface suitable to receive brick masonry levelling courses, precast slab, or manhole frame and cover.
- I. A 6-inch external joint/seam wrap shall be installed on all precast concrete joints.

#### **2.04 CASTINGS.**

- A. Manhole frames and covers, grates, inlets, steps, and other castings shall be in accordance with ASTM Designation A-48, Grade 30. All manhole frames and covers shall have machined bearing surfaces. Manhole frames and covers shall have a minimum weight of 310 pounds unless otherwise designated.
- B. Manhole covers shall have the words "Sanitary Sewer" or other appropriate designation cast into cover.

#### **2.05 MANHOLE COATINGS.**

- A. All sewer manholes shall be field applied with the following interior protective coating system. The general level of quality and type of coating required is outlined by the product names and numbers listed below for Tnemec, Raven Lining Systems and Sherwin Williams Company. Other manufacturers with equal products shall be permitted:

1. Tnemec
    - a. Skim Coat: Series 218 Mortar Clad (to fill bugholes and voids).
    - b. First Coat: Series 436 Perma-Shield FR (125 mils).
    - c. Final Coat: Series 435 Perma-Glaze (20 mils).
  2. Raven Lining Systems
    - a. Raven 405 (125 mils).
  3. Sherwin Williams
    - a. Skim Coat: Dura-Plate 2300 (to fill bugholes and voids).
    - b. Final Coat: Dura-Plate 6000 (145 mils).
- A. Prior to applying the coating system all interior surfaces shall be abrasive blasted or equivalent to remove laitance, form release agents, curing compounds, sealers, and other contaminants and to provide a surface profile in accordance with SSPC-SP13/NACE 6.
- B. Coatings shall only be applied after manholes are fully assembled and all core holes and connections have been made.

### **PART 3 – EXECUTION**

#### **3.01 COMPLETION.**

- A. Manholes, vaults, and inlets shall, in all cases, be completely constructed and fitted with their frames and covers as the work progresses and as each structure is reached. After final inspection and acceptance of the pipeline or other facility served by the manholes, vaults, and inlets, the Contractor shall, unless otherwise directed, seal all covers with an approved fibrated mastic compound.
- B. All manholes shall be vacuum tested before backfilling in accordance with ASTM 1244. Pipes entering manholes shall be plugged and a vacuum of 10-inches of mercury shall be created on inside of manhole. The amount of time for the vacuum to drop to 9-inches shall be recorded. The allowable time for 4-foot diameter manholes is 60 seconds. The allowable time for 6-foot diameter wet well shall be 90 seconds. The contractor shall supply all equipment.

### **END OF SECTION 33 05 61**

## SECTION 33 31 00 – SANITARY SEWERAGE PIPING

### PART 1 – GENERAL

#### 1.01 GENERAL.

- A. This section includes the installation of all sanitary sewer pipelines.
- B. Pipelines shall be located with adequate clearance from adjacent structures and other pipelines. For pipe with nominal ID of 20-inches or smaller the minimum clearance shall be 6-inches; for pipe 21-inches ID or larger, the minimum clearance shall be 12-inches.
- C. Sanitary sewer lines shall be kept at minimum clearances in accordance with Title 15A, Subchapter 2T of the North Carolina Administrative Code. Sanitary sewers that cannot meet the separation requirements shall meet the applicable alternatives.

### PART 2 – PRODUCTS

#### 2.01 DUCTILE IRON PIPE.

- A. Ductile iron piping shall include all ductile iron pipe and fittings, except for cast iron soil pipe. All pipe and fittings shall be cast in one piece, except for flanged pipe which shall have screw-on flanges or grooved pipe fittings which shall have cast fittings.
- B. All ductile iron pipe shall be centrifugally cast in accordance with ANSI/AWWA Specifications C151/A21.51, and shall be of Class 350, unless different classes are scheduled herein. Appurtenances for iron pipe shall comply with the following standards or latest revision thereof:
  - 1. Steel for Bolts, Studs & Nuts - ASTM Designation A 307, Grade "B"
  - 2. Fittings - AWWA C110, C111, C153 & ANSI A21.11, A21.53
  - 3. Cement Mortar Lining - AWWA C104 & ANSI A21.4
  - 4. All fittings shall be of the short body pattern unless long body fittings are shown on the Contract Drawings.
- C. The following joint types shall be used for ductile iron pipe.
  - 1. Flanged pipe shall have flanges with long hubs, shop fitted on the threaded end of the pipe. All flanges shall be faced and drilled to the 125-pound American Standard drilling, unless special drilling is shown, specified or required. 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 pitch varnish or otherwise protected against corrosion of flange faces. Flange faces shall be cleaned to bare metal with wire brushes before installation of the piping.
  - 2. In general, flanged joints shall be made up with through bolts of the required size. Stud or tap bolts shall be used only where shown or required. Steel bolts and nuts shall be electro-plated zinc, with good and sound, well fitting threads, so that the nuts may be

turned freely by hand. Zinc plating shall be by an approved process with a plate thickness of 0.0003 to 0.0005 inches.

3. Gaskets for flanged joints shall be the ring type, of cloth inserted rubber. Gaskets shall be 1/8-inch thick.
4. Connecting flanges shall be in proper alignment and no external force shall be used to bring them together. Bolts and gaskets shall be furnished by the installer of piping for joints connecting the piping with equipment, as well as for those between pipe and fittings, whether such equipment and piping is furnished by the installer or not.
5. Mechanical joints shall be ANSI/AWWA C111/A21.11. Joints shall be made up in accordance with the industry standard recommendations. All bolts shall be tightened by means of torque wrenches in such a manner that the follower shall be brought up toward the pipe evenly. If effective sealing is not obtained by tightening the bolts to the specified torques, the joint shall be disassembled and reassembled after thorough cleaning.
6. Slip or "push-on" joints shall be manufactured in accordance with ANSI/AWWA C111/A21.11. 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 lubricant used in making up the joints shall be furnished by the pipe manufacturer. The jointing shall be done by guiding the plain end into the bell until contact is made with the gasket and by exerting a sufficient compressive force to drive the joint home until plain end makes full contact with the base of the bell. Manufacturer's recommendations for lubricating joints shall be followed.
7. Where shown on the Contract Drawings or specified herein, grooved joints as manufactured by Victaulic may be substituted for flanged fittings. Pipe shall be cast and cut in accordance with ANSI/AWWA C151/A21.51 and ANSI/AWWA C-606 standards for grooved pipe joints. Couplings and fittings shall be of ductile iron conforming to ASTM A-536 or other suitable material as approved by the Engineer. Gaskets shall be supplied by the fitting manufacturer, shall be suitable for the intended purpose and meet applicable ANSI/AWWA standards. Fittings and couplings must be able to fulfill the requirement for test pressures as scheduled herein. Painting shall match that of adjacent piping and shall be as scheduled.
8. Unless otherwise indicated on the Contract Drawings, all restrained joints shall utilize mechanical locking systems resulting in a metal-to-metal joint restraint that prevents the pipe joint from separating. The restraint system shall be capable of withstanding thrust forces created by internal pressures up to twice the rated pressure of the pipe. The primary means of joint restraint shall be a factory welded ring or lugs on the spigot end of the pipe, interlocked with the bell of the mating pipe. Joints shall be "TR-Flex" as manufactured by U.S. Pipe Company, "Flex-Ring" or "Lok-Ring" as manufactured by American Ductile Iron Pipe Company or approved equal. The use of retaining glands with set screws, cam or wedge locking gaskets or other means of restraint shall not be permitted except where specifically shown on the Contract Drawings.

- D. Unless otherwise shown, all gravity sewer ductile iron pipe and fittings shall have a bituminous outside and inside coating with a minimum thickness of 1 mil.

## **2.02 WALL CASTINGS, SLEEVES, AND SPECIAL FITTINGS.**

- A. Where shown on the Contract Drawings, wall castings shall be provided for iron piping which pass through the walls of structures below grade. Wall castings shall be provided with integral waterstops. In all other cases, iron pipes which pass through walls or floors of structures shall be installed in sleeves.
- B. Where sleeves are installed in exterior walls of structures or where water or gas tightness is required, the space between the pipe and the sleeve shall be caulked on both sides.
- C. Unless otherwise shown, sleeves may be either Class "B" cast iron solid sleeves, or may be fabricated from Schedule 40 - Wrought Steel Pipe. Floor sleeves shall have floor and ceiling plates where finished appearance is required. Where no floor plates are required, sleeves shall extend 6-inches above the finished floor.
- D. Special fittings, where required, shall be of an approved design, and shall have the same diameters and thickness as standard fittings.

## **2.03 POLYVINYL CHLORIDE FOR GRAVITY SEWERS.**

- A. Polyvinyl chloride (PVC) gravity sewers 15-inch and smaller shall be SDR 26 unplasticized polyvinyl chloride pipe.
- B. PVC pipe shall be made for PVC plastic having a cell classification of 12454B or 12454C, or 13364B as defined in Specification D 1784. Compounds that have different cell classifications because one or more properties are superior to those of the specified compounds are also acceptable. Clean reworked material generated from the manufacturers own pipe or fittings production may be used provided that the pipe or fittings meet all the requirements of ASTM D-3034 or ASTM F-679.
- C. PVC pipe shall be capable of withstanding a two hour immersion test in a sealed container of 99.5 percent pure Anhydrons Acetone and show no signs of flaking on interior or exterior when tested in accordance with ASTM D-2152.
- D. PVC pipe strength shall be capable of withstanding stiffness, flattening and impact tests as scheduled or referenced in ASTM D-3034 or F-679.
- E. Pipe shall be joined with an integral bell and spigot type rubber gasketed joint. Gaskets shall conform to ASTM F-477.
- F. All pipe furnished under these specifications shall have a maximum deviation from straightness of 1/16 of one inch per foot.
- G. All PVC pipe shall have a minimum pipe stiffness of 115 psi when measured at 5 percent vertical ring deflection and tested in accordance with ASTM D-2412.

- H. Tests for cell classification, stiffness, paralleled plate loading and linear straightness shall be performed by an independent certified laboratory on a minimum of 0.5 percent of the total quantity of each size of pipe furnished. A minimum of three (3) joints of each size shall be tested.
- I. PVC pipe shall be installed in accordance with ASTM-D2321 as modified herein and as shown on the Plans.
- J. Manhole connections shall be made by means of a bell-spigot piece, with a rubber waterstop. The bell and spigot shall be flush with the manhole outside wall. The waterstop shall be fastened to the bell by a stainless steel strap or other suitable means and centered in the manhole wall. The spigot end shall be furnished with an "O" ring and a retainer ring.
- K. Maximum allowable pipe deflection shall be five (5) percent. A deflection test shall be performed by the Contractor with a pin-type "GO/NO GO" gauge. Gauge shall have an outside diameter 5% less than pipe size. The gauge and all accessories needed to complete test shall be provided by the contractor. All pipe failing the deflection tests shall be removed, reinstalled, and retested at no additional cost to the Owner.

#### **2.04 POLYVINYL CHLORIDE FOR FORCE MAINS.**

- A. This section shall cover unplasticized polyvinyl chloride (PVC) pressure pipe with integral bell containing a locked-in ring and spigot joints for the conveyance of fluids under pressure.
- B. Pipe shall meet the requirements of ASTM 2241 "Polyvinyl Chloride (PVC) Pressure Pipe". Pipe class shall be C900, DR14.
- C. All pipe shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a locked-in solid cross section elastomeric ring which meets the requirements of ASTM F-477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall.
- D. Polyvinyl chloride pressure pipe shall be compatible for use with ductile or cast iron fittings complying with applicable AWWA standards.

#### **2.05 FLEXIBLE PIPE COUPLINGS.**

- A. Flexible pipe couplings shall include sleeve type couplings for interior service, cast solid sleeves for buried service, clamp type couplings, rubber expansion couplings, and expansion joints.
- B. Where couplings are shown for interior service, sleeve type couplings of steel or ductile iron shall be provided for the joining of the plain end iron pipe. Sleeve type couplings shall be designed to fit the outside diameters of the pipe to which they connect. Ductile iron sleeves shall be used for pipes 4 through 16 inches in diameter. Steel sleeves may be used for pipes larger than 16 inches. Each coupling shall consist of a middle ring, two molded rubber gaskets, two follower rings, and sufficient galvanized or cadmium plated bolts and nuts to

insure a complete watertight installation capable of withstanding pressures equal to that of pipeline coupling is installed.

- C. Where sleeves are shown for exterior, buried or submerged service, solid ductile iron sleeves shall be provided. Solid sleeves shall conform to AWWA Specification C-110, Long Body, unless otherwise specified.
- D. Groove couplings shall be of malleable iron, in two or more parts, to mechanically engage and lock grooved or shouldered pipe ends, with a single composition sealing gasket, and two or more track-head steel bolts and nuts for tightening assembly. Groove couplings shall be Style 31 as manufactured by the Victaulic Company of America, or approved equal. Clamps shall be self-centering over pipe ends, with a sealing gasket of rubber. Malleable iron clamps shall meet the requirements of ASTM Designation A-47. Bolts for clamps shall be in accordance with ASTM Designation A-183, with a minimum tensile strength of 110,000 psi. All clamp bolts and nuts shall be cadmium plated.
- E. Rubber expansion couplings shall be of the standard or tapered spool type and shall be equal to Mercer Rubber Company Style 500 or approved equal. Where used on sewage or sludge gas lines, the rubber lining shall be resistant to sewage or sludge gas action. Outer covers shall be oil resistant. The tube of the joint shall be of single piece rubber construction extending to the outside edges of the flanges. The flanges shall be full-faced with fabric reinforced rubber. Metal retaining rings shall be split type, of flat rolled steel, beveled and galvanized. Bolt circle shall be 125 pound American Standard Drilling. Bodies adjoining rubber arches shall have wire ring reinforcing for sizes under 4-inches inside diameter and metal ring reinforcing for sizes under 4-inches inside diameter and metal ring reinforcing for sizes 4-inches inside diameter and over.
- F. Expansion joints shall be internally guided sleeve type, and shall be packed with materials which are suitable for the intended service. Expansion joints 2-inches and smaller shall be all bronze, and shall have male threaded ends. Expansion joints 3-inches and larger shall be iron body and shall have flanged ends. All expansion joints shall be designed to withstand the test pressure of the pipeline that expansion joint is installed.
- G. Where shown or specified, sleeve type couplings and rubber expansion couplings shall be harnessed by means of welded steel lugs and harness rods. The lugs and welds shall develop the full strength of the harness rods, and where used on galvanized pipelines shall be galvanized after welding.
- H. Harness rods shall be of heat treated steel with a minimum yield strength of 70,000 psi and a minimum ultimate strength of 110,000 psi, and shall be threaded with American Standard Coarse Threads. Nuts shall be of the same material as the rods and shall be hexagonal. Harness rods and nuts shall be galvanized or cadmium plated.
- I. All flexible couplings shall be installed in pipelines in accordance with the manufacturer's directions. Couplings shall be free from support of carrying any weight of adjoining pipe or fittings.

- J. All steel parts of flexible pipe couplings to be installed in exposed locations, except those to be galvanized or cadmium plated, shall be shop painted with a rust-inhibitive coat of priming paint.

### **PART 3 – EXECUTION**

#### **3.01 SUBGRADE PREPARATION.**

- A. Pipelines and appurtenant structures shall be located as shown on the Contract Drawings or otherwise fixed by the Engineer in accordance with provisions of the Contract.
- B. All pipe shall be on a prepared bed. Where improved bedding is required, the trench subgrade will be determined by the type bedding required.
- C. Subgrade preparation for the pipe shall be performed immediately prior to installing the pipe in the trench. The trench bottom shall be accurately shaped by means of hand tools to conform to the full bottom segment of the pipe barrel in such a manner that a uniform and continuous bearing and support on solid and undisturbed ground is provided for each pipe for its entire length between bells. The subgrade shall allow the pipe to be accurately aligned with the adjacent pipe bell without transmitting the weight of the pipe to the receiving bell through the joint material. Correction of a subgrade that is too low shall be done only by placing and compacting suitable material over the entire width of trench and regrading.
- D. Bell holes shall be excavated immediately prior to laying the pipe and shall be only of sufficient size so that no part of the pipe bell will be in contact with the trench bottom or granular fill.
- E. Ledge rock, shale, boulders, and large stones shall be removed from the sides and bottom of the trench to provide bottom and side clearances for the pipe. For pipe with nominal ID of 20-inches or smaller the minimum clearance shall be 6-inches; for pipe 21-inches ID or larger, the minimum clearance shall be 12-inches.
- F. Selected earthen material, approved by the Engineer, or granular material shall be used to fill voids left by removal of rock or other material from below the subgrade. No additional compensation will be made for this material.

#### **3.02 PIPE INSTALLATION.**

- A. Except as otherwise specified, ductile iron pipelines shall be installed in accordance with AWWA Specification C-600. Care shall be taken during loading, transportation, unloading, and installation to prevent damage to the pipes or coatings. All pipe and fittings shall be carefully examined before installing and no piece shall be installed which does not conform to the appropriate ASTM Specification.
- B. Pipes shall be laid to the required lines and grades on prepared subgrade or improved bedding. Any bed disturbed during the installation of the pipe shall be repaired prior to embedment of the pipe. Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water, and no pipe shall be laid under unsuitable weather or trench conditions.

- C. Except where the pipe is to be laid with concrete embedment or encasement, blocking of the pipe will not be permitted. Where the pipe is to be laid with concrete, the pipe shall be laid to grade and supported on approved blocks and securely braced in all directions to prevent movement.
- D. No pipe shall be laid upon a foundation where frost exists, nor any time when the Engineer shall deem that there is a danger of formation of ice, or the penetration of frost at the bottom of the excavation.
- E. The pipe shall be installed with the bell ends in the direction of laying. Pipeline for sewers shall begin at the low end of the run and all pipe shall be laid with the bells or sockets uphill.
- F. If any defective pipe or fittings are discovered after installation, they shall be removed and replaced with sound pipe and fittings or shall be repaired by the Contractor in an approved manner and at his own expense.
- G. When joined in the trench, the pipe shall form a smooth line and shall be fitted together so that the alignment and slope are correct. Pipe shall not be trimmed except for closure, and pipe not making a good fit shall be removed. No pipe shall be laid until the preceding length has been completely aligned and secured. The installed pipe shall not be disturbed in any manner and its proper grade and alignment shall be maintained during pipe joining, pipe embedment, and backfilling operation.
- H. The interior surface of all pipes shall be cleaned when installed and shall be kept clean until final acceptance. Temporary bulkheads shall be placed in all open ends of pipelines when pipe laying is not actively in progress. The bulkheads shall be designed to prevent the entrance of dirt or debris and shall not be removed until pipe laying is resumed. Where danger of water entering the pipeline may exist, the bulkheads shall be designed to prevent the entry of water. Adequate precaution shall be taken by the Contractor to prevent flotation of pipes in the event of water entering the trench.
- I. If laser alignment equipment is used, periodic elevation measurements shall be made with surveying instruments to verify accuracy of grades. If such measurements indicate thermal deflection of the laser beam due to differences between ground temperature and the air temperature within the pipe, precautions shall be taken to prevent or minimize further thermal deflections.
- J. A 14-gauge green stranded copper tracer wire shall be taped to top of all pipe regardless of material. Wire shall extend up to surface at all valve and manhole locations. A detectable tracer tape shall be installed directly above and parallel with all force mains. The tape shall be buried approximately eight inches below finished grade. The tracer tape shall be a continuous 2-inch wide strip of tough inert plastic bonded to aluminum or copper. The color shall be bright orange with 1-1/2-inch high block lettering repeated every 20 to 30 feet identifying the pipe below.

### **3.03 PIPE EMBEDMENT.**

- A. Embedment shall be defined as that portion of the trench from the subgrade to an imaginary line drawn 18-inches above the top of the pipe. Embedment materials shall be excavated

soil if suitable or if not suitable, shall be of washed stone or other material specified herein or detailed on Contract Drawings.

- B. Deposition and compaction shall be done simultaneously and uniformly on both sides of the pipe so as to insure adequate lateral and vertical stability of the installed pipe during subsequent joining, embedment and backfill operations. In no case will impact or unbalance deposits of materials be allowed.
- C. Pipe embedment shall be subject to Density Control as specified herein.

### **3.04 CONNECTION TO EXISTING FACILITIES.**

- A. Where sewers are to be connected to existing manholes or other structures, and where no stub or opening has been provided for the connection, the Contractor shall make an opening of minimum diameter through the side wall of the structure for inserting the sewer pipe. After inserting the pipe, the space remaining outside the pipe shall be completely filled with a non-shrinking mortar and made watertight.
- B. Benchwalls in existing structures shall be altered to form a trough, so that new sewer connection will enter the existing sewer at a 45 degree angle in the direction of flow.
- C. In making connections to existing manholes, structures, or pipe, care shall be taken to avoid damage to the manhole or structure. Any damage resulting from this operation shall be repaired and made good by the Contractor at his own expense.
- D. Connections to either new structures or existing structures shall be made in such manner that a flexible joint shall occur at the outside footing line. All such connections shall be made watertight.
- E. Whenever pipes require cutting to fit into other lines, the work shall be done with approved cutting tools specifically designed to cut pipe, so as to leave a smooth end at right angles to the axis of the pipe.

### **3.05 BACKING.**

- A. Concrete backing and/or tie rods and concrete anchors for exterior pressure piping shall be provided at all tees, bends and in other locations indicated on the Contract Drawings. Tie rods shall be of mild steel, except where high tensile strength steel is called for on the Contract Drawings. High tensile steel rods, where required, shall have the minimum yield strength of 70,000 psi. Nuts and washers shall be of the same material as tie rods. All tie rods and nuts installed underground or in contact with water shall be hot-dipped galvanized. Concrete backing and/or tie rods and concrete anchors for gravity pipelines shall be in locations shown on the Contract Drawings.

### **3.06 SEWER LATERALS.**

- A. Lateral connection made to the sewer prior to backfilling shall not be installed in the pipe trench as vertical risers except as approved in writing by the Engineer, but shall be laid on a slope not exceeding two feet vertical to one foot horizontal, and not less than 1/8-inch per foot, in such a manner that the lateral shall have a solid bearing on undisturbed earth as

stipulated for pipe sewers. All laterals shall be closed by means of suitable stoppers or end caps.

- B. All laterals shall be properly marked at the original ground surface at the point where laterals terminate with either timber markers, concrete markers, or clean outs. Concrete markers and clean outs shall be installed as shown on the Contract.
- C. Timber markers shall consist of a 4-inch by 4-inch timber extending from the end of the lateral vertically to two foot above the ground surface. All such markers shall be securely anchored and maintained in a proper vertical position until backfilling has been completed.

### **3.07 FIELD LEAKAGE TESTS.**

- A. All pressure and gravity piping and pipelines shall be tested by the Contractor as directed by the Engineer. All tests shall be conducted in a manner to minimize interference with the progress of the work.
- B. The Contractor shall notify the Engineer when the work is ready for testing and tests shall be conducted as soon as possible thereafter under the direction of the Engineer. All other labor, equipment, water and materials, including meters and gauges shall be furnished by the Contractor at his own expense.
- C. Piping and other equipment designed to carry fluids under pressure shall be tested as a whole, or in sections valved or bulkheaded at the ends. Testing shall be under a hydrostatic pressure equal to test pressure specified herein and not less than 150% of working pressure or 80 psi, whichever is greater.
- D. Test pressure for pressurized piping shall be applied by means of a pump and a tap in the pipe. The rate of leakage shall be determined over a two hour period, by means of volumetric measurement of the water added during the test to maintain a pressure  $\pm 5$  psi from the specified test pressure. No pipeline will be accepted if the leakage is greater than the amount calculated by the formula below:

$$L = (S \times D \times P^{1/2}) / 148,000$$

Where:

L is the allowable leakage in gallons per hour,  
S is the length of pipe in feet,  
D is the nominal pipe diameter in inches, and  
P is the average test pressure in psig.

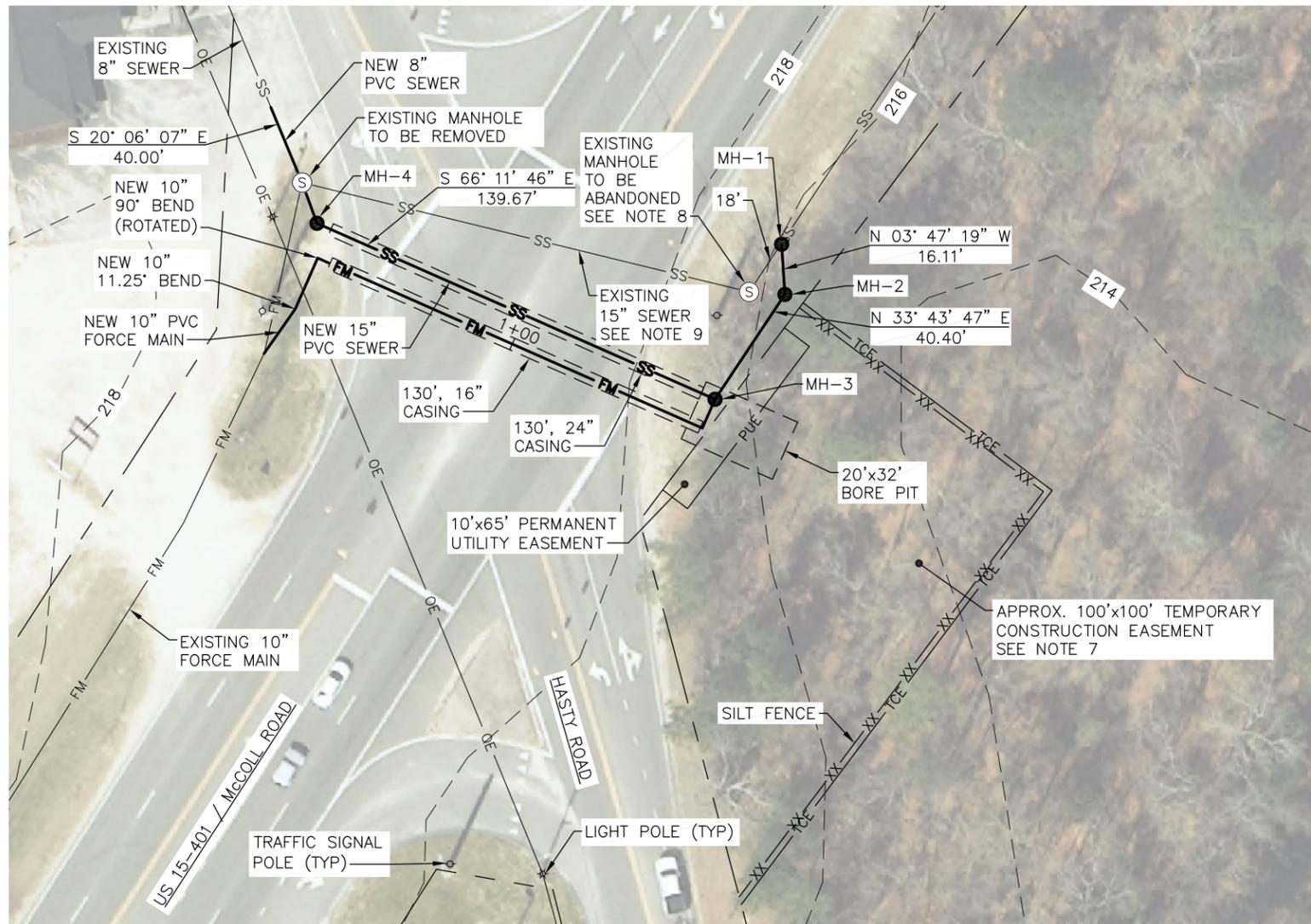
- E. All new sewers shall be tested by means of a low pressure air test in accordance with ASTM C-828 and ASTM C-924. A tabulation of the Minimum Holding Times for each section of sewer to be tested shall be submitted to the Engineer for approval prior to conducting the testing.

### **3.09 FINAL INSPECTION FOR SEWER.**

- A. Each section of sewer, between each pair of manholes will be inspected by the Contractor after the line is complete. Such inspection will be visual and by transversing the inside of the

pipe or by looking through the sewer from manhole to manhole with the aid of reflected sunlight or by the use of an electric light, when the sewer is too small to be entered. The pipe shall be true to both line and grade, shall show no leaks, shall show no obstruction to flow, shall have no projections of connecting pipe into the sewer, shall be free from cracks and protruding joint materials, and shall contain no deposits of sand, dirt, or other materials which will in any way reduce the full cross sectional area. All wall joints in manholes, junction chambers, pumping stations, and elsewhere shall be watertight. All finished work shall be neat in appearance and of first class workmanship. Proper stoppers and bulkheads must be in place where required.

**END OF SECTION 33 31 00**



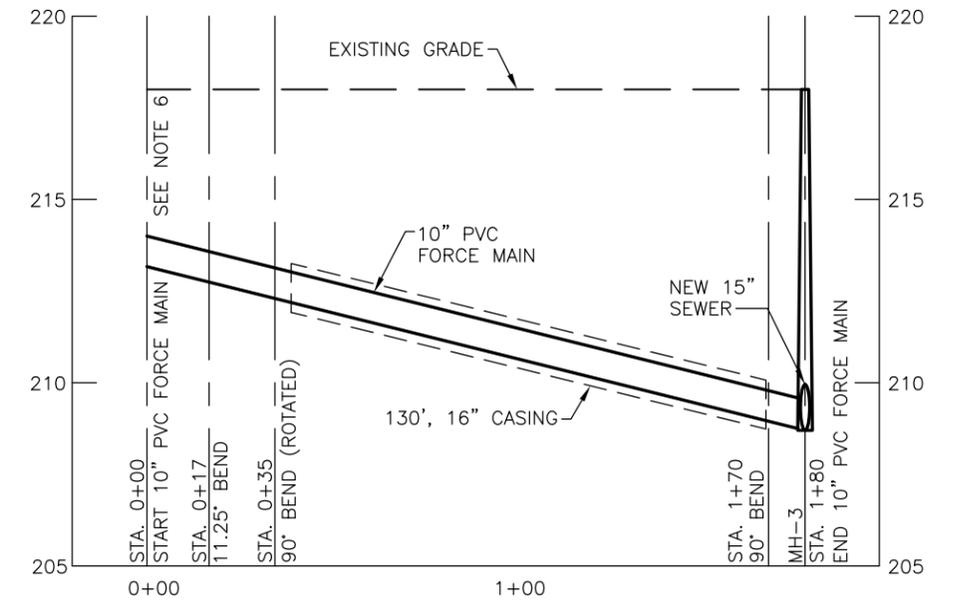
**PLAN**

**CONSTRUCTION SEQUENCE:**

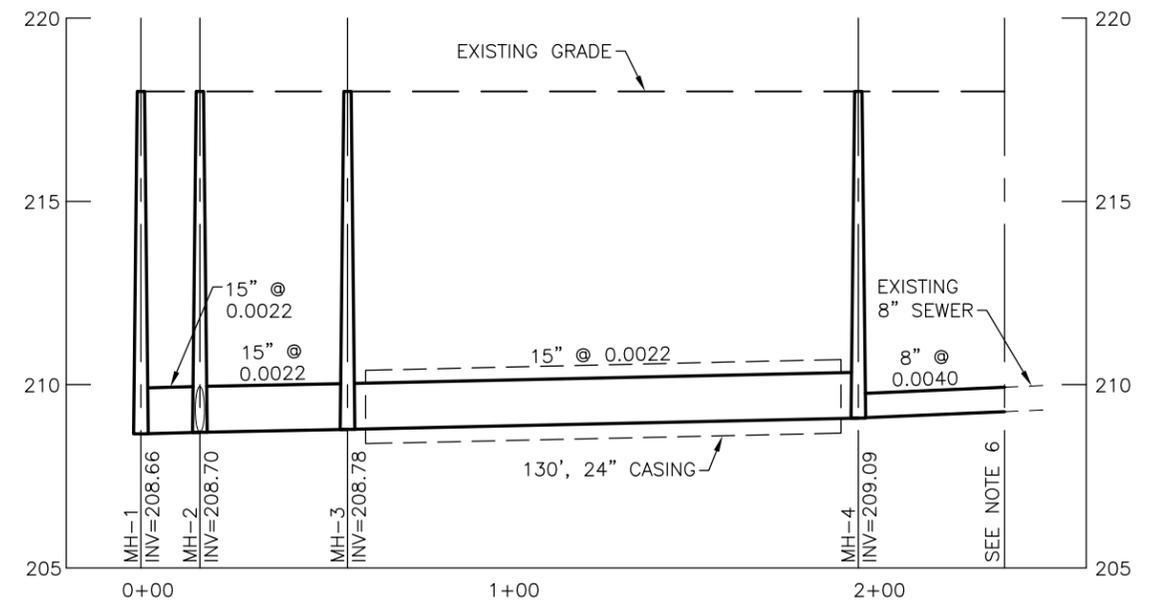
1. VERIFY DEPTH OF EXISTING SEWER AND FORCE MAIN AT ALL POINTS OF CONNECTION.
2. COMPLETE INSTALLATION OF CASINGS.
3. CONSTRUCT MANHOLES 1-4 AND SEWER AND TEST.
4. CONSTRUCT FORCE MAIN FROM STA. 0+05 TO 1+40 AND TEST.
5. SAW CUT EXISTING SEWER AND GROUT NEW INVERT AT MANHOLE 1.
6. COMPLETE CONNECTION OF NEW FORCE MAIN TO EXISTING FORCE MAIN. COORDINATE WITH OWNER TO DIVERT FLOW.
7. REMOVE EXISTING MANHOLE AND CONNECT 8" SEWER TO MANHOLE 4.

**NOTES:**

1. ALL WORK SHALL BE COORDINATED WITH THE ENGINEER. CONTRACTOR SHALL SUBMIT A SCHEDULE AND WORK PLAN IN WRITING TO THE ENGINEER AND RECEIVE APPROVAL PRIOR TO BEGINNING WORK.
2. PROPERTY LINES AS SHOWN ARE APPROXIMATE. ALL WORK SHALL BE COMPLETED WITHIN EXISTING PROPERTY OR RIGHT-OF-WAYS. OWNER WILL STAKE PRIOR TO CONSTRUCTION.
3. SIZE AND LOCATION OF UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION AND IS RESPONSIBLE FOR ANY UTILITY DAMAGE.
4. ALL MATERIAL GENERATED DURING DEMOLITION SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.
5. PROVIDE INTERIOR PROTECTIVE COATING ON ALL MANHOLES.
6. PROVIDE 8" TWO BOLT CONNECTOR TO CONNECT EXISTING SEWER TO NEW SEWER. PROVIDE 10" TWO BOLT CONNECTOR TO CONNECT EXISTING FORCE MAIN TO NEW FORCE MAIN.
7. CONTRACTOR SHALL CLEAR ONLY TREES AND UNDERBRUSH THAT INTERFERES WITH CONSTRUCTION. PROVIDE SILT FENCE AT EDGE OF CLEARING.
8. REMOVE TOP 3' OF EXISTING MANHOLE, PLUG PIPE PENETRATIONS AND FILL WITH LOW STRENGTH GROUT.
9. UPON COMPLETION OF NEW SEWER, FILL EXISTING SEWER AND CASING PIPE CROSSING ROADWAY WITH LOW STRENGTH GROUT.



**FORCE MAIN PROFILE**



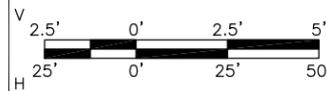
**GRAVITY SEWER PROFILE**

27 OCT 2022



*James C. Stowe*

IN CHARGE	JCS
DESIGNED	JCS
MADE BY	AMA
CHECKED	GJW

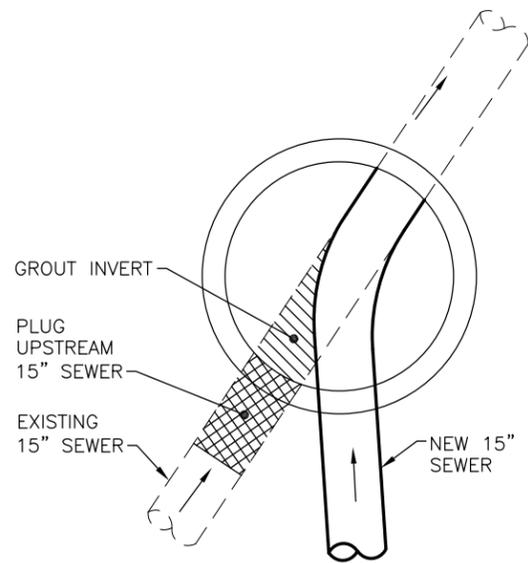


**CITY OF LAURINBURG  
McCOLL ROAD SEWER**

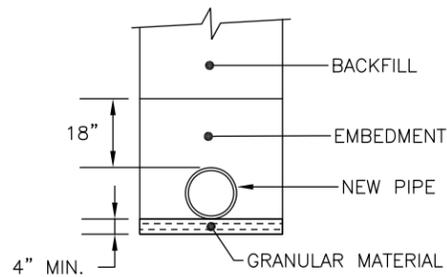
**PLAN AND PROFILES**

1973.047
01.DWG
OCTOBER 2022

WILLIS ENGINEERS, INC., 10700 SIKES PLACE, CHARLOTTE, NORTH CAROLINA, 28277 - NC LIC. NO. F-0114



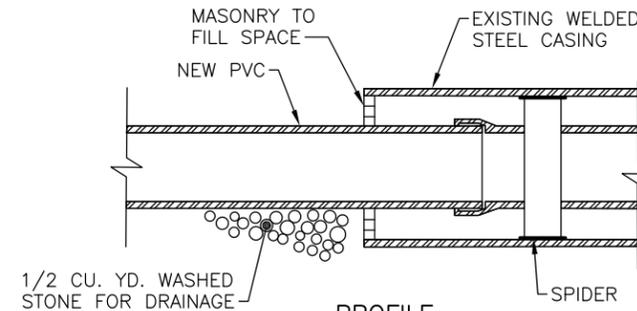
**MH-1 DETAIL**



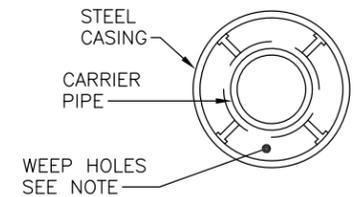
**NOTES:**

1. TRENCH DEPTHS MEASURED FROM FINISHED GRADE TO PIPE INVERT.
2. PIPE EMBEDMENT SHALL BE PLACED IN A MINIMUM OF 6" LAYERS AND COMPACTED TO 95% OF THE MAXIMUM LABORATORY DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR METHOD.
3. PIPE EMBEDMENT SHALL EXTEND TO FINISHED GRADE FOR PIPELINES WITHIN ROAD RIGHT-OF-WAY.

**BEDDING DETAILS**



**PROFILE**



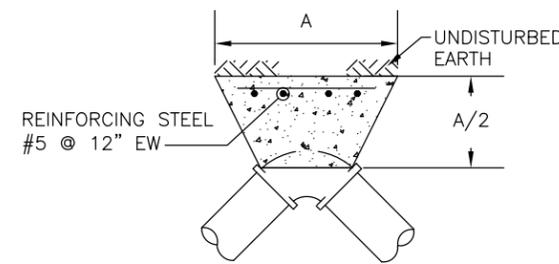
**SECTION END WALL**

**NOTE:**

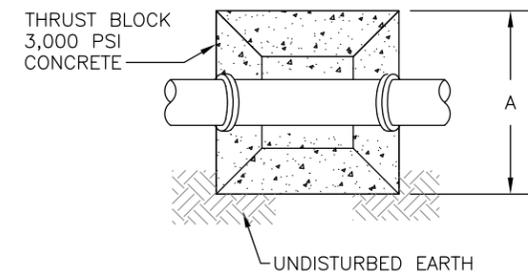
PROVIDE TWO 1" WEEP HOLE DRAINS EACH SIDE OF THE CARRIER PIPE IN DOWNHILL END WALL.

CARRIER PIPE	CASING PIPE SIZE AND WALL THICKNESS
10"	16" X 0.250"
15"	24" X 0.250"

**CASING**



**PLAN**



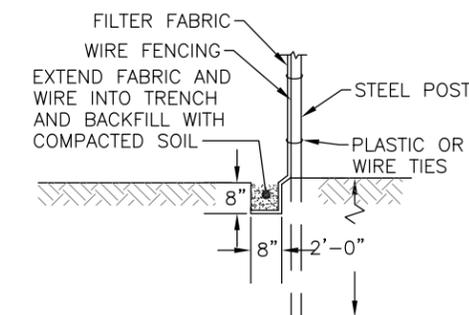
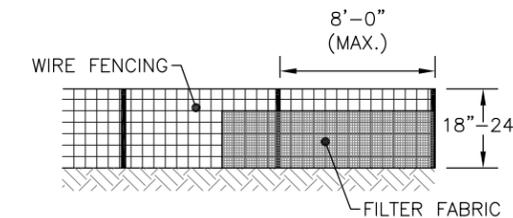
**ELEVATION**

DIMENSION "A"	
11.25' BEND	1'-6"
90' BEND	3'-6"

**NOTES:**

1. ALL FACES OF THE BLOCK SHALL REST AGAINST UNDISTURBED SOIL.
2. PIPE JOINTS ARE NOT TO BE ENCASED IN CONCRETE.
3. THRUST BLOCKS REQUIRED AT ALL BENDS & TEES.
4. DIMENSIONS BASED ON 150 PSI TEST PRESSURE 1,000 PSF BEARING CAPACITY. LARGER SIZES MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER.

**THRUST BLOCK**

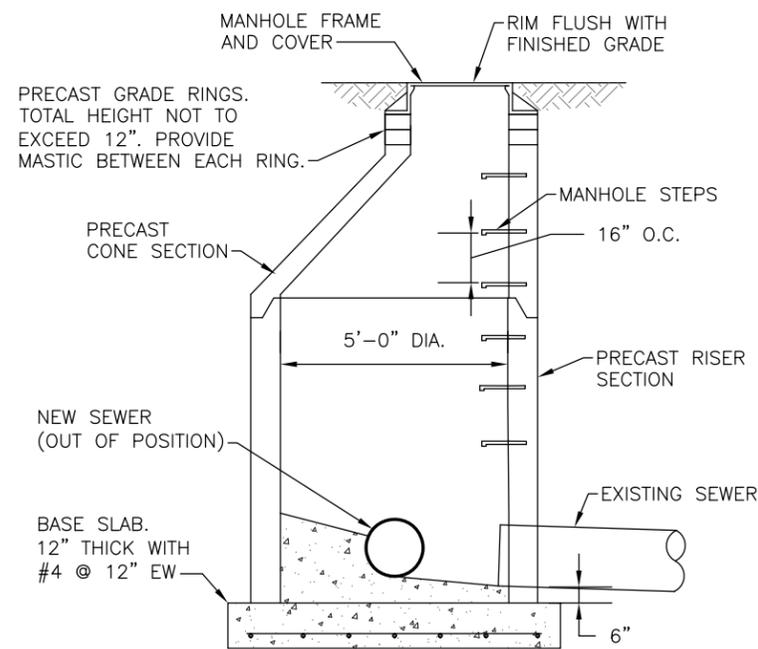


**NOTE:**

INSPECT SILT FENCE WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL. REMOVE SEDIMENT DEPOSITS TO REDUCE PRESSURE ON THE FENCE. ANY DAMAGED FABRIC SHALL BE REPAIRED OR REPLACED IMMEDIATELY AS REQUIRED.

**SILT CHECK FENCE**

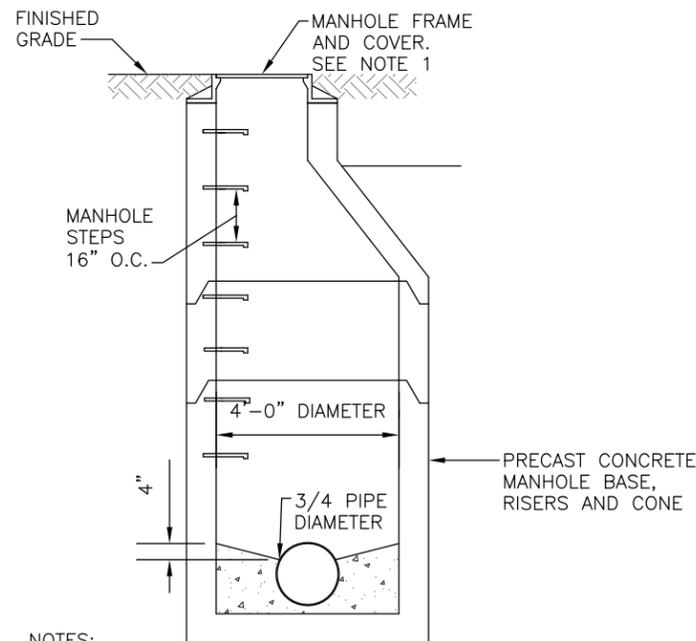
SILT CHECK FENCE SHALL CONFORM TO EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL DETAIL 6.62



**DOGHOUSE MANHOLE CONSTRUCTION SEQUENCE:**

1. VERIFY ELEVATION OF EXISTING SEWER PRIOR TO CONSTRUCTION.
2. POUR CONCRETE BASE SLAB AND INVERT.
3. CONSTRUCT PRECAST MANHOLE.
4. UPON APPROVAL OF OWNER AND ENGINEER, SAW CUT EXISTING SEWER AND GROUT NEW INVERT TO PROVIDE SMOOTH TRANSITION INTO NEW SEWER.

**DOGHOUSE MANHOLE**



**NOTES:**

1. ALL MANHOLE FRAMES SHALL BE BOLTED TO CONE SECTION WITH 3/4" STAINLESS STEEL WEDGE ANCHOR BOLTS.
2. RIM ELEVATIONS SHALL BE FLUSH WITH FINISHED GRADE.
3. ALL MANHOLES SHALL BE APPLIED WITH AN INTERIOR PROTECTIVE COATING.

**TYPICAL MANHOLE**

27 OCT 2022



*James C. Stowe*

IN CHARGE JCS  
DESIGNED JCS  
MADE BY AMA  
CHECKED GJW

NO SCALE



CITY OF LAURINBURG  
McCOLL ROAD SEWER

DETAILS

1973.047  
02.DWG  
OCTOBER 2022